



I.M.A.G.S.B. NEWS BULLETIN

Estd. On 2-3-1945

GUJARAT MEDICAL JOURNAL

INDIAN MEDICAL ASSOCIATION, GUJARAT STATE BRANCH

Office : A.M.A. House, 2nd Floor, Opp. H. K. College, Ashram Road, Ahmedabad-380 009.

Fax / Phone : (079) 2658 73 70 E-mail : imagsb@youtele.com, gujaratmedicaljournal@gmail.com

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**STATE PRESIDENT
AND
HON. STATE SECRETARY'S
MESSAGE**



Dear Members,

Till you get this issue in your hands, most of the exams of 10th and 12th going students might be complete. Many other school and college exams would be about to start or might have already been started.

But the issue is not of such exams only. In life, we all have to come across and face such situations day in and day out. Recently, our fraternity has faced one more bad incidence at KANPUR medical college, where one of the political leader and their people made assault on medical personnel. Not only that, also made huge damage and filed cases against them and get them imprisoned thru their political influence. And there we have shown our unity under our able and strong leadership of DR JITUBHAI B. PATEL and other national leaders. They went there in no time. Made sittings with all concerned people and sorted out the issue in favour of our fraternity. Thats the exam and we passed out with flying colours.

One such incident has happened in DEESA too during same period where our local leaders and members have collectively represented and sorted out the issue in legal way. Congratulations to all of them.

Once again Govt Of India has appointed IMA as nodal body thru which, Department of Health and we have been bestowed upon the responsibility of RNTCP PROJECT. Under which, we are working with Govt to eradicate Tuberculosis. At this juncture, it is my sincere request to all our members to participate actively in this project. All of us can surely support without hampering our own routine too much. But we feel that its our responsibility towards community and we all must fulfil it. That is also a kind of exam for all of us where we should really work hard and fulfil the expectations from our fraternity by society & Govt.

When I am talking about all these, don't forget our own GUJARAT's National president's appeal to work ongoingly on those 6 points thru which we are going to make our fraternity much more solid and respectable. I invite once again to interested and efficient members to be my partner in preparation of this bulletin. Come out with your own suggestions, ideas, feedbacks, new columns, write ups, non scientific topics which you feel interesting for all. No need to think too much. Just share what you have with our own people. No need to hold a post to have your views and write ups.

ISN'T IT A CHANGE?

In this issue you will find that the editors have taken care to choose articles on various topics, We are sure, which will provide useful information and help everybody in updating their knowledge. We also congratulate our contributors for sending us such useful research work which helps in building the image of GMJ.

Wishing you all happy summer. Take some responsibility. Enjoy the life the way it is or make it the way you wish. CHANGE IT, OR, GET CHANGED. See you next month.

Always with you,

DR. BIPIN M. PATEL
President, IMA GSB.

DR. JITENDRA N. PATEL
Hon State Secretary, IMA GSB.

FROM THE DESK OF EDITORS



Dear friends,

While putting this issue of Gujarat Medical Journal in your hands in this year, we regret that, the issue that was to be published in February, is being published a month late. Because of some dispute, still continued with the postal department, the delay took place this time also. We hope, we shall be able to publish the next issue of GMJ, as per the schedule, in July 2014. We hope you all will bear with us.

GMJ is an INDEXED JOURNAL. For last few years, indeed, we get more research articles for publication which has forced us to increase the number of pages so that we can accommodate more number of articles. But this increases financial burden on the journal. Moreover cost of papers and printing along with labor charges has increased many fold in last few years resulting in heavy financial burden.

Without making any compromise in our laid down standards and policy, it has always remained our effort to make GMJ more informative, more interesting and more popular so that large number of our colleagues read it and utilize the knowledge and information provided in it. For this, we welcome your suggestions and comments also. In this issue also you will find original articles, research studies and also case study on variety of subjects, which you will find very interesting.

As many medical colleges are set up in our state, many new doctors are coming out to serve the country and the society. At the same time a demand for new academic minded medical teachers is also increasing. Also our hospitals, at the government and private level, are becoming world class, as far as equipments and expertise are concerned. That pushes the medical tourism in Gujarat far ahead.

Surveys carried out by many agencies revealed that, Gujarat is the most favored state for medical treatment in African and European countries. Gujarat is marching to become the hub for medical tourism. People from developed and underdeveloped countries come here for treatment and we provide them world best treatment at a cheaper rates than that is available in developed countries. Also we get large number of patients from our own domestic population and this provides ample of opportunities for our colleagues working in hospitals, medical colleges and research institutes for research. GMJ provides them a platform.

Our sincere thanks to GSB president Dr. Bipin Patel and hon. secretary Dr. Jitendra N. Patel for encouragement and suggestions. We are grateful to Dr. Kirtibhai Patel and Dr. Mahendrabhai Desai for their guidance and help. Our particular thanks to GMJ ex. editor Dr. Amitbhai Shah for all sorts of help and guidance that he has provided us time to time

Promising you the best reading,

With regards,

DR. K. R. SANGHAVI
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Anaesthesia For Laser Surgery Of Larynx**Shruti M. Shah, Manisha S. Kapadi, Darshna R. Shah, Heena R. Gajjar, Priyan Shah, Bhargav G. Buha.**

Smt. N. H. L. Medical College, V. S. Hospital, Ahmedabad.

KEY WORDS : CO₂ laser in laryngeal laser surgery, Safe anaesthesia**ABSTRACT :**

Laser surgery offers several advantages to the surgeon and patient; i.e. microscopic precision, a bloodless operative field & complete sterility. We have reviewed selected aspects of anaesthetic management of patients undergoing CO₂ laser surgery of larynx & outlined the principles of laser technology. We also emphasized on currently available measures to prevent problems of laser surgery. We studied 60 patients of ASA Grade I to III posted for elective laryngeal laser surgeries to study the outcome of our anaesthetic management.

INTRODUCTION

With rapid advancement in ENT laser surgery there are new challenges to the surgeons and anaesthesiologist. It consists of package of some benefits and some problems. Anaesthesiologists and Surgeons are working in the same anatomic field and share the airway which is already compromised by the disease. Margin of safety is reduced. Close co-operation and communication between anaesthesiologist and surgeon is of paramount importance.

Airway fire is the major hazard.

Role of anaesthetist :

- Maintain Oxygenation
- Allow removal of CO₂
- Keep patient anaesthetised
- Reduce incidence of airway fire by special approaches
- To deal with crisis
- Reduce post operative complications

Anaesthesia Management :**Pre-operative Consideration :**

We have studied 60 patients between 5 years to 60 years of age group. A pre-operative visit to determine the degree of existing airway obstruction is mandatory. Patients are being evaluated for hoarseness, stridor and haemoptysis.

Following laryngeal surgeries were included in our study:-

- laryngeal papilloma exision - 16,
- vocal cord nodule/cyst removal - 9,
- postcorrosive tracheal stenosis - 15,

- posttrauma tracheal stenosis – 10,
- obstructing tumour - 7,
- vocal cord dysfunction - 3.

A meticulous preoperative history, physical examination with particular attention to potential airway problems must precede any decision regarding the anaesthetic plan. Many patients have undergone IDL by surgeon & discussing the findings & plans with surgeon preoperatively are important.

The most important point is that whether the patient will be easy to ventilate with a face mask & easy to intubate with direct laryngoscopy. If either is in doubt, the patient's airway should be secured prior to induction by using alternative technique such as use of fiberoptic bronchoscope or tracheostomy under Local Anaesthesia. All the patients were given anaesthesia as follows.

PREMEDICATION: Inj. Glycopyrolate 0.004mg/kg i.v. Inj. Fentanyl 1µg/kg i.v. Inj. Ondansetron 0.08mg/kg i.v.

Anaesthesia goals include profound muscle paralysis to provide masseter muscle relaxation for introduction of scope, immobile surgical field, adequate oxygenation, ventilation and cardiovascular stability during period of surgical stimulation. Profound relaxation is required until the end of surgery and rapid recovery is essential.

INDUCTION: Monitors were applied and vitals, SPO₂, ETCO₂ were monitored. Preoxygenation with 100% O₂ for 3 minutes. Inj. Dexamethasone 150µg/kg. Inj. Propofol 1.5mg/kg, Inj. Lignocaine 1.5mg/kg, Inj. Suxamethonium 2mg/kg

INTUBATION: Intubation was done with special tube (Mallinckrodt tube in adults and Wrapped tube in

Correspondence Address : Dr Heena GajjarSmt. N. H. L. Medical College, V. S. Hospital,
Paldi, Ellisbridge, Ahmedabad-380007.

Paediatric patients) or ventilation with wrapped tracheostomy tube was done. Cuff was inflated with saline and methylene blue.

MAINTENANCE: Controlled ventilation was done with air using silicon ambu bag with long extension. Intraoperative muscle relaxation with Atracurium/vecuronium. We used Inj. Propofol 8mg/kg/hour and Inj. Fentanyl 0.5µg/kg/hour as TIVA.

REVERSAL: Inj. Glycopyroplate 0.008 mg/kg. + Inj. Neostigmine 0.05 mg/kg. After extubation patients were observed for any complication like laryngeal edema and laryngeal spasm.

POSTOPERATIVE ANALGESIA: Inj. Diclofenac 1mg/kg i.v. slowly.

PER/POST-OPERATIVE COMPLICATIONS:

- In one patient (1.6%) very little portion of aluminium foil covering the endotracheal tube got damaged due to heat. It was brought to notice by operating surgeon and we changed the tube.
- One of the patient (1.6%) complained of difficulty in breathing after extubation. On examination we diagnosed laryngeal edema and treated accordingly. Patient recovered fully.

DISCUSSION

OXYGENATION AND VENTILATION

Several methods have been successfully used to provide oxygenation and ventilation during endoscopy. The best approach is to have several alternatives available at the time of induction of anaesthesia. For adult patients, wrapped tubes, metal tubes and jet ventilation should be on hand. Each method has its own sets of problems and benefits. Most commonly the patient is intubated with small diameter endotracheal tube through which positive pressure is administered. Advantages of this is, smooth maintenance of airway throughout surgery. Disadvantage is small size which increase airway resistance and it obstructs surgical field.

TIVA(TOTAL INTRAVENOUS ANAESTHESIA)

Propofol is a short acting induction agent. It is associated with rapid emergence of anaesthesia and hence it is agent of choice for TIVA. Fentanyl which is a strong analgesic is combined with it. It also deepens the plane of anaesthesia. Combination of this provide minimal intra and post operative complications by maintaining adequate depth of anaesthesia and wide awake patients. Disadvantage of TIVA are difficulty in assessing the depth of anaesthesia.

AIRWAY FIRE AND EXPLOSION

Airway fire and explosion is the major risk factor for laryngeal laser surgery.

Incidence - 0.5% to 1.5%.

It is caused by

- Direct laser illumination,
- Reflected laser light.

Airway fire causes

- Thermal burns,
- Chemical response to burns.

Approaches to reduce incidence of airway fire

- 1) Reducing flammability of ETT
 - Special tubes those are laser resistant.
 - Wrapping standard tubes.
 - Cuff of ETT has to be inflated with saline+methylene blue
- 2) Using different modes of ventilation
 - Intermittent Extubation
 - Venturi Jet Ventilation,
Jet ventilation: (HFJV) there are different method of delivering HFJV
 - o Trastracheal HFLV
 - o Subglottic/Traslaryngeal HFJV
 - o Supraglottic superimposed HFJV
 - ◆ Advantages: No obstacle to surgical field, Adequate ventilation
 - ◆ Disadvantages: Surgical emphysema, barotrauma, pneumothorax, hypoxemia, hypercarbia, abdominal distension, compliant lung is required
 - ◆ Contraindication: Patient requiring ETT <2.5mm
- 3) $FiO_2 < 30\%$, Avoid N_2O and volatile anaesthetics
- 4) Use of TIVA

Special Tubes:

These tubes are laser resistant, bulky and stiffer.

Disadvantages :

- ✓ Trauma to mucosa
- ✓ Reflect laser beam
- ✓ No protection of cuff

Laser Resistant Tracheal Tubes

A. THE NORTON TUBE :

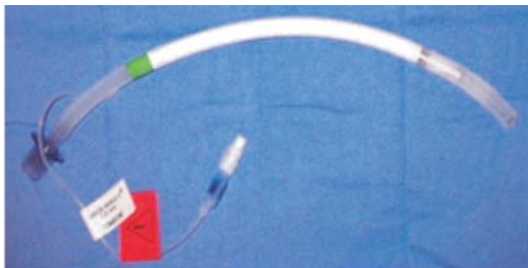
- Reusable
- Stainless steel
- Flexible tube
- No cuff

B. THE LASER FLEX TUBE (MALLINCKRODT LASER TUBE) :



- Airtight stainless steel tube
- Flexible
- Uncuffed or with two cuffs

C. THE LASER-SHIELD II(XOMED-LASER SHIELD II TUBE) :



- Silicon tube
- Inner aluminum wrap
- Outer Teflon coating

D. THE BIVONA FOME-CUFF LASER TUBE:



- Designed to solve the perforated cuff deflation problem
- It consists of an aluminum wrapped silicon tube with unique self inflating foam sponge filled cuff which prevent deflation after puncture.

Wrapped standard tubes



- Standard tracheal tubes (rubber, silicon and PVC)
- Wrapped with laser resistant material (except cuff)
- Wrapped material may be
 - Aluminum or copper foil tape with adhesive back.
 - Merocel laser guard (merocel wrap).
- Method of wrapping:
 - Paint the tube with medical adhesive such as benzoin.
 - Cut the end of the tube with scalpel to approximately 60 degree.
 - Start wrapping from junction of tube and proximal end of cuff
 - Wrapping in spiral with 30% to 50% overlap layer
 - It includes inflation tube of the cuff
- Disadvantages
 - No cuff protection
 - Add thickness to tube
 - Airway obstruction
 - Rough edges may cause damage to mucosal surface.

Airway fire protocol

- 1) Communication and recognition.
- 2) Stop ventilation, remove ETT and disconnect breathing circuit from anaesthesia machine.
- 3) Flood the airway with saline.(if flame not controlled)
- 4) Ventilate the patient with 100% O₂ via face mask.
- 5) Assess the damage:

- ◆ Rigid Brochoscopy – remove debris and fragmented mucosa
 - ◆ Examine the patient's face and oropharynx
 - ◆ Direct laryngoscopy.
- 6) Monitor the patient with pulse oximetry, serial ABGA and chest X-ray.
 - 7) Reintubate the patient or perform tracheostomy as needed.
 - 8) Use ventilator support, steroid and antibiotic as needed.

REFERENCE

SAFETY MEASURES

- Warning signs outside OT
- Eye protection :
 - For the patient: eye should be taped closed and covered with opaque saline swabs or metal shield.
 - For the working personals: wear safety goggles or lens specific for the laser wave length in use
- For laser plume:
 - Use efficient smoke evacuator mask.
 - Use special high efficiency mask.
- Instruments: matt finish to avoid reflection.
- Mucous membrane and teeth adjacent to operative field should be covered with saline soaked gauze.
- Surgical drapes made of flame resistant or waterproof material.
- Preventive measures against fire and explosion must be ready. eg. CO₂ fire extinguisher, bucket of water.

SUMMARY

Smooth and safe general anaesthesia in compromised airway with abnormal anatomy, sharing of airway with surgeon, avoidance of potential laser hazards, prevention of awareness, wide awake patient after surgery with least postoperative complication are main challenges for anaesthesia for laryngeal laser surgery.

With use of safety measures and special techniques for anaesthesia, the problems of laryngeal laser surgery are minimized.

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REVIEW ARTICLE

Fetus in fetu- in a 5 days old male new born baby presented with right lumber region mass- a case study and reviewof literature.

Mukesh Pancholi*, Praveen Sharma*, Gulab Patel**

*Associate Professor, ***Professor and Head Department of General Surgery) Government Medical College, Surat.

KEY WORDS : Fetus in fetu, newborn, teratoma

ABSTRACT :

Introduction: Fetus in fetu (FIF) is a rare developmental abnormality in which a mass of tissue resembling a fetus forms inside the body.

Case study: This report presents a case of "fetus in fetu" located in the right retroperitoneal area in a 5 days old male newborn baby presented with right lumber mass. It was diagnosed preoperatively by CT scan and operated upon with exploratory laparotomy.

Discussion: "Fetus in fetu" is estimated to occur in 1 in 500,000 live births. This rare congenital anomaly, which was reported more than 100 times since its first definition in the eighteenth century. There are two main theories about the development of fetus in fetu; one is Teratoma theory and another is parasitic twin theory.

Conclusion: FIF is a rare condition and it is not always possible to diagnose preoperatively, also carries possibility of benign teratoma to malignant teratocarcinoma.

INTRODUCTION

Fetus in fetu (or foetus in foetu) is a rare developmental abnormality in which a mass of tissue resembling a fetus forms inside the body. The FIF complex is characteristically composed of a fibrous membrane (equivalent to the chorioamniotic complex) that contains some fluids (equivalent to the amniotic fluid) and a fetus suspended by a cord or pedicle¹. There are two theories of origin concerning "fetus in fetu". One theory is that the mass begins as a normal fetus but becomes enveloped inside its twin; the other theory is that the mass is a highly developed teratoma².

Case report

A 5-day-old male newborn baby of 26-year-old primigravida mother, delivered at the thirty six weeks by normal delivery, was referred to our department with a prediagnosis of abdominal mass. Upon physical examination, a mass with a size of nearly 10 × 7 × 5 cm was detected at the right lumber region of the abdomen. The computerized abdominal tomography showed a multilobed heterogeneous mass lesion with a size of 10 × 7 × 5 cm in the right retroperitoneal area [Fig. I].

During the operation, a mass with a size of 10 × 7 × 5 cm was found at the right retroperitoneal area. The right ureter and inferior vena cava were arching over anterior

surface of mass. The mass was totally removed, including its capsule. Upon the incision of the capsule, we found a fetus like structure measuring 7 × 4 × 2 cm, attached with a placenta like structure by an umbilical cord like structure along with nearly 150 cc of serohemorrhagic fluid [Figure II]. The mass was having a vertebra like structure and bony structures like pelvis. Pathological studies revealed, grossly on cut section of fetus like structure, cystic, calcific and yellowish areas; Microscopically the sections from fetus like structure showed ectodermally derived structures such as keratinized squamous epithelium, skin adnexa, neural tissue, mesodermally derived structures such as adipose tissue, myxoid areas, cartilage and bone tissue with areas of calcification. Placenta like structure showed structure like fetal membrane and cord like structure showed two vessels. The gross and microscopic features are of Mature Teratoma (Fetus in fetu). Post-operatively the child was under paediatric intensive care and the course was uneventful.

Discussion and review of literature

"Fetus in fetu" is estimated to occur in 1 in 500,000 live births. The anomaly was first defined in early eighteenth century by Johann Friedrich Meckel. An early example of the phenomenon was reported in 1808 by George William Young³. Despite its prevalence among infants and children, there have been reports of cases in which the

Correspondence Address : Dr Mukesh Pancholi

A/14, Professor Quarter, Govt. Medical College, Majuragate, Surat-395 001 (Gujarat), India.
E-mail- dr_mpancholi@yahoo.co.in



Fig. I – CT scan picture showing a multilobed heterogenous mass lesion in the right retroperitoneal area.

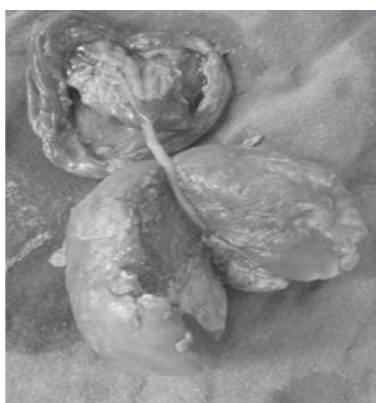


Fig. II – Operative specimen of Fetus in fetu attached with placenta and umbilical cord like structures.

anomaly had remained asymptomatic until later ages. The literature rarely describes multiple or twin FIF. The majority of cases of FIF occur during infancy, with the oldest reported case being that of a 47-year-old man⁴. Thakral et al. reported that FIF occurs equally among the male and female populations⁵. This rare congenital anomaly which was reported more than 100 times since its first definition in the eighteenth century has been discussed with respect to its prognosis and treatment in the light of the relevant literature. Fetus in fetu most frequently (80%) inhabits the retroperitoneal region. However, there have been few reports of FIF location in the head, sacrum, scrotum and the mouth. Despite the requirement of the presence of a vertebral column for diagnosis, there are reports of the cases without a vertebral column⁶. The presence of a vertebral column in the FIF is an important feature that distinguishes it from a teratoma. The clear identification of a vertebral column shows that fetal development of the included twin had advanced at least beyond the primitive streak stage (12 to 15 days of gestation) to a notochord, which is the precursor of the vertebral column^{4, 5, 7, 8}. FIF generally occurs singly. Multiple masses have been found in only a

few instances. Daga et al reported double fetus in fetu in an adult³.

The pre-operative diagnosis of FIF depends on its related radiological findings. Plain abdominal X-ray examination may prove helpful, as up to half of reported cases show the presence of a vertebral column and axial skeleton. Meanwhile, Hoeffel et al. discussed the inability of radiographic examination to visualize the vertebral axis of the FIF⁴. This inability to visualize the vertebral axis when a patient is examined through a CT scan, however, should not lead to diagnostic exclusion because an under-developed and markedly dysplastic spinal column may have prevented identification of the pathology at imaging. Sonographic findings are usually those of a complex cystic mass with ill-defined solid internal components. Imaging continues to play an important role in diagnosing FIF. CT and MRI have been proven to be very helpful in suggesting a pre-operative diagnosis⁹. In our patient, CT has shown a heterogeneous mass lesion with calcified vertebra and pelvic bones, diagnosed preoperatively.

A fetus in fetu can be considered alive, but only in the sense that its component tissues have not yet died or been eliminated. Thus, the life of a fetus in fetu is akin to that of a tumor in that its cells remain viable by way of normal metabolic activity. However, without the gestational conditions in utero with the amnion and placenta, a fetus in fetu can develop into, at best, an especially well differentiated teratoma; or, at worst, a high-grade metastatic teratocarcinoma. In terms of physical maturation, its organs have a working blood supply from the host, but all cases of fetus in fetu present critical defects, such as no functional brain, heart, lungs, gastrointestinal tract, or urinary tract. Accordingly, while a fetus in fetu can share select morphological features with a normal fetus, it has no prospect of any life outside of the host twin. Moreover, it poses clear threats to the life of the host twin on whom its own life depends¹⁰.

Theories of development

There are two main theories about the development of fetus in fetu; one simple, the other complex.

Teratoma theory

Fetus in fetu may be a very highly differentiated form of dermoid cyst, itself a highly differentiated form of mature teratoma¹¹.

Parasitic twin theory

Fetus in fetu may be a parasitic twin fetus growing within its host twin. Very early in a monozygotic twin pregnancy, in which both fetuses share a common placenta, one fetus

wraps around and envelops the other. The enveloped twin becomes a parasite, in that its survival depends on the survival of its host twin, by drawing on the host twin's blood supply. The parasitic twin is anencephalic (without a brain) and lacks some internal organs, and as such is almost always unable to survive on its own. As the normal twin has to "feed" the enveloped twin from the nutrients received over a single umbilical cord, it usually dies before birth¹¹.

Fetus in fetu is considered as a benign condition. Consequently, some researchers have stated that to facilitate the excision, it is possible to leave some sections of the capsule in its place. Nevertheless, in one case, the mass has been reported to recur as a yolk sac tumor after 4 months. This has been attributed to the presence of immature tissues in the small areas and the remnants of the capsule of the mass¹². Although the prognosis for FIF is more favorable than for cystic teratoma, the presence of immature elements nevertheless indicates the need for close clinical, radiological and serological (AFP) follow-up¹². Despite the AFP levels before and after surgery remaining at normal values, a possible recurrence of a malignant teratoma after FIF resection must best be kept in mind. This was the reason why we continued to monitor the serial tumor marker levels of our patient, while also conducting cross-sectional imaging follow-up examinations⁴.

CONCLUSION

FIF is a rare condition and it is not always possible to diagnose preoperatively, also carries possibility of benign teratoma to teratocarcinoma. So, every child presented with progressively growing abdominal mass with inconclusive radiological and biochemical investigations should be explored. The child should be followed up as there are chances of recurrence of a malignant teratoma after FIF resection later.

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ORIGINAL ARTICLE

Microneedling Using Dermaroller A Means Of Collagen Induction Therapy

Pragya A Nair*, Tanu H Arora**

*M.D.Professor, **DVTutor

Department of Dermatology., Pramukhswami Medical College, Karamsad, Gujarat 388120, India.

KEY WORDS : Microneedling, collagen induction therapy, dermaroller, scars

Abstract :

Collagen induction therapy using dermaroller a form of microneedling is gaining popularity for the treatment of scars, wrinkles and stretch marks as it is cheap, effective and lacks the side effects of other modalities for the same.

INTRODUCTION

Microneedling, a form of collagen induction therapy was introduced in 1997 as a new treatment modality using a device called dermaroller. It was used as an indication for scars and wrinkles¹.

Important milestones in its development are

1995-Orentreich and Orentreich described subcision or dermal needling for scars.

1997-Camirand and Doucet described needle dermabrasion using tattoo pistol to treat scars².

2006-Fernandes developed percutaneous collagen induction(PCI) therapy with dermaroller to initiate the natural post traumatic inflammatory cascade by rolling needles vertically, horizontally, and diagonally with pressure over the treated area.

Many therapies like CO₂ laser resurfacing, dermabrasion that offers a significant improvement in facial scars are invariably associated with considerable morbidity and downtime interfering with the daily activities of patients in post treatment period³, while treatment with microdermabrasion and non ablative resurfacing with lasers are associated with the minimal or no downtime, do not show the same level of efficacy⁴. Deep chemical peeling used for the treatment for scars ablate the epidermis with subsequent reepitheliazation, which may render the skin more sensitive to photodamage and dyschromia.

Dermaroller in contrary do not damage the skin or remove the epidermal layer. One single microneedling causes tiny wound in skin and as a result of post traumatic response platelets are

released, which produce a series of growth factors that promotes the body's own production of collagen and elastin. It is a safe alternative for the treatment of post-burn injury, wrinkles, stretch marks and for smoothing of skin without the risk of dyspigmentation or scarring⁵.

INSTRUMENT

It is a simple hand held drum shaped roller consisting of handle with a cylinder studded with 192 fine stainless steel microneedles all around in eight rows 0.5-1.5mm in length and 0.1 mm in diameter. The microneedles are synthesized by reactive ion etching techniques on silicon or medical grade stainless steel.

The quality, hardness and sharpness of needles are important property of good skin needling device. High ratio of tip length vs diameter of 13:1 is an important property of good needles. The depth of neocollagensesis was found to be average 5 – 600 micrometers with 1.5 mm length needle. It is presterilised by gamma irradiation⁶. Medical grade stainless steel makes the needles non- allergenic to human tissue. Re-sterilization of the dermaroller in an autoclave or using ultrasound is prohibited because needles would lose their sharpness and may detach from the roller.

Roller should be kept in isopropyl alcohol all the time.

INDICATION

1. Wrinkles-Wrinkles occurs when the skin loses suppleness and tightness as it ages. It is seen more commonly in areas of skin which are

Correspondence Address : Dr. Pragya A Nair
Pramukhswami Medical College, Karamsad, Gujarat 388120, India.
E-mail address : drpragash2000@yahoo.com

stretched regularly such as around the eyes (crows feet), fore head and mouth. By renewing the production of collagen the skin becomes plumped out, thicker and retains its elasticity.

2. Scars :

- a. Acne scars – Atrophic, boxcar, rolling and pitted scars.

Grade 2 and 3 rolling/box car scars responds better. Good to excellent response is achieved in 88.7% patients studied by Majid⁷, in rolling or boxcar scars and moderate response was seen in pitted scars. Grade 4 scar did not respond as well as Grade 2 and Grade 3. Linear and deep pitted scars also do not respond well which are difficult to treat by laser as well and requires surgical corrections.

- b. Postburn scar

3. Stretchmarks

- 4. Mesotherapy – Microneedling when used to puncture skin will bypass the stratum corneum and create transient aqueous transport pathways of micron dimensions and enhance the transdermal permeability. These microspore are orders of magnitude larger than molecules dimensions and therefore readily permit the transport of hydrophilic macromolecules^{8,9}.

In androgenetic alopecia and alopecia areata, 1 ml of 5% minoxidil is applied and roller is rolled over the scalp. It enhances upto 40 times more absorption of substance compared to topical creams.

- 5. Cellulite-With thickening of skin epidermal layer will become tighter and firmer giving younger and healthier look³.
- 6. Lax skin on arms, abdomen, neck, thighs, areas between breast and buttocks³.
- 7. To tighten skin after liposuction³.

CONTRAINDICATION

- 1. Active acne, herpes labialis.
- 2. Chronic skin disease like eczema and psoriasis
- 3. Blood clotting disorders and patient on any anticoagulant therapy like warfarin, heparin or other oral anticoagulants, as it can cause uncontrolled bleeding.

- 4. Rosacea
- 5. Skin malignancy, Moles or warts and Solar keratosis: as the needles may disseminate abnormal cells by implantation.
- 6. Patients who have not pretreated their skin with vitamin A.
- 7. Patients on Aspirin should discontinue it atleast three days before the treatment.

PATHOPHYSIOLOGY OF COLLAGEN INDUCTION THERAPY

Needles pierce the stratum corneum, create holes without damaging epidermis. Each pass of rolling produce 16 micro punctures/cm². Rolling with dermaroller over an area for 15 times results in approximately 250 holes/cm². Microneedling aims to stimulate collagen production (Figure 1), by producing microwounds and initiating the normal post-inflammatory chemical cascade. There are 3 phases in the bodies wound healing process which follow each other in predictable fashion described¹⁰:

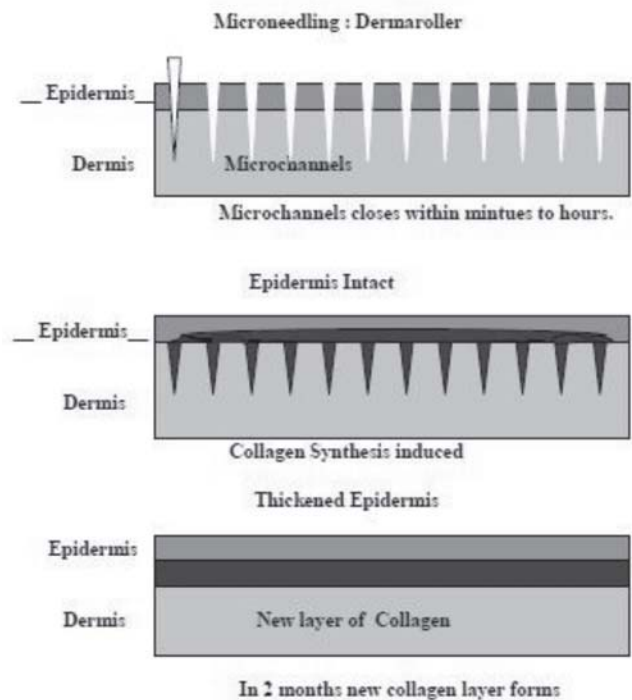


Figure 1. Induction of Collagen by microneedling

- 1. Platelets and neutrophils release growth factors such as, TGFβ, platelet derived growth factor, connective tissue activating protein, connective tissue growth factor which all increase the production of intercellular matrix.
- 2. Monocytes then release growth factor to increase the production of collagen, elastin, glycosaminoglycans. After 5 days of injury – a fibronectin matrix forms with an alignment of

fibroblast that determines the deposition of collagen, which remains for 5 – 7 years and tightens naturally.

3. It also increases gene and protein expression of collagen, glycosamino glycans and growth factors, vascular endothelial growth factor, epidermal growth factor, fibroblast growth factor which are relevant for skin regeneration.

Neovascularization and neocollagenesis following treatment leads to reduction of scars.

HISTOPATHOLOGY

Histopathology shows normal stratum corneum, thickened epidermis and normal rete ridges at one year interval after the treatment in postburns scars¹¹. Skin becomes thicker with greater than 400 % increase in collagen deposition and significantly more elastin³. Collagen fibre bundles qualitatively increases, thickens and more loosely woven in both papillary and reticular dermis. It appears to have laid down in normal lattice pattern than in parallel bundles as in scar tissue¹².

PREOPERATIVE CARE

Patients skin should be prepared preoperatively for atleast 1 month with vitamin A and vitamin C cream twice a day to maximize dermal collagen formation described by Aust⁵.

Vitamin A, is a retinoic acid is an essential vitamin for skin. It expresses its influence on 400-1000 genes that control proliferation and differentiation of all major cells in epidermis and dermis. Vitamin A may control the release of TGFβ3 in preference to TGFβ1 and TGF β2 . Vitamin C, is essential for production of normal collagen.

Percutaneous collagen induction and vitamin A switch on the fibroblast to produce collagen and therefore increases the need for vitamin C.

PROCEDURE

Area to be treated is anesthetised with topical anaesthesia i.e EMLA and covered with cellophane tape for 45 minutes to 1 hour. EMLA removed using normal saline. The skin of face is stretched by one hand while the other is used to roll the instrument over in a direction perpendicular to that of stretching force.

Roller is rolled 15-20 times in horizontal vertical and both oblique directions. In deep seated scar base of the scar is to be treated till pin point bleeding occurs, which should be from the base of scar⁶.

Saline pads are kept over treated area.

Topical antibiotic cream is applied

Whole procedure takes 15-20 minutes

Treatment is to be repeated after 4-6 weeks.

POSTOPERATIVE CARE

Treated area is swollen and superficially bruised. To absorb the bleeding and serous discharge, it should be covered with cool, damp swabs that are replaced for 2 hours.

Topical antibiotic cream (mupirocin) is applied for few days to minimize the chance of bacterial infection.

Avoid sun exposure & harsh chemicals or any cosmetic procedure over the face for atleast for one week.

SIDE EFFECTS OR RISKS

They are almost negligible

1. Pain.
2. Reactivation of herpes simplex.
3. Impetigo.
4. Allergic contact dermatitis to the material used in needles.
5. Exposure to blood.
6. Poor quality needles of the roller device often result in bending at needle tips after repeated treatments, which results in more tissue damages and haemorrhage with linear hypertrophic scars or post inflammatory hyperpigmentation. Over aggressive needling may also cause scarring using a tattoo gun but not with special barrel of needles.

ADVANTAGES

1. It has a short healing time.
2. It can be used in any type of skin and on all area of body where lasers and deep peels cannot be performed
3. It is a convenient office procedure and cost effective than other alternative therapy
4. Well tolerated and accepted by patients.
5. No risk of post-inflammatory hyperpigmentation

Interleukin10 was increased after PCI therapy while expression of MC1R (Melanocortin I receptor) gene coding for a melanocyte stimulating hormones indicates a faint down regulation upto 2 weeks post operatively, therefore in opposite to dermabrasion, PCI therapy appear to have lower risk of dyspigmentation^{5,13}.

6. Microneedling can be combined with other acne scar treatment like subcision, chemical peeling, microdermabrasion and fractional resurfacing giving maximum benefits. Combination with glycolic acid peels showed improvement in skin texture and post acne pigmentation in moderately deep scar of grade 2 and grade 3¹⁴.

7. It does not damage the skin histology, rather epidermis may show more dermal papillae.
8. Technique is easy to master.
9. Can be done on people who have had laser resurfacing or have very thin skin.

OTHER TYPES OF DERMAROLLER

1. DERMASTAMP – It is a miniature version of dermaroller. Needles are 2mm in length with a diameter of only 0.1mm. They are used for localised scars eg.post herpetic scars, varicella scars, post traumatic scars.
2. HOME CARE DERMAROLLERS – They are less than 0.15 mm in length .Mainly used for transdermal delivery of substances like lipopeptides and other antiageing products.
3. AUTOMATED ROLLERS – They are battery driven with disposable heads, can be used in more than one patient as disposable heads needs only to be changed. Pressure applied on scars here are uniform.
4. Scalp roller: It uses titanium needles unlike steel needles used in other rollers, used to treat thinning hair.

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ORIGINAL ARTICLE

A comparative study of two tocolytic agents for inhibition of preterm labour

Vaja Pradyuman* Goyal Mekhla **

*Head of Department, **Senior Resident

ESIC Model Hospital, Bapunagar, Ahmedabad 380024

KEY WORDS : tocolysis, isoxsuprine hydrochloride, terbutaline sulfate

ABSTRACT

Preterm birth means birth of a baby before 37 completed weeks of gestation. It is the top most cause of neonatal deaths. These babies are at a greater risk for short term and long term complications. Terbutaline sulphate and Isoxsuprine hydrochloride both have been used as tocolytic drugs for suppression of preterm labour. Studies have shown both these drugs to be effective.

Objective : Our study compares the relative efficacy and safety of both of these drugs in relation to each other.

Method : This is a study of 60 women conducted at Model Hospital Bapunagar, Ahmedabad. Each of these women having preterm labour was randomly given tocolytics according to our selection criteria. Comparison between the effects of these two drugs in terms of prolongation of labour, fetal and maternal side effects was evaluated.

Results : In our study, oral terbutaline sulfate prolonged pregnancy in 90 % of women by > 42 days, intravenous terbutaline sulfate prolonged pregnancy by >42 days in 80% of women. Oral isoxsuprine hydrochloride prolonged pregnancy by > 42 days in 50% women and intravenous route prolonged pregnancy by > 42 days in 25 % women. Regarding the discontinuation of the drugs due to side effects in mother or the fetus, there was a statistically significant difference between isoxsuprine hydrochloride and terbutaline sulfate ($p < 0.05$). Isoxsuprine hydrochloride was discontinued in more number of patients than Terbutaline sulfate.

Conclusion : Thus Terbutaline sulfate was found to be more efficacious in prolonging pregnancy with less maternal and fetal side effects as compared to Isoxsuprine hydrochloride.

INTRODUCTION

A healthy baby is the dream of every mother and an obstetrician plays a very vital role in fulfilling it.

James Elgin Gill (born on 20 May 1987 in Ottawa, Canada) was the earliest premature baby in the world. ⁽¹⁾ He was 128 days premature (21 weeks and 5 days gestation) and weighed 624. Preterm labour is defined as the Onset of labour with intact membranes before 37 weeks. The incidence is about 5-10%. The topic holds its importance because preterm is an important cause of neonatal morbidity & mortality and has been reported to cause up to 85% of early neonatal deaths. Significant progress has been made in the care of premature infants, but not in reducing the prevalence of preterm birth. ⁽²⁾ The etiology of preterm is multifactorial. Four different pathways have been identified that can result in preterm birth and have considerable evidence: premature fetal endocrine activation, uterine overdistension, decidual bleeding, and intrauterine inflammation/infection. From a practical point a number of factors have been identified that are associated with preterm labour :

- Incompetency of cervix
- Multiple pregnancy

- Abnormality of uterus
- Chorioamnionitis, infection outside uterus
- Placental abnormalities like abruption placenta, circumvallate placenta.

Though many pharmacological drugs are available to supplement the treatment in preterm labour, there is still a debate as to which of these drugs is the best. In literature it is mentioned that as NICU care has improved over the last decade, viability has reduced to approximately 30 weeks in the Indian setup. Though tocolytics may not help in prolonging pregnancy to such an extent that fetus may grow and mature further, it may defer delivery sufficiently to allow the mother to be brought to a specialized center that is equipped and staffed to handle preterm deliveries. ⁽³⁾ Also it helps in providing time for steroids to act so as to reduce neonatal complications like intraventricular hemorrhage, necrotizing enterocolitis and hyaline membrane disease. ⁽⁴⁾⁽⁵⁾

Today many tocolytics are available in the market such as Beta2-agonist drugs (isoxsuprine hydrochloride, terbutaline sulfate, ritodrine hydrochloride), calcium-channel blockers (Nifedipine) and oxytocin antagonists (Atosiban). Ritodrine hydrochloride is a [beta]-

Correspondence Address : Pradyuman Vaja
ESIC Model Hospital, Bapunagar, Ahmedabad.

sympathomimetic agent with predominant effects upon beta2 receptors of the uterus. ⁽⁶⁾⁽⁷⁾⁽⁸⁾

Terbutaline sulfate is a drug having predominantly beta adrenergic effect. It is given orally as 2.5 or 5 mg pills at 3-4- or 6-hour intervals or by subcutaneous injection of terbutaline sulfate. It is also available as a continuous infusion pump. ⁽⁹⁾ It relaxes uterine muscles. Isoxsuprine is beta adrenergic agent having effect on both beta 1 and beta 2 receptors. It produces peripheral Vasodilatation by a direct effect on vascular smooth muscle, primarily within skeletal muscle with little effect on cutaneous blood flow and uterine relaxation through its beta adrenergic action. The most common side effects of both these drugs are headache, dizziness, insomnia, restlessness, sweating, nausea, vomiting, increased blood sugar, irregular heart rhythm, low calcium or potassium, hypotension, fetal tachycardia, fetal hypoglycemia, neonatal seizures etc ⁽¹⁰⁾ Through this study we made an attempt to identify the better drug out of isoxsuprine hydrochloride and terbutaline sulfate which can prolong the pregnancy causing minimal maternal and fetal complication.

MATERIALS AND METHODS

In this study 60 women of preterm labour were enrolled. The selection criteria of enrolling women for oral or intravenous regime of tocolytic drugs were made. Informed consent of all women was taken. Their detailed history was taken. Physical examination and ultrasonic confirmation of gestation age of fetus was done. Those with multiple pregnancy, ruptured Membranes, abruptio placenta, fetal distress, and a known medical disorder contraindicating the use of tocolytic drugs were excluded. Drugs aimed to treat preterm labour were administered to these women. Each woman was investigated for hemoglobin estimation, albuminuria, glycosuria, bacterimia, blood group estimation, and random blood sugar.

Electrolytes and total and differential leukocyte count were estimated. High vaginal swabs were taken. Their follow up was done till delivery. A special note of any maternal or fetal complications was made. For all of these women, appropriate intrapartum and postpartum care were given to mother as well as the baby. Thereafter comparison of each drug in relation to maternal and fetal side effects and prolongation of pregnancy was done.

CRITERIA FOR SELECTION OF WOMEN AND TOCOLYTIC DRUGS

COMMON CRITERIA:

- Gestation age >28 but <34 weeks
- Intact membranes
- Mother having no medical complications, with normal ultrasonographic findings coinciding with the

weeks of gestation and no obvious fetal malformation.

(A) ORAL REGIME :

- < 3 contraction in 10 minutes
- <= 2 cm dilation confirmed by ultrasound

(B) I.V. REGIME :

- 3 contractions in 10 minutes
- 3-4 cm cervical dilation confirmed by ultrasound

According to this selection criteria, we divided all 60 women into 4 groups. 20 were given intravenous infusion of terbutaline sulfate, 10 were given oral tablet terbutaline sulfate, 20 women were given intravenous isoxsuprine hydrochloride and 10 were given oral tablet isoxsuprine hydrochloride.

The protocol of treatment was :

TERBUTALINE SULFATE : (5 mg tablet and ampoule 1 mg./ml)

Dose : 5 ampoules (5mg) in 500 ml. 5% dextrose (10microgram/ml.)

Method : Start with 5µg/min. Increase every ten minute by 5µg/min till the total dose reaches 15µg/min or side effects appear or contractions disappear. With the disappearance of contraction, same dose is maintained for 12 hours. Then oral 5 mg 4 hourly on first day then 6 hourly.

ISOXSUPRINE HYDROCHLORIDE : (10 mg tablet and ampoule 5mg/ml)

Dose : 10 ampoules in 500 ml dextrose 5 %

Method : Initially 0.1 mg/min till the maximum dose of 0.8 mg/min reached. Increase the drop every 10-15 minutes till the contractions disappear or side effects appear. The same is maintained for 12 hours. Then 10 mg intramuscular 6 hourly for 48 hours followed by 10 mg oral tablet at 6-8 hour interval

OBSERVATION

As shown in table 1, out of 10 women who were given oral Isoxsuprine hydrochloride, 5 women (50%) had pregnancy prolonged by more than 42 days and 2 women (20%) had pregnancy prolonged by 0-7 days. Oral terbutaline sulfate given in 10 women, 9(90%) had pregnancy prolonged by more than 42 days and in 1 (10 %) had pregnancy prolonged by 7-14 days. In all these cervical dilation was less than 2 cm. In the intravascular regime Isoxsuprine hydrochloride given in 20 women, 5(25%) had pregnancy prolonged by more than 42 days and 6 (30%) had pregnancy prolonged by 0-7 days.

TABLE - I
PROLONGATION OF PREGNANCY IN RELATION TO CERVICAL DILATION
(RESULT OF ORAL AND INTRAVENOUS REGIME)

DRUGS	CERVICAL DILATATION	PROLONGATION OF PREGNANCY IN DAYS							MEAN NO. OF DAYS ±SD	
		0-7	8-14	15-21	22-28	29-35	36-42	>42		
ISOXSUPRINE (ORAL)	<2CM, N=10	2 (20%)	1 (10%)	0	2 (20%)	0	0	5 (50%)	28.7±19.6	T value=1.8, P value<0.05
TERBUTALINE (ORAL)	<2 CM, N=10	0	1 (10%)	0	0	0	0	9 (90%)	42±11.1	
ISOXSUPRINE (INTRAVENOUS)	3-4 CM N=20	6 (30%)	2 (10%)	1 (5%)	2 (10%)	4 (20%)	0	5 (25%)	23.1±16.9	T value=3.0, P value<0.05
TERBUTALINE (INTRAVENOUS)	3-4 CM N=20	2 (10%)	1 (5%)	0	1 (5%)	0	0	16 (80%)	38.5±14.9	

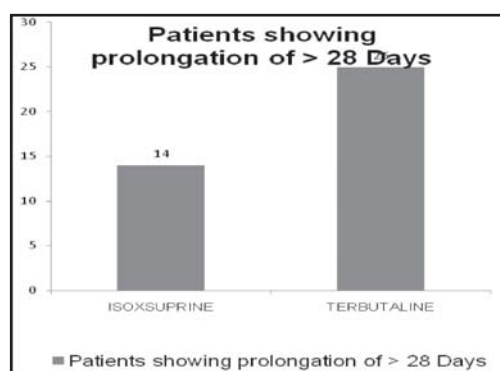
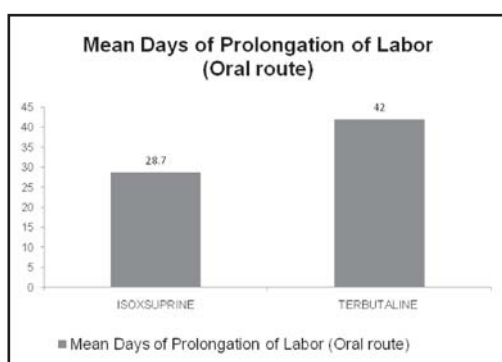
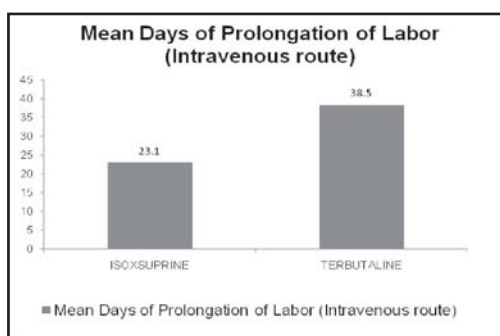


TABLE II
MATERNAL SIDE EFFECTS

SIDE EFFECTS	ISOXSUPRINE TOTAL OCCURENCE	TERBUTALINE TOTAL OCCURENCE	P Value
Hypotension	12(30.8)	4(16.0)	P<0.05
Tachycardia	12(30.8)	6(24)	P<0.05
Uneasiness	6 (15.4)	8 (32.0)	P<0.05
Palpitation	2(5.1)	5 (20.0)	P<0.05
Vomiting	2(5.1)	-----	-----
Headache	3 (7.7)	1 (4.0)	P<0.05
Progress of Labour	2(5.1)	1 (4.0)	P<0.05
	39(100)	25(100)	



Intravenous terbutaline sulfate in 20 patients, 16(80%) had pregnancy prolonged by more than 42 days. 4(20%) had pregnancy prolonged by 0-7 days. In all these patients cervical dilatation was 3-4 cm.

Terbutaline sulfate was found to cause less maternal complications and therefore only 2 (6.6%) women needed discontinuation of treatment, where as Isoxsuprine hydrochloride was stopped in 8 (26.66%) women. Comparing the neonatal outcome, out of 30 women on terbutaline sulfate 3(10%) of newborns had complications. (1 neonatal death and 2 hyperbilirubinemia). Out of 30 women of isoxsuprine hydrochloride 7(23.33%) had complications (3 neonatal death, 2 respiratory distress syndrome, 2 hyperbilirubinemia).

TABLE III
EFFECTIVENESS OF TWO DRUGS IN PROLONGING PREGNANCY USING >28 DAYS FOR COMPARISION

	ISOXSUPRINE	TERBUTALINE	Z Value	P Value
<28 DAYS	16 (53.3%)	5 (16.7%)	3.21	P<0.05
>28 DAYS	14 (46.7%)	25 (83.3%)		

DISCUSSION

In humans, preterm birth refers to the birth of a baby of less than 37 weeks gestational age. The cause for preterm birth is in many situations elusive and unknown; many factors appear to be associated with the development of preterm birth, making the reduction of preterm birth a challenging proposition. . Significant progress has been made in the care of premature infants, but not in reducing the prevalence of preterm birth.

The conclusive highlights of our study are that both drugs are comparatively effective in prolonging gestation. Terbutaline sulfate is the most effective of them. Terbutaline sulfate prolongs the pregnancy by mean 38.5 days and the standard deviation is 38.5+14.9. For Isoxsuprine hydrochloride mean is 23.1 and standard deviation is 23.1+16.93. So it comes to be the less effective than terbutaline sulfate. Cervical status is related to the outcome of treatment. So the earlier the treatment the more effective the drugs are. Tachycardia and hypotension are observed in all the drugs, but mainly are dose dependent and reducing dose is beneficial. These are more common in isoxsuprine hydrochloride than the other two drugs. Therefore careful monitoring of the patient's pulse and blood pressure along with fetal heart rate monitoring is essential for safe and effective means to treat preterm labour. Oral route was also effective as maintenance treatment after infusion is stopped. Our study considers terbutaline sulfate to be the better drug as compared to isoxsuprine hydrochloride.

Therefore when statistical tests were applied, the results were as follows:

For oral regime, there was no statistically significant difference between mean days of pregnancy prolongation when compared to isoxsuprine hydrochloride ($p > 0.05$). Z value for terbutaline sulfate was 1.87.

For intravenous regime, there was statistically significant difference between prolongation of labour between isoxsuprine hydrochloride and terbutaline sulfate. ($p < 0.002$).

As compared to Isoxsuprine hydrochloride, Terbutaline sulfate was more effective for prolongation of labour for > 28 days and this difference was statistically highly significant. ($Z = 3.21, p = 0.001$)

Regarding the discontinuation of drugs, there was statistically significant difference between isoxsuprine hydrochloride and terbutaline sulfate ($p < 0.05$).

Regarding the neonatal outcome, there was no statistical significance between adverse neonatal outcomes regarding both the drugs. ($p = 0.38$)

CONCLUSION

Though there are many studies showing that tocolytics are not useful in long term management of preterm labour. ⁽¹¹⁾⁽¹²⁾ Our study has asserted that further studies on a large number of subjects need to be done to determine the role of tocolytics ⁽¹²⁾ Since they are a much effective way of management of preterm labour and are far much cheaper than the cost incurred in the management of preterm neonate, they definitely should be explored on a larger scale.

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Maggots Debridement Therapy [MDT]

Dr. Shreyas Dholaria*, Dr. Parth Dalal**, Dr. Nina Shah**, Dr. Rajvilas Narkhede*

3rd year Resident in MS General Surgery*, MS General Surgery**

Department of General Surgery, B J Medical College, Civil Hospital, Ahmedabad, India.

KEY WORDS : Maggots Therapy, Maggots debridement therapy

METHOD

Review is prepared by searching the following terms in Google Scholar, Pubmed, Pubmed central and exploring the other related articles. The terms were 'Maggots therapy', 'Maggots debridement therapy', 'larval therapy'.

INTRODUCTION

Maggot therapy is also known as maggot debridement therapy (MDT), larval therapy, larva therapy, larvae therapy, bio-debridement or bio-surgery. It is a type of biotherapy in which live, disinfected maggots (fly larvae) were placed into the non-healing skin and soft tissue wound(s) of humans or animals to clean out the necrotic (dead) tissue within a wound (debridement) and to disinfect the same. Maggot debridement therapy (MDT) was first introduced in the US in 1931 and was routinely used there until mid-1940s in over 300 hospitals. With the advent of antibiotics, maggot therapy became rare until the early 1990s, when it was re-introduced first in US [1]. It was seen by Army physicians that soldiers whose wounds were colonized with maggots had less morbidity and mortality than soldiers without having maggots in wounds. They also observed that soldier with fracture of femur and bad lacerated wound over abdomen and scrotum showed no signs of septicemia due to presence of maggots despite the severe injury. [2]

BIOLOGY OF FLIES AND MAGGOTS

Those flies whose larvae feed on dead animals will sometimes lay their eggs on the dead parts (necrotic or gangrenous tissue) of living animals. The maggots infesting live animals, is called "myiasis" [3]. Some of those maggots will feed only on dead tissue, some only on live tissue, and some on live and dead tissue. The flies used most often for the purpose of maggot therapy are "blow flies" (Calliphoridae); and the species used most commonly is *Phaenicia [lucilia] sericata*, "the green blow fly". [4] [5]

Adult female *Phaenicia* lays a large number of eggs (2000–3000) over the course of a few weeks. The eggs are laid in clusters directly onto the chosen food source, upon which the emerging larvae will feed. Eggs hatch within 18–24 h into first larvae, ~ 1–2 mm in length, which

immediately and actively begin to feed. It is this vigorous feeding activity, which is beneficial to an infected or necrotic wound. The maturing first larvae continue to feed for ~ 4–5 days, molting twice as they increase in size to ~ 8–10 mm, at which point they stop feeding and leave the wound or corpse to search for a dry place in the ground where they pupate. Following metamorphosis, an adult fly emerges from the pupa. In preparation for clinical use, the flies typically oviposit onto porcine liver, and the eggs are separated and chemically sterilized. Resultant larvae are sterile upon emergence from the egg and undergo rigorous testing to ensure their microbiological status. Larvae are then maintained under aseptic conditions prior to wound application. [6]

Another important species, *Protophormia terraenovae*, is also known for its feeding secretions, which fight infection by *Streptococcus pyogenes* and *Streptococcus pneumoniae*. [7]

INDICATION

- Pressure ulcers
- Venous stasis ulcers [8]
- Neuropathic, diabetic foot ulcers. [9]
- Non-healing traumatic [10], or postsurgical wounds [11]
- Wound infected with MRSA (Methicillin resistant *Staphylococcus Aureus*) which are resistant to most antibiotics [4, 11, 12]
- Severe burns [13]
- Superficial gangrene
- Osteomyelitis [14]
- Perineal wounds--which are difficult to provide with hydrocolloid wound dressings
- Wounds caused by radiation therapy [15]
- Non healing wounds in orthopedic like infected total knee replacements where the prosthesis is exposed [16]
- Complicated necrotic wounds that are resistant to conventional treatment [17]

Correspondence Address : Dr. Shreyas Dholaria,
"Madhuram", 76, Astron Society, Amin Marg, Kalawad Road, Rajkot, Gujarat. 360001
Email : shreyas.dholaria@gmail.com

Even though the maggot therapy may not work, the treatment isn't hazardous to the patient.

Although maggots do heal wounds faster, in about three weeks' time versus four weeks for conventional measures; however, some studies show that maggot therapy doesn't heal the wound faster than conventional therapies, but it does clean the wound faster (up to 18 times faster).[11]

HOW IT ACTS..??

"Maggots are classified as drugs because their mode of action is closest to the definition of a drug, particularly a biological drug". So it is also known as "Bio-Surgery" [3]

- ❖ **Debridement-** They have modified mandibles, called "mouthhooks,"[19] and they have some rough bumps around their body which scratch and poke the dead tissue. This probing and maceration of wound tissue with maggot mouthhooks may enhance debridement, but these hooks are used during feeding to disrupt membranes and thus facilitate the penetration of proteolytic enzymes.[6] Maggots are photophobic and will naturally move into the deep crevices that may be beyond the reach of a surgeon's scalpel [6]. They derive nutrients through a process known as "extracorporeal digestion" by secreting proteolytic enzymes[20] i.e. metalloproteinase and aspartyl proteinase[6] and a rich soup of digestive enzymes while feeding, including carboxypeptidases A and B, leucine aminopeptidase, collagenase and serine proteases (trypsin-like and chymotrypsin-like enzymes). The latter shows excellent degradation of extra cellular matrix components like laminin, fibronectin and collagen types I and III, and may therefore play a significant role in the digestion of wound matrix and effective debridement. This all can liquefy necrotic tissue in optimum wound environment. Maggots molt twice, increasing in length from 1–2 mm to 8–10 mm, and in girth, within a period of 3–4 days by ingesting necrotic tissue, leaving a clean wound, free of necrotic tissue when they are removed. When maggots stay longer or too many are used, healthy tissue is removed as well.[21]

- ❖ **Disinfection-** Secretions which are believed to have broad-spectrum antimicrobial activity include allantoin, urea, phenylacetic acid, phenylacetaldehyde, calcium carbonate, and proteolytic enzymes and many others. Bacteria not killed by these secretions are subsequently ingested and degraded within the maggots.

Methicillin-resistant staph.aureus (MRSA)[22], group A and B streptococci, and Gram-positive aerobic and anaerobic strains, pseudomonas – all can be killed by maggots. (23)(24)(25)

The wound becomes alkaline after twenty-four hours' activity of the maggots, which can be easily tested out by litmus paper inserted into the wound. Daily the number of bacteria diminishes, — Streptococci and staphylococci get destroyed first and the proteus remains until the end. Few bacteria may still live on the surface but they are very few in number.

- ❖ **Biofilm inhibition and eradication** - [26] maggot excretions and secretions could prevent, inhibit, and break down biofilm [27]
- ❖ **Stimulation of healing-** Maggot secretions skew the differentiation of monocytes into macrophages away from a pro-inflammatory to a pro-angiogenic type .[28, 29]

It also increases oxygen perfusion, rapid and luscious spread of granulation tissue, cellular proliferation, fibroblast migration, and matrix remodeling(26)

- ❖ **Self Protection by Maggots-** Lucifensin (Lucilia defensin) is purified from the extracts of various tissues (gut, salivary glands, fat body, haemolymph) of green bottle fly (Lucilia sericata) larvae and from their excretions/secretions. The primary sequence of this peptide is very similar to that of sapecin and other dipteran defensins. We assume that lucifensin is the key antimicrobial component that protects the maggots when they are exposed to the highly infectious environment of a wound during the medicinal process known as maggot therapy.(30)

HOW TO APPLY AND MANAGE

- ❖ Special type of dressing called Creature Comfort dressing, made up of polyester netting is assembled with other dressing material[most commonly hydrocolloid pad] to create a confining "cage dressing". The layers should be like from below upward-
 - Wound bed
 - Maggots with gauze
 - Hydrocolloid dressing on skin[tegaderm]
 - Glue or adhesive
 - Polyester net
 - Tape or adhesive
 - Absorbent gauze

This dressing allows air to enter, allows liquefied necrotic tissue to drain out and still keep the maggots securely over the wound..

- ❖ These larvae have the property of not damaging healthy dermis and subcutaneous tissue but can destroy healthy epidermis. Thus, epidermis protection is mandatory in maggots debridement

therapy [MDT]. Hence, hydrocolloid dressings are to be applied on the surrounding normal skin to protect it. No other specific type of skin protector are needed.

- ❖ Another method is to clean the wound and then live maggots are placed inside the wound and then covered with a bandage to keep them in place. In a few days' time, the maggots and the bandage are changed and replaced.
- ❖ Sterile nylon stockings are also available for wounds with complicated 3-D surface like toes, feet, stumps.
- ❖ Generally, there should be no more than eight-ten maggots per square centimeter of surface in the treatment area.
- ❖ Antibiotic treatment is to be continued according to culture sensitivity.
- ❖ The number of treatment cycles depends on the size of the wound and the ultimate goal of treatment (debridement, wound preparation for graft, or wound closure). The average course is 2-4 cycles. Examine the wound after treatment (and 24 hours later, if possible), to determine if another treatment is necessary.
- ❖ The maggot dressing is removed as soon as the maggots have finished secreting their proteolytic enzymes (within 48-72 hours). At that time, their natural instinct is to leave the wound and crawl away as quickly as possible. So when the dressing is opened, the maggots will be at the surface to be free.
- ❖ If any slow growing larvae remain, they can be removed with a simple wipe, wash, or irrigation.

- ❖ Medical grade maggots do not bury in or feed on healthy tissue. They are obligate air-breathers. So they must remain where there is air, and they will leave the body as soon as they are finished feeding or as soon as there is no more dead, infected tissue left.
- ❖ If there are any young larvae still there that cannot be removed, simply cover the wound with moist gauze and replace it three times a day; the remaining maggots will leave the wound and bury themselves in the gauze within 24 hours
- ❖ It is advised to change the covering gauze bandage daily to prevent odor and avoid the dressing to be filled with wound fluid, which could drown the maggots...maggots are captured and enclosed in special biobag containing a polyvinyl alcohol spacer . The network of the biobag is permeable and permits the migration of maggots' excretions and secretions to the wound. This bag facilitates the application of MDT and also the inspection of the wound bed during the treatment at any time.

HOW TO DISPOSE THE DRESSING?

Maggots are germ-free when applied, but become contaminated when they come into contact with the patient's wound flora. Therefore, MDT dressings should be handled like all other infectious dressing waste. Place the maggot dressings in a plastic bag and seal the bag completely. Then place the sealed bag into a second plastic bag and seal completely. Place the bag with the other infectious dressing waste in an appropriate infectious waste bag and autoclave or incinerate within 24 hours, according to waste management policies.

SEVERAL STUDIES - RESULTS

	Mumcuoglu et al 2001[33]	Gilead et al 2012[34]	Steenvoorde et al 2007[10]	Mumcuoglu et al 2009[35]	Mumcuoglu et al 2012[36]
Duration of treatment	—	1-81 days	—	—	3-5 days
Complete debridement	80-90%	82.1%	67%	80%	—
Partial debridement	—	16.8%	—	—	—
Ineffective debridement	20-25%	1.1%	—	—	—
Painful therapy	—	38%	—	25-30%	38%

PAIN CONTROL

Some percentage of patients may develop pain while undergoing maggot debridement therapy as described above. But most of the time, pain is well tolerated by simple oral analgesics like NSAIDS. Sometimes pain may be more severe so requires some treatment.

Pain control measures are undertaken in patients who were already in intense pain prior to the initiation of MDT

and in those patients who reported intense pain during treatment. The measures include shorter periods of application of maggots, and applying relatively small maggots as well as a smaller number of maggots during an MDT session.

In patients who continue reporting intense pain, systemic analgesic medications and peripheral nerve blocks can be used. So we should titrate analgesics as needed and

be prepared to treat patients even with potent analgesics, such as opioids.

In severe painful condition, sometimes we have to stop the treatment.

ADVANTAGES

Maggot therapy seems to be an effective and environmentally friendly treatment of complicated necrotic wounds that are resistant to conventional treatment. Maggot therapy should also be considered in earlier stages of treatment

- Independent of the underlying diseases or the location on the body for ambulatory as well as for hospitalized patients
- Do not damage healthy dermis and subcutaneous tissue
- No heavy sedative before the procedure
- Takes about 15-30 minutes to apply
- Simple enough for even non-surgeons to use it
- Effective against both Gram-positive and Gram-negative bacterial strains, namely *Staphylococcus aureus*, *Pseudomonas aeruginosa* and MRSA.
- Maggots separate the necrotic tissue from the living tissue, making a surgical debridement easier.
- Offensive odor emanating from the necrotic tissue and the intense pain accompanying the wound, decrease significantly.
- More proximal amputation could be avoided.
- Septicemia can be prevented.
- The combination effect of ES [excretion and secretion] and ciprofloxacin at sub-MIC (Minimum Inhibitory Concentration) levels show enhanced antibacterial activity compared to the effect of ES or ciprofloxacin as individual agents. Hence ES-ciprofloxacin combination can be proposed as a more effective means of treatment for *S. aureus*.

DISADVANTAGES

- Distasteful to patient
- Sometimes the therapy can be painful, especially in the first few treatments after 24 hr due to increased size of maggots due to crawling over exposed nerve ending. However, if pain is unmanageable in the outpatient department, we believe that options include hospital admission, using the contained method of application or, in the worst case scenario, cessation of treatment. A standardized but individually tailored pain management protocol is mandatory

- It can damage epidermis so its protection is needed
- Not useful for dry wounds
- Maggots are highly perishable and should be used within 24 hours of arrival so no long term storage.
- Transportation problems as there is viability problems resulting from extreme temperature and exposure during delayed transportation.
- Escaping maggots
- In patients with septic arthritis, chronic limb ischaemia, deep wounds and older age, negatively influenced outcomes were observed.
- It is not so effective wound of >3 month old and wound with exposed tendon, muscle, bone
- Not indicated in open wounds of the abdominal cavity.
- It is not used in *Pyoderma gangrenosum* in patients with immunosuppressive therapy.
- Wounds heavily contaminated with *pseudomonas aeruginosa* cannot be treated with MDT.

COST OF TREATMENT

The cost of treatment per patient in the MDT group was £79 compared to £136 for the hydrogel group. Patients also require less number of visits to get treated than other methods. If nursing costs are also included the total expenditure to full debridement of one wound, the difference would have been 6 times lower in the MDT group than other groups.

IN FUTURE

Recent research focuses on the identification of molecules from *L. sericata* mediating promotion of wound healing as well as debridement and disinfection of wounds. The production and application of corresponding synthetic or recombinant analogues may expand the use of insect-derived molecules beyond maggot therapy of wounds to include the cure of other diseases by bio-surgery.

CONCLUSION

Application of disinfected and sterile maggots in the form of "maggot debridement therapy" can be a safe, effective, non toxic, eco-friendly, well tolerated management for any type of wound ranging from non healing ulcers to severely contaminated wounds even by MRSA. There have been no bars regarding the location, type and duration of wound or need of an expertise for application. Although, the availability of sterile maggots, difficulty in their storage as well as maintenance and poor patient acceptance; can be a limiting factor for this treatment.

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ORIGINAL ARTICLE

Coagulation profile in liver disease-a study of 100 cases.

Shah Shaila N*, Trupti Jansari **

M.D. Pathology, Associate professor*, M.B.B.S,Resident doctor** Govt Medical College, Bhavnagar.
Department of pathology, Sir. T. Hospital & Medical college,Jail road, Bhavnagar, Gujarat.

KEY WORDS : coagulation, hepatitis, cirrhosis.

ABSTRACT

Objective : To study the alteration in coagulation profile in various liver diseases which helps to evaluate the risk of bleeding in patients with liver disease and to study the association of coagulation abnormality with the extent of liver disease.

Material and Methods : The study was conducted in 100 patients with liver diseases attending Medicine and Paediatric clinics in a teaching hospital. The patients were divided into three groups:1)50 cases of cirrhosis,2)30 cases of hepatitis and 3)20 cases of other liver diseases.Three coagulation tests-Prothrombin time(PT),Activated partial thromboplastin time(APTT) and Platelet count were performed.

Conclusion : There are more chances of bleeding when coagulation parameters are altered in cases of cirrhosis but more studies are required in this field to evaluate the thrombotic events seen in patients with liver diseases.

INTRODUCTION

The study of coagulation can be traced back to about 400 BC and to the father of Medicine,Hippocrates.The liver is the cornerstone of the coagulation system and patients with liver disease are at a substantially increase risk of both thrombosis and haemorrhage.¹Owing to the substantial overlap in the hemostatic abnormalities observed in patients with acute infectious or toxic hepatitis,chronic hepatitis and cirrhosis,the severity of hepatocellular dysfunction is typically more informative than the etiology.²In acute liver disease,the extent of coagulation abnormalities reflected most sensitively by PT,correlates well with the severity of hepatocellular damage as well as with the occurrence of abnormal bleeding and the overall prognosis,irrespective of the etiology.Studies have shown that significant prolongation of PT and APTT in absence of significant hypofibrinogenemia suggests their importance as a reliable marker of coagulopathies in cirrhotic patients.³Haemostatic abnormalities in patients with liver disease can increase the risk of bleeding in cirrhotic patients.

MATERIAL AND METHODS

The present study was conducted on 100 patients having liver disease attending Medicine and Paediatric clinics at a teaching hospital.They were divided into following three groups:50 cases of cirrhosis,30 cases of hepatitis and 20 cases of other liver diseases(e.g.liver parenchymal diseases,hepatic encephalopathy,cholestasis,fatty

liver,liver abscess,jaundice,chronic liver disease,portal hypertension and hydatid cyst).

Blood samples from the patients were collected and following three coagulation tests were performed.

- 1) PT- By reagent kit Lyoplastin –manufactured by Tulip diagnostic ltd.
- 2) APTT- By diagnostic kit manufactured by Diagnostica Stago S.A.S.
- 3) Platelet count-By Automated haematology analyzer.

Staging of chronic liver diseases is done by modified Child-Pugh classification with a scoring system of 5-15.⁵The Child-Pugh score is calculated by adding the scores of the five factors and can range from 5-15.⁵ (table-I)

Table -I. Child – Pugh⁵ classification of cirrhosis

Factor	Units	1	2	3
Serum bilirubin	mg/dL	<2.0	2.0–3.0	>3.0
Serum albumin	g/dL	>3.5	3.0–3.5	<3.0
Prothrombin time	Seconds prolonged	0–4	4–6	>6
	International normalized ratio (INR)	<1.7	1.7–2.3	>2.3
Ascites		None	Easily controlled	Poorly controlled
Hepatic encephalopathy		None	Minimal	Advanced

Correspondence Address : **Dr. Shaila N. Shah**
11, Kalpadrum flats, Nr. Takhteshwar Post Office, Waghawadi Road,
Bhavnagar-364002. Email address: shaila.shah15@yahoo.com

Stage A-score 5-6.

Stage B-score 7-9.

Stage C-score 10 or more.

Recently the model for end stage liver disease (MELD) score is used for assessing the need for liver transplantation.

MELD score = $9.57 \times \log_e \text{creatinine (mg/dl)} + 3.78 \times \log_e \text{bilirubin (mg/dl)} + 11.20 \times \log_e \text{International normalized ratio (INR)} + 6.43$.⁶

OBSERVATIONS

The study was conducted in 50 cases of cirrhosis of liver, 30 cases of hepatitis and 20 cases of other liver diseases. PT, APTT and Platelet counts were done. Data was statistically analysed by chi square test and 'p' values and Pearson's 'r' test were obtained. Interpretations were based on p value.

$P < 0.05$ -significant

$P < 0.001$ -highly significant

$p \geq 0.05$ -nonsignificant.

The mean age of cases of cirrhosis, hepatitis and other liver diseases in present study are 48.48 ± 14.78 (mean \pm SD) years, 35.17 ± 17.359 (mean \pm SD) years and 24.08 ± 21.37 (mean \pm SD) years respectively.

The sex distribution of liver diseases in present study was 78% males, 22% females in cases of cirrhosis, 77% males and 23% females in cases of hepatitis and 70% males and 30% females in cases of other liver diseases.

PT was altered in 46 out of 100 total cases, APTT was altered in 58 out of 100 total cases while Platelet count was altered in 37 out of 100 total cases.

Bleeding was present in 20 out of 26 cases of cirrhosis in which PT was altered and 8 out of 24 cases in which PT was not altered. Bleeding was present in 23 out of 31 cases of cirrhosis in which APTT was altered and 5 out of 19 cases in which APTT was not altered. Bleeding was present in 18 out of 24 cases in which platelet count was altered and 10 out of 26 cases in which platelet count was not altered. (table II).

Table - II. Statistical values of coagulation profile in patients with bleeding tendency in cirrhosis

Statistical values	PT	aPTT	Platelets
χ^2 - test	7.936	9.102	5.36
p-value	0.004	0.002	0.020
Sensitivity(%)	76.92	74.19	75.00
Specificity(%)	66.67	73.68	61.54
Positive predictive value(PPV) (%)	71.43	82.14	64.29
Negative predictive value(NPV) (%)	72.73	63.64	72.73
Relative risk(RR)	2.62	2.26	2.35
95% Confidence interval(C.I.)	1.27-5.39	1.26-4.03	1.13-4.92

In cases of hepatitis bleeding was present in 2 out of 9 cases in which PT was altered and 2 out of 21 cases in which PT was not altered. Bleeding was present in 3 out of 16 cases in which APTT was altered and 1 out of 14 cases in which APTT was not altered. Bleeding was present in 2 out of 6 cases in which platelet count was altered and 2 out of 24 cases in which platelet count was not altered. (table III).

Table - III. Statistical values of coagulation profile in patients with bleeding tendency in hepatitis

Statistical values	PT	aPTT	Platelets
χ^2 - test	0.123	0.155	0.883
p-value	0.725	0.693	0.347
Sensitivity(%)	22.22	18.75	33.33
Specificity(%)	90.48	92.86	91.67
Positive predictive value(PPV) (%)	50.00	75.00	50.00
Negative predictive value(NPV) (%)	73.08	50.00	84.62
Relative risk(RR)	1.85	1.50	3.25
95% Confidence interval(C.I.)	0.57-5.96	0.75-2.97	0.8-12.31

In other liver diseases, bleeding was present in 4 out of 11 cases in which PT was altered and 1 out of 9 cases in which PT was not altered. Bleeding was present in 4 out of 11 cases in which APTT was altered and 1 out of 9 cases in which APTT was not altered. Bleeding was present in 4 out of 7 cases in which platelet count was altered and 1 out of 13 cases in which platelet count was not altered. (table IV).

Table - IV. Statistical values of coagulation profile in patients with bleeding tendency in other liver diseases

Statistical values	PT	aPTT	Platelets
χ^2 - test	0.606	0.606	3.590
p-value	0.436	0.436	0.058
Sensitivity(%)	36.36	36.36	57.14
Specificity(%)	88.89	88.89	92.31
Positive predictive value(PPV) (%)	80.00	80.00	80.00
Negative predictive value(NPV) (%)	53.33	53.33	80.00
Relative risk(RR)	1.71	1.71	4.00
95% Confidence interval(C.I.)	0.85-3.44	0.85-3.44	1.32-12.05

Table - V. Association of statistical values of coagulation parameters with Child-Pugh score⁵ in cirrhosis

Coagulation parameter	Cases of cirrhosis	
	Pearson's 'r' value	p-value
PT	0.651	0.000
aPTT	0.533	0.000
Platelets	-0.470	0.001

Table - VI. Distribution of cases according to Child-Pugh class⁵ in cirrhosis

Child – Pugh class	Number of cases	Percentage of cases
Class A	03	06%
Class B	29	58%
Class C	18	36%
Total	50	100%

Table - VII. Association of statistical values of coagulation parameters with MELD score⁶ in hepatitis and other LD

Coagulation parameters	Hepatitis		Other LD	
	Pearson's 'r' value	p-value	Pearson's 'r' value	p-value
PT	0.273	0.144	0.727	0.00
aPTT	0.419	0.021	0.379	0.099
Platelets	0.063	0.740	-0.417	0.067

Table - VIII. Distribution of MELD score⁶ in cases of hepatitis and other liver diseases

MELD score	Percentage of cases
≤ 9	22%
10-19	50%
≥ 20	28%

DISCUSSION

The findings for age and sex distribution are compatible with previous studies.

In the present study there was a significant alteration ($p < 0.05$) of PT, APTT and Platelet count in patients of liver cirrhosis. The findings are compatible with several previous studies as shown in table IX.

Table - IX. Comparison of percentage of cases with altered coagulation profile in cirrhosis with previous studies

Studies	Percentage of cases with altered coagulation profile		
	Altered PT	Altered aPTT	Altered Plt
Sohail ahmed siddiqui et al ⁷	87.7%	71.3%	36.8%
Sylvester chuks Nwokediuko et al ⁸	36.6%	22.6%	42.7%
R C Van Nieuwenhuizen et al ⁹	79%	42%	11%
Bikha Ram Devrajani et al ¹⁰	50.85%	51.7%	-
Present study	52% ^a	62%	48%

Present study shows the significant p values of altered coagulation profile in patients with cirrhosis which is compatible with the study by Sheikh Sajjadih Mohammad Raza¹ on coagulation activity in liver disease (table X).

Table - X. Comparison of p-values of coagulation profile in cirrhosis with previous studies

Studies	PT	aPTT	Plt
Sheikh sajjadih mohammad reza ¹	0.001	0.000	0.000
Present study	0.004	0.002	0.020

PT is commonly increased in liver diseases because liver is unable to manufacture adequate amount of clotting factors. Factor VII is the rate limiting factor in this pathway and thus has the greatest influence on the PT. As the liver function worsens, the APTT may become abnormal, the reason being that factors X, XI, XII and fibrin stabilizing factors are also produced by the liver. The common reason cited for thrombocytopenia in patients with cirrhosis is splenomegaly and portal hypertension with hypersplenism which results in thrombocytopenia.³ (table XI).

Table - XI. Comparison of p-values of coagulation profile in hepatitis with previous studies

Studies	PT	aPTT	Plt
Sheikh sajjadih mohammad reza ¹	0.195	0.000	0.000
Present study	0.725	0.693	0.347

In patients with acute infectious, drug induced or toxic hepatitis and other liver diseases thrombocytopenia and other coagulation abnormalities are uncommon until the late stages.² In present study the coagulation profile in cases with hepatitis and other liver diseases was near normal and p values were not significant ($p \geq 0.05$). The findings were compatible with previous studies. (table XI).

In present study 76.9% cases with prolonged PT, 74.19% cases with prolonged APTT and 75% cases with decreased platelet counts had bleeding. According to the study of Sohail Ahmed Siddiqui et al⁷ in 171 cases with chronic liver diseases 72% cases with prolonged PT, 70% cases with prolonged APTT and 83% cases with decreased Platelet counts had gastrointestinal bleeding.

Present study shows that sensitivity of coagulation parameters to evaluate the risk of bleeding is more in cases of cirrhosis and specificity is more in cases of hepatitis.

In the present study the coagulation profile was significantly correlated with the Child-Pugh score.⁵ (p

value<0.05).The findings were compatible with the previous study(tableXII).

Table - XII. Comparison of r- and p- values of coagulation parameters versus Child-Pugh score5

Parameters	Sylvester chuks nwokediuko et al study ⁸		Present study	
	r-value	p-value	r-value	p-value
PT vs childs	0.791	0.0001	0.651	0.000
APTT vs childs	0.869	0.0001	0.533	0.000
Plt vs childs	-	-	-0.470	0.001

Present study shows highly significant correlation between INR and MELD score.⁶(p value<0.001).The findings were compatible with the previous study.(tableXIII).

Table - XIII. Comparison of MELD score⁶ with severity of liver disease and its association with coagulation profile

Studies	Percentage of cases with MELD score of		INR	
	≤ 9	10-19	≥ 20	p- value
Ying Wang et al ¹¹	33%	49%	18%	0.000
Present study	22%	50%	28%	0.000

CONCLUSION

PT had 76.9%,22.25 and 36.4% sensitivity, 66.7%, 90.55% and 88.95% specificity and 71.4%, 50.0% and 80.0% positive predictive value in cirrhosis,hepatitis and other liver diseases respectively.APTT had 74.2%,18.85% and 36.4% sensitivity,73.7%,92.9% and 88.9% specificity and 82.1%,75.0% and 80% positive predictive value in cirrhosis,hepatitis and other liver diseases respectively.Platelet count had 75.0%,33.3% and 57.1% sensitivity,61.6%,91.7% and 92.3% specificity and 64.3%,50.0% and 80.0% positive predictive value in cirrhosis,hepatitis and other liver diseases respectively.

The study is concluded with the fact that the coagulation profile was significantly altered in cases of cirrhosis.The alteration of coagulation profile was not significant in cases of hepatitis and other liver diseases.The risk of bleeding was more in the cases of cirrhosis with altered coagulation profile.Coagulation abnormalities were significantly associated with the extent of liver disease.By early identification of patients at risk of bleeding,early interventional steps can be taken in the benefit of the patient.

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ORIGINAL ARTICLE

Three year experience of operated cases of oesophagectomy in our surgical unit.

Devendra S Jain*, Nishant H Sanghavi**, Jayesh D Patel***, Jayveersinh T Jhala****

*3rd year Mch resident, **2nd year Mch resident, **Associate professor in surgical unit 2,

****Professor and head of surgical unit 2 (The Gujarat Cancer and Research institute, B.J. Medical college, A'bad.)

KEY WORDS : Transhiatal, Iver-Lewis, McKeown

ABSTRACT

Esophageal cancer is a deadly disease. Only one third of patients with localized disease experience long-term survival. Over the past 20 years, investigators have evaluated neoadjuvant strategies to improve the outcomes of surgical management. Chemotherapy and radiation have been evaluated individually and in combination for preoperative management of patients with localized esophageal cancer.⁶ This paper is based on our 3 year experience of cases of esophagectomy in our unit. Hospital performance is being benchmarked increasingly against surgical indicators such as 30-day mortality, length-of-stay, survival and post-surgery complication rates. The aim of this paper was to examine oesophagectomy rates and post-surgical outcomes in cancers of the oesophagus and gastro-oesophageal junction.

INTRODUCTION

Esophagogastrectomy (EG) is a challenging operation with significant morbidity and mortality rates. Resection remains the standard treatment for curable oesophageal cancer. The effect of surgical experience on results of esophagectomy has not received much attention in the medical literature. Case-series reports from tertiary centers report improved outcomes for esophageal resection in recent years. The objective of the current study was to determine trends in short-term outcomes after esophageal resection in our surgical unit 2 at GCRI. By linking databases- mortality, post-resection complications and survival associated with oesophagectomy were investigated. This review considers the esophagectomy techniques in the treatment of esophageal cancer and provides the guidelines for optimizing the patients' chances at cure, minimizing the risk of mediastinal enteric leak (which carries a mortality rate as high as 50%) and minimizing associated pulmonary insufficiency and infection. The 4 most commonly used routes for resection and replacement include a transhiatal, transthoracic (Ivor-Lewis), tri-incisional (right chest then simultaneous abdominal and left neck), and left chest (distal tumors).

METHODOLOGY

- 37 patients of carcinoma oesophagus operated in our unit between august 2010 to february 2013. Retrospective review of clinical records of all patients who underwent oesophagectomy at our unit was performed.

- Pre operative workup: routine tests for preoperative optimisation, upper gi scopy for localising length of involved segment and taking biopsy, ct thorax+abdomen with contrast for locoregional staging. 2DEcho and pulmonary function test for checking cardiopulmonary status.

Exclusion criteria (unresectable oesophageal cancer)

- T4 tumours with involvement of the heart, great vessels, trachea or adjacent organs including liver, pancreas, lung and spleen¹
- Multistation bulky lymphadenopathy
- Patient with EGJ and supraclavicular lymph node involvement
- Patient with nonregional lymph nodes and distant metastasis

Patients who were unable to swallow well enough to maintain nutrition during induction therapy- ryle's tube insertion was done for nutritional improvement.

- Medically fit patients having resectable disease more than 5 cm from cricopharyngeus were subjected for surgery under ga+epidural anaesthesia.

Acceptable operative approaches for resection were used depending on locoregional tumour location and patients general condition.

- 1 McKeown three stage esophagectomy⁴
- 2 Transhiatal oesophagectomy²
- 3 Iver Lewis esophagectomy

Correspondence Address : **Dr Devendra S Jain**

C/4, Orchid green apartment, Near Girdharnagar bridge, Shahibagh,
Ahmedabad-380004, Gujarat. E-mail drdev77@gmail.com

- In all patients, stomach was preferred, Standard two field lymph node dissection was done. During preparation of stomach tube, if communication between gastroepiploic artery and short gastric artery was found-short gastric artery was ligated as far away from stomach tube as possible to prevent ischemia. Pyloromyotomy was done if thickened pylorus was palpated. Results were analysed in terms of demographic data, operative details, median operative time, intraoperative blood loss, postoperative recovery parameters, mortality, survival data, histopathological staging, complications, need for adjuvant therapy, follow up and disease free survival.

OBSERVATIONS AND RESULTS

In our series

- 1 Mean age was 56.6 plus or minus 4.9 years.
- 2 Male:female ration-1.6:1
- 3 Location of tumour-middle third-58%, lower one third and junction tumour-42%
- 4 Preoperative biopsy- 76% squamous cell carcinoma and 24% adenocarcinoma
- 5 One patient(2.70%) died due to pulmonary complications leading to sepsis and DIC.
- 6 Mean operative time was 420.2 minutes plus or minus 60.3 minutes.
- 7 Mean intraoperative blood loss was 634.5 plus or minus 190.2 ml.
- 8 Median intensive care unit stay was 7 (4-11) days, and total day stay was 12 (10-26) days.
- 9 Tracheostomy was performed in 3 patients (8.11%).
- 10 Anastomotic leak occurred in 4 patients (10.81%), chylothorax in 2 patients (5.41%), Tube necrosis in 2(5.41%) patients, diaphragmatic hernia in one patient(2.70%) and cardiopulmonary complications in one patient(2.70%).
- 11 7 Patients found lost to followup .
- 12 Postop CT+RT was received by 8.11 %.

DISCUSSION

- There is a strong relationship between lower hospital mortality and increasing surgeon and institutional The histological tumour type, its location, the extent of the proposed lymphadenectomy, patient factors and the experience of the surgeon should determine the operative approach. In Western patients there is little evidence that any particular approach is superior to another in terms of OS.
- A large and well-designed randomised trial in patients with lower oesophageal and type I and II oesophago-

gastric junctional tumours compared transhiatal with transthoracic resection and extended lymphadenectomy. Studies claiming benefits for a particular usually hide multiple confounders, of which the potential for stage migration as a result of inadequate lymphadenectomy is usually important. In an era of increasing use of neoadjuvant therapies where specific treatments are approach increasingly stage dependent, the surgeon should avoid carrying out an operation that is likely to underestimate the extent of disease or leave disease behind. Studies claiming benefits for a particular approach usually hide multiple confounders, of which the potential for stage migration as a result of inadequate lymphadenectomy is usually important. In an era of increasing use of neoadjuvant therapies where specific treatments are increasingly stage dependent, the surgeon should avoid carrying out an operation that is likely to underestimate the extent of disease or leave disease behind.

- For adenocarcinomas, most surgeons accept the need for an adequate abdominal lymphadenectomy as the predominant route of lymphatic spread in lower third tumours is in a caudal direction. The extent of mediastinal lymphadenectomy,⁵ particularly in the upper half of the mediastinum, remains unclear.
- The most widely practised operation is the two-phase Ivor Lewis operation with a laparotomy followed by a right thoracic approach with the anastomosis high in the chest. Some surgeons favour a third stage with a cervical incision to create the anastomosis at this level. This may be an important consideration to gain adequate clearance in proximal tumours. Transhiatal³ surgery again seems best suited to early stage disease including multifocal high grade dysplasia in patients with very long Barrett's segments. A small group of patients who would not withstand thoracotomy may tolerate a transhiatal approach. There is a growing interest in the use of minimal access techniques to replace conventional open surgery.
- Prospective cohort studies have shown that clinical outcomes with complete minimally invasive oesophagectomy can be achieved with good short-term outcomes. Early experience has shown that lymph node yield from laparoscopic lymphadenectomy is similar to that obtained at open surgery. However, there are specific complications with associated significant morbidity and mortality such as gastric tube necrosis (incidence up to 13%) which need better understanding and resolution. In all these studies the impact on gastric tube necrosis on

postoperative quality of life is severe because of the necessity to form a cervical oesophagostomy. A prospective cohort study using validated measures of HRQL shows that following minimal access oesophagectomy the impact on HRQL may be less severe than standard open surgery. However, there is insufficient robust evidence to reach meaningful conclusions of the impact of minimal access surgery for oesophageal cancer on HRQL, postoperative clinical outcomes and long-term survival.

- Consensus guidelines have been produced by AUGIS which recommends a pragmatic approach for the development of minimal access surgery for oesophageal and gastric cancer resection and should be used for learning curve, audit and research purposes. It is also recommended that these new techniques are carried out by specialist teams with appropriate mentorship and training. However, only data from well-designed and conducted RCTs will be able to demonstrate the effectiveness and cost-effectiveness of minimal access as an alternative to open surgery.

CONCLUSIONS

- Oesophagectomy in our centre is performed with satisfactory results. There is a suggestion that higher volume hospitals have better post-resection outcomes.
- Survival outcomes of oesophagectomy in our hospital are comparable to published series from national and international tertiary centres.
- For patients with stage I disease, standard care remains esophagectomy.
- Although multimodality approaches are clearly superior to single modality surgery or radiotherapy alone, most patients have disease already spread to regional nodes at diagnosis and will die with distant metastases. Thus, improved strategies for treatment are needed and the challenge is to identify more effective systemic therapies. The future of treatment for this disease relies on exploiting combinations including new targeted therapies. The challenge is to design therapies that are not only efficacious but also tolerable for patients. Currently, the field has a lot of room for improvement.
- Surgery without additional adjunctive therapy provides palliation of symptoms but infrequently cures esophageal cancer. Even with improvements in surgical technique and postoperative care, modern studies with a comparator arm of surgery alone show an average 5-year overall survival of 14% to 22%.

Limited ability to obtain complete resections, high rates of early lymph node involvement, and haematogenous distant recurrences are obstacles that must be addressed to improve survival.

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Prevalence of Multi Drug Resistance-TB in Category-2 failure

Gupta Anil M*, Nilesh Dutt**, N. Patel***

*Assistant Professor, **Associate Professor, ***Professor and Head Department of Pulmonary Medicine, Smt. Shardaben Chimanlal Lalbhai Hospital (Smt. NHL Municipal medical college & VS hospital Ahmedabad), Saraspur, A'bad

KEY WORDS : Pulmonary Tuberculosis, Drug susceptibility testing**ABSTRACT****Aims And Objective**

The aim of this study is to evaluate level of drug resistance in directly observed treatment; short-course (DOTS) Cat-2 failure pulmonary tuberculosis patients enrolled for retreatment according to Indian Revised National Tuberculosis Control Programme (RNTCP). **Methodology** : From October 2011 to June 2012 sputum samples were collected from all patients of DOTS Cat-2 failure from North Zone of AMC & transported to laboratory (IRL) for mycobacterium tuberculosis culture & drug susceptibility testing. DOTS Cat-2 failure pulmonary TB includes those patients who remained sputum positive after 5 months of Cat-2 TB treatment. AFB culture was done on line probe assay method at Civil Hospital Ahmedabad which is RNTCP accredited laboratory. **Results** : DST results were available for 115 sputum smear positive DOTS Cat-2 failure patients. Mean age of the patients were 33.96 years (range 15-65 years). Male to female ratio was 3.03:1. Of 115 patients 40 (34.78%) had multidrug resistance tuberculosis (MDR-TB). Out of 115 patients 80 had treatment after default and 35 had treatment failure of Cat-2. The prevalence of MDR-TB pulmonary tuberculosis patients were 34.78%. **Conclusion** : The prevalence of MDR-TB strains was dramatically high (55.2%) among patients with pulmonary TB who failed Cat-2 therapy. Capacity of drug sensitivity testing is essential for continuous monitoring of drug resistance trends; in order to assess the efficacy of current programme and epidemiological surveillance for planning.

INTRODUCTION

The directly observed treatment short-course (DOTS) strategy is endorsed by the World Health Organization (WHO) as a current standard for tuberculosis treatment. It has been adapted for use by TB Control Programme in 148 countries¹. The efficacy of DOTS in the treatment and control of TB is widely recognized²⁻⁵. However treatment failure occurs most often due to limited resources of medicine, inadequate retreatment regimes, improper regimen and hidden MDR-TB.

Since 1998 there has been a rapid expansion of the DOTS based RNTCP in India. With such a large DOTS based programme in place, there is a need to assess the drug susceptibility profile among previously treated patients under programme conditions.

Drug resistance surveillance is considered useful tool to assess the effective functioning of TB control programmes⁶. Levels of drug resistance and its trends vary from place to place and score as an epidemiological indicator to assess the extent of resistant bacterial transmission in the community⁷. Drug resistance levels

among patients treated under TB control programme are not available in many settings.

In poorer regions DST is not available. Empiric Treatment Regimes for MDR cases are generally customized to an individual's treatment and contact history but used in the absence of or while awaiting DST results.

We conducted this retrospective analyses to evaluate level of drug resistance in DOTS Cat-2 failure patients.

METHODOLOGY

A total 115 patients having sputum positivity, clinical and or radiological features of TB attending on the out patients Dept. Of TB Ahmedabad Municipal Corporation, Ahmedabad were enrolled in this study during Oct 2011 to June 2012.

AMC TB unit (NZ) for ahmedabad covers about 10.0 lac population; Civil Hospital Ahmedabad has the only accredited laboratory that perform mycobacterium cultures (IRL).

Subjects attending to hospital with the history of DOTS Cat-2 and complaint of cough with expectoration were

Correspondence Address : **Dr Anil M. Gupta** (Assistant Professor)
43, Ashray, Nr. Indira Bridge, Opp. Forest Nursery Office, Hansol, Ahmedabad-382475.
E-mail : dr.niruani@gmail.com

screened sputum smear microscopy. All participants had active pulmonary TB disease and had failed previous DOTS Cat-2 treatment.

Sputum samples from all patients of DOTS Cat-2 failure were cultured by providing a sterile bottle (Falcon bottle) to collect sputum samples for culture and sensitizativity test.

Sputum was collected and processed for culture. Culture positive for M.TB were subjected to sensitivity testing. Data was handled and analysed.

Information on associated factors for drug resistance-age, sex, history of alcoholism, smoking, occupation, family history of contact with pulmonary tb, personal history of contact with pulmonary tb and previous AKT received (Table-1).

INCLUSION CRITERIA

DOTS Cat-2 Failure (Category-2 failure pulmonary TB includes those patients who remained sputum positive (DS) of the 5 months of Cat-2 treatment).

EXCLUSION CRITERIA

The following patients were excluded from this study:-

- 1) Presence of secondary immunodeficiency states like HIV, organ transplant, diabetes mellitus and malignancy, BMI <15, emaciated, malnourished, patients on systemic steroids for a long time >3 months.
- 2) Hepatitis B infection.
- 3) Seriously ill and moribund patients with very low lung reserve.
- 4) Abnormal renal functions, S.Creatinine >2mg%.
- 5) Patients needing surgical intervention.

Table 1: Assoiated Risk Factors of Drug Resistance in study patients.

Risk Factor	No. of patients	Percentage
History of Smoking	58	50.46
History of Alcoholism	18	15.66
Both Smoking and Alcoholism	14	12.18
Family H/o PTB	10	8.7
H/o contact with ICU PTB person	04	3.48
Labourers	76	66.12

A final total of 115 cases were included in the study; male 88 (77.25%) and female 27 (23.58%); male to female ratio 3.03:1 and mean age of patients were 33.96.

Of 115 patients 40 (34.78%) patients were resistant to Isoniazide and Rifampicin (MDRTB).

The most common single drug resistance was of Isoniazide and Rifampicin which was present in 06 (5.22%) patients. The resistance to drugs other than Isoniazide & Rifampicin were not done routinely in IRL.

Table 2 : Drug Susceptibility Profile among Cat-2 failure patients. (n=115)

Resistance to	No. of patients	Percentage
H	6	5.21%
R	6	5.21%
HR	40	34.78%
NON MDR	63	54.80%

When we analyzed associated factors in DOTS Cat-2 failure patients, family H/o contact with Cat-4 was present in 04 (3.47%). Out of 115 patients 80 (71.6%) had treatment after default (TAD) and 35 (28.4%) had treatment failure of Cat-1.

DISSCUSSION

The main finding of the above study among 115 patients of DOTS Cat-2 failure; 40 (34.78%) were MDR and 06 (5.21%) were resistant to INH and 06 (5.21%) were resistant to RMP. Patients with resistance to 1st line drugs were 52 (45.2%) and non-MDR 53.38%. The prevelance of MDR-TB among patients of DOTS Cat-2 failure was dramatically higher overall then among the previously detected patients in WHO (20% MDR-TB; 2% XDR-TB) study. The National Tuberculosis Institute (NTI) Bangalore reported that 77% of 271 patients treated by Cat-1 regim had organism susceptibility to SM, INH, RMP and 2.2% had HR resistance⁸. Among 226 patients treated with Cat-2 regim ; 59% had drugf susceptibility organism; 27.4% had INH resistance and 12.8% had HR resistance⁹. Whereas study from South India reported resistance to both INH and RMP has 1.7% among newly diagnosed patients and 12% in previously treated paientis. The remainder had single drug resistance¹⁰.

Malhotra B Gupta (Ref-11) PR et-al have reported higher prevelance of MDR-TB¹¹⁻¹². A high prevelance of MDR-TB in Cat-2 failure is not unique to India and has been documented in Vietnam¹³, Thailand¹⁴, Rwanda¹⁵ low to moderate risk groups.

Routine surveillance of drug resistance patients found in specific populations of previously treated patients provides information that is useful for adapting strategies for effective treatment within National Tuberculosis Programme (NTP) and is essential for the care of persons with chronic active tuberculosis disease.

In the present study there has been a large population of MDR-TB patients. It would mean that a high degree of resistant strains is already circulating in the community. In recent years; WHO launched DOTS Plus initiative to provide 2nd line drugs free of cost in India that will facilitate the treatment of many patients who currently require it.

Establishment of programme for the treatment of MDR-TB DOTS-plus patients has been backed by secured source of funds and technical assistance from WHO and World Bank. Several studies have estimated the prevalence of patients with resistant bacilli in specific locations. And in recent years the IUALTD and the WHO have conducted large surveys to ascertain the importance of resistant TB patients throughout the world; utilizing a systematic approach and common laboratory techniques, to suggest better guide lines to different countries⁶⁻¹⁶.

Drug resistant TB is a significant threat to TB control because only a few effective drugs are available against MDR-TB. Elimination of MDR-TB in a population will only occur with adherence to all aspects of TB control. In the light of a recent report- "totally drug resistant TB in India"¹⁸ followed by a big controversy about the origin and proper identification, it becomes indispensable for a clinician to confirm about the status of infecting species along with the exact nature of drug resistance.

The strategy designated to manage MDR TB using 2nd line anti-TB drugs within the DOTS strategy using standardized regimen called Cat-4 is an integral component of RNTCP known as PMDT (Programmatic Management of Drug Resistant TB).

CDC guidelines:

1. Periodic screening/monitoring to identify active disease in contacts of MDR-TB for 2 years.
2. Rule out active disease before starting preventive therapy.
3. Educate contact persons about signs and symptoms of TB in case they activate their disease.

CONCLUSION

- ❑ The prevalence of MDR-TB strains was dramatically high (34.78%) among patients with pulmonary tuberculosis who failed Cat-2 therapy. Capacity of

drug sensitivity testing is essential for continuous monitoring of drug resistance trends in order to assess the efficacy of current programme and epidemiological surveillance for planning.

- ❑ About 55.20% (52/115) of patients are harbouring resistant strains among Cat-2 failures.
- ❑ 76.92% (40/52) are having MDR amongst resistant cases.
- ❑ Mono resistant to H&R in Cat-2 failures is 11.53% (6/52).
- ❑ This leads us to think the validity of Cat-2 regimen.

TB has been a disease affecting almost all parts of world since ages. Lot many efforts came in the past for improving diagnosis and treatment. Also an effective vaccine has been sought after for long. With the emergence of resistant strains of *M. tuberculosis*, the casual organisms of TB and complexities emerging due to other associated infections and disease conditions there is a desperate need for further research input in the field. Be it the better medication and care or better resistance management, proper diagnostics holds the key to success. It has been observed that a high burden of the disease was accompanied by resource limitations and poor research setup. The scenario remained like this for several decades with the refreshed vision of resourceful countries and funding agencies, funding is being provided in many areas of research in MDR-TB diagnosis and treatment.

Anticipation and removal of inhibitory substances from the samples before the assay setup is also a major issue to consider. For this basic knowledge and training about molecular assays can be made a part of the basic training for technicians and scientists working in the field. Also NAA (Nucleic Acid Amplification) test are not considered for the evaluation of patients receiving therapy as the technology cannot distinguish between live and dead organisms. This can still be used with the same specificity if followed by short-term culture based enrichment. A culture enriching the initial viable loads followed by a sensitive and specific NAA test with a minimized need of containment can make identification safer, faster and more reliable.

With the recent enthusiasm of various policy makers, funding agencies and grants the need is now to foster innovations that deliver better tools to diagnose MDR-TB with confidence using affordable approaches. After this only the next step to treat MDR-TB and associated risk can be taken with confidence.

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ORIGINAL ARTICLE

Role of sonohysterography in evaluation of endometrial pathologies.

Dr. Parth J. Darji*, Dr. Gurudatt N. Thakkar;***, Dr. Viplav S. Gandhi;**, Dr. Hemang D. Chaudhari*, Dr. Hiral K. Banker*, Dr. Bharat Ghatala

Professor & HOU, *Associate Professor, * 3rd year residents.
Department of radiology, Smt. S.C.L. Municipal General Hospital,
Smt. N.H.L. Municipal Medical College, Ahmedabad-380018

KEY WORDS : sonohysterography, transvaginal sonography, endometrium.

ABSTRACT :

Sonohysterography (SH) is the ultrasound imaging of the uterine cavity using sterile saline solution as a negative contrast medium. It is a cost effective and painless enhancement of transvaginal sonography which obviates the need for diagnostic hysteroscopy in cases of abnormal uterine bleeding, reproductive failure or abnormal endometrial images obtained with any modality. In our study of 52 patients, we concluded that sonohysterography is a simple out patients procedure that improves evaluation of endometrial abnormalities with few contraindications (e.g. active pelvic inflammatory disease) and virtually no complications. Many uterine abnormalities that may not be adequately seen with routine TVS may be viewed in detail with sonohysterography.

INTRODUCTION

Sonohysterography (SH) is the term for ultrasound imaging of the uterine cavity using sterile saline solution as a negative contrast medium. In principle, any clear liquid could be used to define surfaces. However, sterile saline is inexpensive, easily available and safe to infuse into the peritoneal cavity through the reproductive lumen.

It is a low-tech, low-cost, painless enhancement of transvaginal sonography which obviates the need for diagnostic hysteroscopy in cases of abnormal uterine bleeding, reproductive failure or abnormal endometrial images obtained with any modality. The same idea had occurred sporadically to imagers around the world for the past 20 years, but widespread use has come about only recently.

AIMS AND OBJECTIVES

- To assess the role of sonohysterography in patients with abnormal uterine bleeding.
- Detection and characterization of endometrial pathologies by transvaginal sonography (TVS) and sonohysterography.

MATERIALS AND METHODS

This is a prospective study evaluating role of transvaginal sonography and sonohysterography in detection of endometrial cavity lesions in 52 patients. Lesions were classified as diffuse hyperplasia, endometrial polyp, endometrial carcinoma, adhesions and submucosal leiomyoma.

Sonohysterography [1] :

DEFINITION: it is a new technique that involves slow infusion of sterile saline into the uterus during ultrasound imaging allowing the evaluation of abnormalities of uterus and endometrium.

INDICATION:

- Pre, peri or post menopausal women with unexplained vaginal bleeding.
- As a diagnostic procedure for infertility.
- As a screening test to minimize the use of more invasive diagnostic procedures.

CONTRAINDICATIONS:

- Cervical stenosis
- Acute pelvic inflammatory disease.

PREPERTION:

- Proper position of patient- lithotomy
- Analgesics, antibiotics and atropin

TIMING OF PROCEDURE: 7th to 10th day of menstrual cycle.

TECHNIQUE:

- 1) The baseline ultrasound study is performed first in the midsagittal plane, which includes the entire length of the cervical canal, as a landmark for orientation. The maximum thickness of the dual-layered endometrium is measured. The current convention is to measure both walls of the endometrium together, unless there is

Correspondence Address : Dr. Parth J Darji
A-3/15, Simandhar complex, Nr. Prabhat Chowk, Ghatlodia, Ahmedabad.

fluid in the cavity, in which case they are measured individually and added together. Symmetry of both the cavity and of the endometrium are noted.

2) Next, the following questions are answered:

- Is there a focal thickening or absence of the endometrium?
- Is there an anomalous cavity?
- Is the cavity distorted by either a myometrial or intracavitary lesion?
- Is the appearance of the endometrium appropriate for the woman's history, treatment, and her ovarian activity?

3) The cervix is visualized and the external os is cleansed through a speculum. A 20 cm long (2mm outer diameter) flexible catheter is inserted gently into the cavity to the fundus. Many catheters have a mark at about 7 cm which alerts the operator to approach the fundus very gently in order to avoid the pain of sudden impact.

The catheter can be primed with fluid before insertion in order to minimize air artefacts. Balloon catheters are only required if the internal os is patulous, the uterus is very large, intrauterine synechiae are suspected, or if tubal patency is being tested. The balloon should be lodged in the cervix, and filled with water in order to minimize the risk of image artefacts in the cavity.

The speculum is removed, holding the catheter in place, and the saline-filled syringe is attached to the catheter. The vaginal probe, with plenty of lubricant over the protective sheath, is re-inserted.

The same sagittal and transverse manoeuvres are performed to study the entire uterine cavity surface while slowly infusing saline until the walls are adequately expanded or the patient complains of pain. This amounts to about 2 cc of saline in a postmenopausal woman, and 5 to 10 cc in a premenopausal woman.

POST PROCEDURE COMPLAINS: Spotting, cramping and watery discharge, infection and fever.

LIMITATIONS:

- Inadequate distension and limited ability to assess tubal patency.
- Operator dependant.

Imaging appearances :

The differential diagnosis of focal endometrial abnormality seen on SH includes polyp, subendometrial fibroid, focal cancer, and hyperplasia. Although cancer and hyperplasia are a consideration, they would more

typically show a broad base of attachment and appear diffuse.

Endometrial polyps are localized hyperplastic overgrowths of endometrial glands and stroma around a vascular core that form a sessile or pedunculated projection from the surface of the endometrium. Single or multiple polyps can occur ranging from a few millimetres to several centimetres in size. On sonohysterography, polyps appear as echogenic, smooth, intracavitary masses outlined by fluid [2,3]. Colour Doppler images may show a single feeding artery at the base of attachment, as seen in this patient, a finding frequently seen with polyps [4]. The sonographic appearance of polyps can be variable. Cystic spaces corresponding to dilated glands filled with proteinaceous fluid may also be seen. The polyp may show a narrow stalk but can occasionally appear broad-based or sessile. The point of attachment does not disrupt the endometrial lining. At times polyps show heterogeneous echo texture, indicating haemorrhage, infarction, or inflammation [5]. Foci of hyperplasia or malignant degeneration cannot be excluded with imaging. Thus, even though most polyps are benign, those that cause bleeding are resected for histological evaluation to exclude malignancy.

Another cause of focal endometrial abnormality on sonohysterography is subendometrial fibroids. Subendometrial fibroids are typically hypoechoic, well-defined solid masses, with either a narrow or a broad base of attachment. Most important, they show an overlying layer of echogenic endometrium. They often distort the interface between the endometrium and myometrium and show acoustic attenuation. Subendometrial fibroids are often larger than polyps and may show multiple feeding vessels [6]. The key to differentiating the two entities is to ascertain the location of the endometrial lining with regard to lesion. In this patient, a fibroid is not likely because the endometrium subtends the focal lesion.

Endometrial hyperplasia is caused by unopposed estrogen stimulation. Risk factors include endogenous or exogenous exposure to estrogen, use of tamoxifen, nulliparity, obesity, hypertension, and diabetes. On sonohysterography, endometrial hyperplasia usually appears as a diffuse thickening of the endometrial echo complex. Although hyperplasia typically presents as a diffuse endometrial abnormality, focality is occasionally seen. Endometrial cancer has the same risk factors and overlapping imaging appearance as hyperplasia. The most common appearance is nonspecific thickening. On sonohysterography, the diagnosis should be suspected when a single layer is thicker than 8 mm, irregular, broad-based, poorly marginated, or when the endometrial – myometrial interface is disrupted [4]. On occasion, early

cases of endometrial cancer can be polypoid. In summary, the imaging features of the endometrial abnormality in this premenopausal patient are most in keeping with an endometrial polyp.

However, fibroids, focal endometrial hyperplasia, or carcinoma can mimic a sessile polyp, and foci of atypical hyperplasia are sometimes found in polyps. The next step in the workup of this patient is histologic resection of the focal endometrial lesion under hysteroscopic guidance.

OBSERVATION AND ANALYSIS :

All patients were broadly divided in three groups: 1) infertile, 2) ppremenopausal, 3) postmenopausal.

TABLE I

GROUP	AGE	NO. OF PATIENTS	PERCENTAGE
INFERTILE	20-40	7	13.46%
PREMENOPAUSAL	20-45	34	65.39%
POSTMENOPAUSAL	45-55	11	21.15%
TOTAL	-----	52	100%

Table I : Majority of patients are premenopausal women with abnormal uterine bleeding followed by postmenopausal and then by infertile(those who have not conceived after 1 year of unprotected intercourse) patients.

TABLE II

PATHOLOGY	NO. OF PATIENTS			TOTAL
	INFERTILE	PRE MENOPAUSAL	POST MENOPAUSAL	
NORMAL	1	9	3	13
ENDO. HYPERPLASIA	1	3	4	8
POLYP	2	16	2	20
ENDOMETRIAL CLOT	0	3	0	3
UNABLE TO CATHETERISE (TB ENDOMETRITIS)	2	0	0	2
ENDO. CARCINOMA	0	0	2	2
ADHESIONS	1	0	0	1
SUBMUCOSAL FIBROID	0	1	0	1
UNDIAGNOSED	0	2	0	2
TOTAL	7	34	11	52

Table II : POLYP and TB are major pathologies in infertile group of patients. As catheterisation was not possible in TB endometritis patients, diagnosis was made by histological examination following D & C.

- Amongst premenopausal group, polyp was the most common endometrial pathology responsible for abnormal uterine bleeding.
- Amongst postmenopausal women, endometrial hyperplasia was most common pathology detected. Patients who were diagnosed as normal on SH were subsequently diagnosed as having atrophic endometritis on histology.

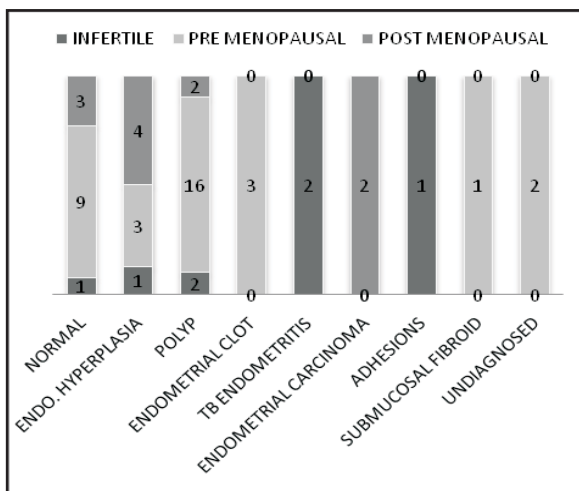


TABLE III

TRANSVAGINAL SONOGRAPHY	SONOHYSTEROGRAPHY	
NORMAL	NORMAL	13
	POLYP	02
THICKENED ENDOMETRIUM	PATHOLOGY	18
	UNDIAGNOSED	02
PATHOLOGY	CORRECT	09
	INCORRECT	08

From above table, it is clear that,

- 1) Out of 15 patients who had normal endometrium on TVS, 2 patients were diagnosed to have polyp on SH.
- 2) Out of 20 patients who had thickened endometrium on TVS, 18 had positive findings (pathology)

diagnosed) and 2 patients were undiagnosed on SH. All the patients were followed up with histopathological findings. 14(77.7%) cases were correctly diagnosed while 4(22.3%) were incorrectly diagnosed.

- 3) Out of 17 patients in whom pathological diagnosis was made based on TVS finding, diagnosis was confirmed only in 9 patients on subsequent SH. In 8 patients TVS diagnosis was found to be incorrect.

In my study, total 20 patients of polyp were diagnosed on SH. Out of them only 5 patients were diagnosed on routine ultrasound. Rest 15 patients had normal or thickened endometrium on ultrasound.

DISCUSSION

This study consists of 52 total cases studied by transvaginal as well as saline sonohysterography. All the cases were divided in three groups which include infertile, premenopausal and postmenopausal groups.

Majority of patients belongs to premenopausal (20-45) age group (table 1). All the patients except infertile group presented with abnormal uterine bleeding.

According to the study of **J A Hamilton [7]**, The Fertility Centre, Department of obstetrics and Gynaecology, St.Bartholomew's Hospital, UK, in 500 infertile patients intrauterine pathology was suspected in 67/499 (13.4%) women on plain ultrasound scan and 58/484(12%) women on saline sonohysterography. Ultrasound alone had a superior specificity (96.3%) to sensitivity (61.8%) and better negative (97.6%) than positive (73.8%) predictive value for the detection of any intrauterine abnormality, using saline hyserosalpingography as the referance procedure. Total 7 patients of infertile group in my study, intrauterine pathology was suspected in 6/7(85.7%) patients on saline sonohysterography.

PROCEDURE	JA HAMILTON STUDY	MY STUDY
	PATHOLOGY	PATHOLOGY
PLAIN TVS	67/499- 13.4%	4/7 -57.14%
SALINE TVS	58/484- 12%	6/7- 85.71%

A recent study of **Katherine Fong [8]** of transvaginal US and Hysterosonography in postmenopausal Women with breast cancer receiving Tamoxifen: Correlation with hysteroscopy and Pathologic study reported low specificity of transvaginal US (56.6%) to find out endometrial pathologies where as hysterosonography has higher specificity (79.2%). In my study plan Transvaginal sonography detected thickened endometrium in 20 patients with possible diagnosis in 9 patients. Subsequent hysterosonography detected 18 out of 20 pathologies.

PROCEDURE	KATHERINE FONG STUDY	MY STUDY
	PATHOLOGY	PATHOLOGY
PLAIN TVS	56.6%	50%
SALINE HS	79.2%	90%

Atrophic endometritis (ET < 4mm) is the common cause of postmenopausal bleeding. Alison H Brand et al. Gynaecological oncologist, Wesmead Hospital, New South Wales, found out atrophic endometritis in 60-80% cases of post menopausal bleeding. In my study, out of 11 patients, 3(27.27%) cases were diagnosed as having atrophic endometritis on histopathological examination however all this cases showed normal appearance of endometrium on hysterosonography.

	Alison H Brand	My study
Atrophic endometritis	69-80%	27-28%

laifer-narin sl [9] et al (transvaginal saline hysterosonography: characteristics distinguishing malignant and various benign conditions) studied sixty three saline hysterosonograms with histological confirmation. They found 26 endometrial polyps, 16 submucosal leiomyomas, 3 endometrial carcinoma;15 sonograms revealed no abnormality.in 2 patients,sonography revealed both polyps and submucosal leiomyoma .compared results with my study are as following:

PATHOLOGIES	LAIFER-NARIN SL	MY STUDY
Polyps	26(41.25%)	20(38.46%)
End.hyperplasia	3(4.76%)	8(15.38%)
CA endometrium	3(4.76%)	2(3.84%)
End.clots	0	3(5.76%)
Normal	15(23.80%)	13(25%)
Adhesions	0	1(1.9%)
Subendo.fibroid	16(25.39%)	1(1.9%)
TB endometritis	0	2(3.84%)
Total	63	52

CONCLUSION

- Sonohysterography is a simple out patients procedure that improves evaluation of endometrial abnormalities. This technique has only few contraindications (e.g. active pelvic inflammatory disease) and virtually no complications. It does not cause significant patient discomfort and provides the referring physician with valuable information regarding case management.
- Many uterine abnormalities that may not be adequately seen with routine TVS may be viewed in detail with sonohysterography.

- Sonohysterography can prevent unnecessary surgery and it can ensure all polyps and fibroids are removed at surgery.

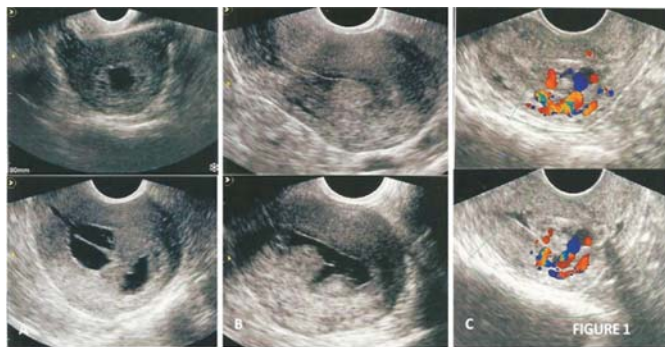


Figure I- A) CASE NO-8: 25 year female with menorrhagia showing thick endometrial adhesion. B) CASE NO 14: female with lower abdominal pain showing two polyps, C) CASE NO-33: 20 year female with menorrhagia showing polyp within endometrium.

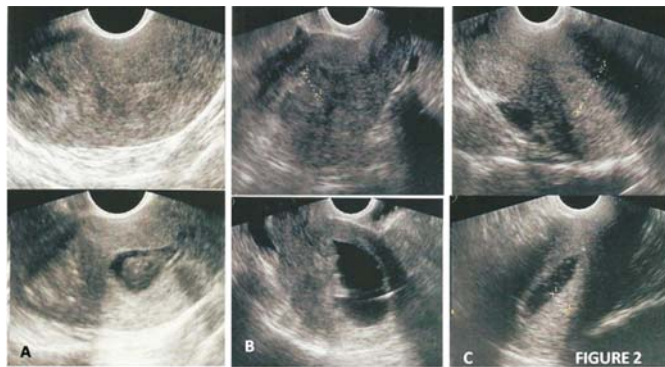


Figure II - A) CASE NO-2: 45 year female with menorrhagia showing fundal fibroid with clot better identified on sonohysterography. B) CASE NO-9: 35 year female with polymenorrhea showing endometrial hyperplasia, C) CASE NO-16: postmenopausal woman with thickened endometrium which is irregular and more involving posterior endometrium- endometrial carcinoma.

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ORIGINAL ARTICLE

Primary Non Hodgkin Lymphoma of testis- study of 12 cases.

Hardik Makwana * Umang V. Patel** , Atul Shrivastav * , Nayna Lakum***, J.R. Joshi****

*Asst. Professor, ** Resident Doctor, *** Professor, **** Sr. Prof., Dept. of Pathology, C. U. Shah Medical College, Dudhrej Road, Surendranagar.

KEY WORDS : NHL, Testis

ABSTRACT :

Introduction: Testicular lymphoma is a rare and deadly disease representing 1% to 2% of all non-Hodgkin lymphomas (NHLs) and approximately 5% of all testicular neoplasms.

Aims & objectives:- To identify the (i) presenting signs and symptoms, (ii) histological patterns, (iii) differential diagnosis of testicular lymphoma diagnosed at our institution from January 2001 to May 2012.

Methods: A retrospective study of non-Hodgkin's lymphomas (NHL) of the testis was undertaken from January 2001 to May 2012, reported at C.U Shah Medical College, Surendranagar. History, Signs and symptoms and treatment was noted.

Results: Ten cases of NHL of testis were studied. Out of this nine cases were of Diffuse large B cell Lymphoma (DLBCL) and one case of Follicular lymphoma. The mean age of patients was 61 years. Most patients presented with unilateral painless enlargement of testis. B symptoms (weight loss, fever, night sweats were present in two cases).

Conclusion: DLBCL was the commonest primary testicular lymphoma. Testicular lymphoma is a rare and deadly form of extra nodal lymphoma. It is important to identify primary testicular lymphoma correctly and distinguish it from other entities because of difference in therapy and prognosis.

INTRODUCTION

Primary Non Hodgkin's Lymphoma of the testis is an uncommon extra nodal presentation with incidence rate of 1.1 to 2% of all Non Hodgkin's Lymphoma and approximately 5% of all testicular neoplasm^{1,2,3}.

Approximately 85% of patient are older than 60 years age. Right and left sided testicular involvement is equal in frequency and approximately 6% of testicular lymphoma have bilateral involvement. The usual presentation is a painless unilateral/bilateral testicular swelling or mass^{1,2,3}.

In human immunodeficiency virus positive patient, the incidence of primary testicular lymphoma in general is increased. In this specific population of patients. Primary testicular lymphoma occurs at an early age (median age 37 years) and is associated with grave prognosis³.

According to literature data, histopathologically 80-90% of primary lymphoma of testis are of diffuse large B cell type and show tendency to disseminate systemically including the CNS, contra lateral testis, skin, waldeyer's ring, lung, pleura and soft tissues⁵.

There are various subtype including diffuse large B cell lymphoma, Burkitt's lymphoma, follicular lymphoma and

B-cell lymphoma – unclassified^{1,2}.

Concerning the treatment, retrospective analyses published until now have shown that after locoregional treatment only (orchidectomy and radiation therapy), relapse is high approximately 50% to 80% of patient in CNS or in contra lateral testis.

Historically, prognosis of testicular Non Hodgkin's Lymphoma is poor after surgery alone and addition of post operative chemotherapy and/or radiotherapy improve 5 years survival upto 50-60% of patient. Due to small number of cases of primary testicular lymphoma, there are few prospective treatment trials^{4,5,6}.

For better prognosis and treatment purpose it is important to diagnose primary Non Hodgkin's Lymphomas of patient, immunohistochemical type and staging of disease and differential diagnosis from other similar looking condition like- classical seminoma , spermatocytic seminoma, embryonal carcinoma and viral and granulomatous orchitis.

In this article we discuss clinical presentation, pathological features, differential diagnosis of Non Hodgkin's Lymphoma of testis.

Correspondence Address : Dr. Umang Patel
Medical College, Dudhrej Road, Surendranagar, 363 001.
E- Mail: umangpatel7580@gmail.com

CLINICAL PRESENTATION

Primary Non Hodgkin's Lymphoma of testis arise in the testis and is associated neither with lymphoma elsewhere nor with leukemia. Involvement of testis by systemic lymphoma /leukemia defines secondary testicular lymphoma.

We included 12 cases of primary Non Hodgkin's Lymphoma of testis diagnosed at C.U. Shah Medical college, Surendranagar from January 2001 to May 2012. All patients didn't have any systemic involvement of lymphoma or leukemia.

Table 1: Distribution of Testicular NHL.

Patients no.	Age in years	Swelling/ mass Unilateral/ Bilateral	Pain	Symptoms: Fever, night sweat, weight loss	Histological type	IHC
					DLBCL	
1.	59	Unilateral	Absent	Present	DLBCL	CD + 20VE AFP -VE
2.	63	Bilateral	Absent	Present	DLBCL	CD 20 +VE
3.	60	Unilateral	Absent	Absent	Follicular lymphoma	CD 10 +VE AFP -VE
4.	61	Unilateral	Absent	Absent	DLBCL	CD 20 +VE AFP -VE
5.	63	Bilateral	Absent	Absent	DLBCL	CD 20 +VE AFP -VE
6.	65	Unilateral	Absent	Present	DLBCL	CD 20 AFP -VE
7.	67	Bilateral	Present	Present	DLBCL	CD 20 AFP -VE
8.	53	Unilateral	Absent	Absent	Follicular lymphoma	CD 10 +VE AFP -VE
9.	61	Unilateral	Absent	Absent	DLBCL	CD 20 AFP -VE
10.	63	Unilateral	Absent	Absent	DLBCL	CD 20 AFP -VE
11.	59	Unilateral	Absent	Present	DLBCL	CD 20 AFP -VE
12.	60	Bilateral	Absent	Absent	DLBCL	

Table 1 shows summary of patients characteristic observed in the present study

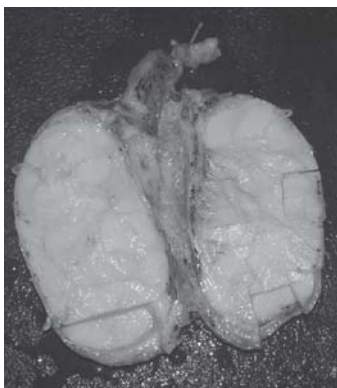


Fig 1. Gross appearance of NHL of testis

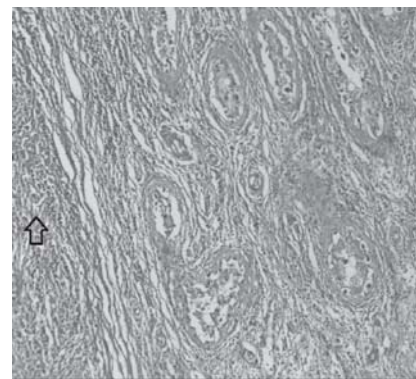


Fig. 2 Microscopy of NHL Testis, Seminiferous tubules right side and tumour (arrow) (H & E X 100)

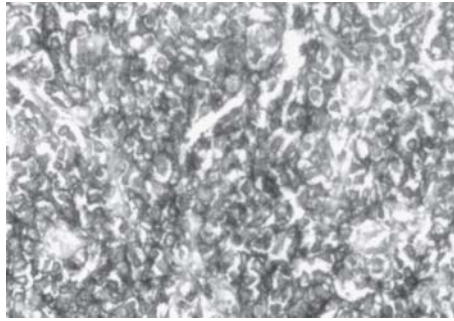


Fig. 3 High power shows cytoplasmic CD 20 +ve neoplastic lymphocytes.

Primary Non Hodgkin's Lymphoma of testis usually present in adult patient with median age in 6th decade.

The most common clinical presentation is a unilateral painless enlargement of testis with rapid progression . In most of patient history of Testicular swelling is generally of weeks to months duration⁷.

40% of patients systemic symptoms such as fever, anorexia, night sweat and weight loss are presenting symptoms along with testicular swelling⁸.

In two patients involvement of scrotum, epididymis, spermatic cord and regional lymph node was observed.

Physical examination of most of patient revealed a unilateral mass.

Serum LDH level have been correlated with tumour aggressiveness where as other tumour marker such as serum β Human Chorionic Gonadotropin (HCG) and serum α -feto protein (AFP) are not elevated⁹.

PATHOLOGICAL FEATURES

- GROSS FEATURES

Macroscopic examination carried out on the removed testicle showed partial or complete replacement of testicular parenchyma by a fleshy to firm lobulated, cream coloured, tan, pale yellow homogenous mass ranging in diameter 5-10 cm in size.(fig :1). In three cases we found focal areas of haemorrhage and necrosis.

MICROSCOPIC FEATURES

Usual light microscopic with H&E stain of all tumour show chiefly intertubular growth pattern without complete destruction of basic architecture. The seminiferous tubules are preserved. Few are atrophic and few are completely obliterated.

Spermatogenic arrest, interstitial fibrosis and tubular hyalinization are commonly seen.

Discohesive sheets of tumour cells diffusely penetrate into tissue space producing wide separation of normal structures. The tumour cells are usually medium sized to

large lymphoid cells with oval to round vesicular nuclei with fine chromatin. There are multiple small membrane bound nucleoli, the cytoplasm is usually scanty and amphophilic to basophilic.(fig 2).

IMMUNOHISTOCHEMISTRY:

Was performed on 3 μ m thick section from 10% formalin fixed paraffin embedded specimens.

(1) Alfa feto protein was positive in seminal tubules & Negative in tumour cells.

(2) CD 20 showed diffuse positive reaction in tumour cells(fig. 3).Diagnosis was made by microscopic immuno-histochemical analysis. Lymphoma were typed using WHO classification out of 12 cases. The most frequent (10 case) being diffuse large β cell lymphoma and 2 cases of follicular lymphoma .

DIFFERENTIAL DIAGNOSIS

Differential diagnosis of testicular lymphoma is made with seminoma of classic or spermatocytic type, embryonal carcinoma, viral and granulomatous orchitis^{1,2}.

Classic type of seminoma usually occurs in middle age group. Unlike the most lymphoma cells, seminoma cells are uniform, have distinct cell membrane, abundant glycogen rich cytoplasm and rounded but faultily flattened central nuclei with one or a more prominent nucleoli.

Lymphoma tend to have smaller cells with scanty cytoplasm, higher nuclear cytoplasmic ratio. They show diffuse intertubular infiltration with recognizable tubular remnants. This characteristic intertubular pattern of growth of lymphoma is initially suggestive of the diagnosis in many cases but is not specific^{10,11}.

In spermatocytic seminoma occurs in older age group(6th decade). The cells of spermatocytic seminoma are glycogen free, polymorphous and of three distinct type of cells- large cells, medium sized cells, small cells.

Embryonal carcinoma has a characteristic epithelioid appearance that frequently forms glandular, papillary or tubular structure.

In contrast to both seminoma and embryonal carcinoma, lymphoma lack precursors intratubular germ cell neoplasia.

Testicular lymphoma is positive for CD 45 & CD 20.

Negative for α feto protein & placental alkaline phosphatase¹². Viral & granulomatous orchitis have heterogeneous and benign appearing inflammatory cellular infiltrates, in contrast with more homogenous and malignant appearing infiltrate of lymphoma. Viral orchitis has apatchy rather than diffuse distribution.

CONCLUSION

The most common type of primary testicular lymphoma is diffuse large B cell type. It usually presents as a painless unilateral testicular mass in older men. Constitutional symptoms such as fever, weight loss, anorexia, and night sweats are often present. Treatment is complex and dependant on the intial characteristic of patient. It is important to identify primary testicular lymphoma correctly and distinguish it from other entities because of difference in therapy, management and prognosis.

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ORIGINAL ARTICLE

Our Experience Of Kite String Injuries During “Makar Sankranti” Festival

Dr. Rahul R. Gupta*, Dr. R.G.Aiyer**, Dr. Yogesh Gajjar***, Dr. Prarthna Jagtap*, Dr. Jayman Raval*

*Assistant Professor, **Professor & Head, ***Associate Professor,
Dept. of E.N.T. & Head, Neck Surgery, Govt. Medical College & S.S.G.Hospital, Vadodara, Gujarat, India.

KEY WORDS : Kite string, Makar Sankranti, slit neck, laryngeal injuries.

ABSTRACT :

Kite thread injuries have been an important emergency during the Makar Sankranti festival in Gujarat and neighboring states of India. Neck and face are the typically affected sites as most of the patients happen to be travelling on fast moving two wheelers. We are presenting the data and analysis of 14 patients who presented to a tertiary care centre in during this festival in the year 2013. All the patients had varying degrees of injuries which were managed in our hospital. There were no mortalities amongst these cases.

INTRODUCTION

Makar Sankranti is the day when the glorious Sun-God begins its ascendancy and entry into the Northern Hemisphere (Sanskrit: Uttarayaan). In the western part of India (specially Gujarat) this festival is traditionally celebrated by flying kites.

“A police constable was seriously injured after a kite string slashed his neck as he was chasing a cellphone thief at Nala Sopara on Sunday. The injury, though, did not deter constable Sudeep Prabhakar from nabbing the crook. (Times News Network Jan 15, 2013, 01.43AM IST names changed).”

Everyone is not that lucky. This Uttarayan a total of fourteen patients presented to our hospital with some or the other kind of kite string injury. A majority of them suffered injury on 14th & 15th of January (15th January is the day following Makar Sankranti popularly known as *Vaasi Uttarayan* in Gujarati language). Two of our patients sustained injury on 20th January (First Sunday after Uttarayan) and one on 13th January (Sunday before Uttarayan). This occurrence suggests direct relationship between the no. of persons engaged in kite flying and string injuries.

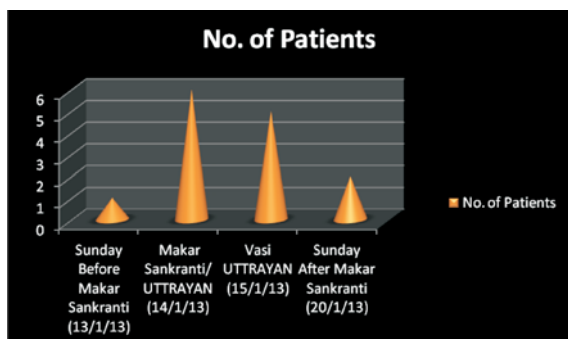


Table - I : Incidence of Kite String injury according to dates

Correspondence Address : Dr. R. G. Aiyer
3/2, Jesal Apprts, Abhishek Colony, Racecourse, Vadodara-7
drrgaiyer@hotmail.com

Essential Anatomy:

¹The lateral aspect of neck is broadly divided into three zones, the system usually used in the evaluation and treatment of penetrating neck injuries:

Zone 1: Extending from the clavicle to the cricoid cartilage including the thoracic inlet. This region contains the major vascular structures of the subclavian artery & vein, jugular vein, jugular vein and common carotid artery as well as the esophagus, thyroid and trachea.

Zone 2: Extends from the cricoid to the angle of mandible and contains the common carotid artery, internal and external carotid arteries, jugular vein, larynx, hypopharynx and cranial nerves X, XI & XII.

Zone 3: Small but critical area extending from the angle of mandible to the skull base.

Epidemiology and Physics:

² Neck injuries like any other trauma can be classified as intentional or non intentional. The objects causing these injuries have traditionally been divided into stabbing (e.g. knives, cutting instruments) and shooting instruments (e.g. missiles, projectiles). We would like to add to this classification a category of slitting objects like thin strings. Although not that common all over the world it is highly frequent in this part of our country during the period of *Makar Sankranti*.

Almost all of our patients were on some kind of fast moving open vehicle (usually a two wheeler). One child landed in trouble while just enjoying the festival on an open terrace, when a kite string suddenly struck her throat. Non use of head-neck protection (e.g. helmets, neck scarfs) was a common occurrence in all the patients. These injuries usually result when a person moving in a

motorized vehicle suddenly intercepts a kite string hanging/ waving at a height of 4-7 feet from the ground level. These strings come in contact with the skin of neck/ face. As the person takes some time to decelerate and stop, the relative motion between the string and skin causes trauma to person.² The amount of Kinetic energy delivered by the wounding agent has to be considered together with its interaction with the involved tissue. The equation $K.E. = 1/2 MV^2$ implies that the increase in speed of the moving vehicle would exponentially increase the amount of energy/ trauma delivered to the tissues. The wounding capacity of the string is hence proportional to the speed of the person's two-wheeler. Thinness, sharpness and strength of the thread (which are the features of an **ideal string** for kite flying) aggravate the injury. These threads are usually multi-braided and coated with fine powdered glass (*Manja*), which adds to their incisive property. The extreme thinness and their light colour reduces their visibility even in broad day light. It is usually a free flying kite string (*kati patang*-whose thread has been cut) which causes maximum damage as it is usually being pulled from other end by the kite flier. A slow moving person intercepting a less than ideal string may initially lead to just a superficial abrasion over neck. On the other hand unfortunate factors may lead to extensive vascular and laryngeal injury. Zone 1 & 2 were the affected sites in our patients with neck injuries. Internationally, the rates of penetrating neck trauma are usually related to the violent crime rates of a particular country, as well as military conflict. The most common causes of penetrating neck trauma being missile injuries from firearms & stab injuries. Although in western part of our country kite string injuries usually form another important form especially during the festival of Makar Sankranti.

DISCUSSION

We studied all these cases who presented to us (one day previous and a week post 14th January). All these patients presented to Emergency Medicine department. Advanced Trauma Life Support guidelines were followed during the treatment of these patients. They were assessed for the requirement of emergency resuscitation, airway compromise, active bleeding and depth of injury. Active bleeding is controlled in the Emergency Dept. by applying clamps/ pressure bandage till the patient was transferred to operation theatre. Airway management can sometimes be challenging. Hoarseness, stridor, respiratory distress, hemoptysis, hemodynamic stability and subcutaneous emphysema all suggest injury to airway and/ or vasculature. A quick surgical and orthopedic opinion was also taken to rule out any neurological or abdomino-thoracic or any bony injuries as most of these patients had a history of fall at the site of injury. None of our patients needed any urgent airway

management and neither did they have any significant associated neurological/ abdomino-thoracic/ orthopedic injury before shifting them to operating room. All trauma patients underwent preliminary laboratory tests like Hemoglobin, Glucose level and Electrolyte levels. After achieving a good airway, breathing and circulation most of the patients were shifted to E.N.T. operating room for exploration of the neck wound. Preparation for surgery also included tetanus prophylaxis, broad spectrum antibiotic prophylaxis and collecting specimen for blood typing should any component therapy be required.

Cooperative adult patients and patients with superficial injuries (skin, subcutaneous tissue & strap injury) were explored under local anaesthesia. Others were explored under general anaesthesia. In our experience of 14 cases only 2 required General Anaesthesia. One child needed to be tracheostomised because there was injury at cricothyroid membrane.

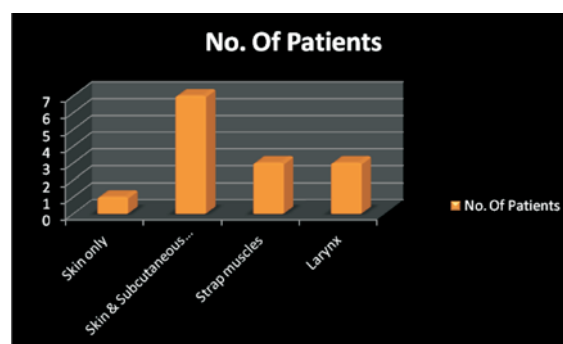


Table - II : Site (Depth) of Injury

One patient having a lip injury and another one having cut injury over nose were sutured under local anaesthesia. Most of the remaining patients (58%) had only skin & subcutaneous tissue injury. These patients usually had only bleeding and pain as their main complaint. Anterior Jugular veins were injured in 7 out of the 12 patients sustaining trauma over neck, leading to alarming bleeding which created needless panic amongst the relatives and patients. This injury was always controlled by ligating these high capacitance vessels. All the veins in the neck may be safely ligated if necessary, although repair of one internal jugular vein should be considered if ligation of both veins is necessary. The branches of external carotid artery may also be ligated if considered necessary for control of bleeding.

All the patients with strap muscle trauma were explored for any inadvertent injury to the deeper vessels. Hematomas (if any) were suctioned out & a gentle massaging wash with betadine solution (50% diluted in normal saline) was given to see for any hidden bleeding vessels. Hemostasis was achieved by unipolar/ bipolar cautery and 2-0 chromic catgut/ 2-0 silk suture materials.

CT scanning of the neck is often valuable for the evaluation of laryngeal injuries. Patients in stable



Figure I : Kite String Neck Injury with Hematoma



Figure II: Scar after healing.

condition who may have laryngeal injuries but who do not require immediate surgical treatment should undergo CT scanning of neck. In cases of excessive contusion the use of MRI in detecting details of soft tissue injuries can prove to be useful preoperatively, although we none of our patients required it. Laryngeal framework was injured in two of our patients. Of these one was a seven year old child who sustained a complete transection of cricothyroid membrane. It was repaired with non absorbable sutures and a tracheostomy was done contemplating the possibility of delayed airway compromise. He was fed with a Ryle's tube for one week keeping in mind the oedema in laryngopharynx noticed intraoperatively. Strapping of tracheostomy stoma was done after an uneventful first ten days and child was successfully shifted on oral feeds. The other patient was a 32 year old man whose thyroid cartilage had lacerations. The vocal cords were however normal and mobile; hence he did not require any tracheostomy. We were considering imaging these patients with CT scan if required, however the need did not arise.

Injuries to esophagus and pharynx are sometimes hard to diagnose and are missed during the management of other immediately life threatening injuries. Bleeding from mouth, drooling and occasionally subcutaneous emphysema are all suggestive of upper digestive tract injury. Esophageal injuries if found intraoperatively should be debrided and closed in double layers. Oral feeds should not be started till all such injuries are ruled out/ healed. We did not find any patient with frank esophageal tear in our series.

57 % of our patients were admitted for varying periods between 3-7 days. Clean dressings, completion of medico legal formalities and patient's willingness to come for advised follow up dressings/ suture removals were the criteria deciding discharge of indoor patients.

Suture removals were commonly performed on 8th-10th post operative day.

One patient developed a serous fluid collection at wound site which gradually subsided with regular dressings. All the other patients had an uneventful recovery, the only complaint usually being the unsightly scar on their necks.

CONCLUSION

Kite string slit neck injuries remain challenging, as there are a number of important structures and injury to any of these small structures may not be readily apparent. As the population density keeps on increasing so will the fervor of celebrating kite flying especially in the Gujarat. Responsible celebration of festivals in open spaces far off the city limits would go a long way in good celebration avoiding unnecessary problems to general public. Also legislation banning use of glass in making of manja threads would prevent such severe injury. Head-Neck protection while riding two wheelers would also help in avoiding kite string injuries.

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ORIGINAL ARTICLE

Cancer Profile in Patan District, Gujarat: A Comprehensive Review

Parimal J. Jivarajani*, Prachi K. Shah**, Jayesh B. Solanki***, Himanshu V. Patel***, Vishruti B. Pandya****, Shilin N. Shukla*****,

*Associate Professor and Head, ** Bio statistician, ***Statistical Assistant, **** Junior Statistical Assistant, *****Hon. Director and Professor of Medical Oncology

Department of Community Oncology and Medical Records, GCRI, Civil Hospital, A'bad.

KEY WORDS : 1)Cancer, Incidence Rates, Method of Diagnosis

ABSTRACT :

Cancer is a disease which shows significant variation with time and across geographical entities. In this paper, we make a start in that direction, with an aim to measure as accurately as possible the incidence of cancer (all types) in Patan district, to compare Crude Incidence Rates, Age Adjusted Incidence Rates, and Truncated Incidence Rates with different population based cancer registries of Gujarat state. The Gujarat Cancer and Research Institute (GCRI) is the prime source of data on cancer cases, along with other sources which were recorded cancer cases contributed data for this study. Information on cases from these sources was subjected to meticulous verification regarding repetition, place of residence and other potential errors. The estimated number of cancer cases in 2011 was 310 men and 162 women and the Age Adjusted Incidence Rates (AAR) were 61.84 and 28.63 per 100,000 populations in men and women respectively. Oral Cavity, Colon & rectum, Lung, Leukemia, Esophagus, Stomach, Thyroid, Skin & melanoma, Non-Hodgkin Lymphoma were the commonly observed sites in both sexes. Though it was noted that oral cavity and breast cancer that ranked the first in men and women respectively in Patan district. During the year 2011, 96.45% of the cases among males and 95.06% of the cases among females were confirmed microscopically. The rates of Patan district was exceptionally lower than in other registries. To reach sound conclusions about extent and determinants of cancer, immense multi-spectrum efforts are now needed.

INTRODUCTION

The burden of Cancer is still increasing worldwide despite advances for diagnosis and treatment. Epidemiological studies have shown that many cancers may be avoidable. It is widely held that 80% - 90% of human cancers may be attributable to environmental and lifestyle factors such as tobacco, alcohol and dietary habits. ^[1]Based on the GLOBOCAN 2008 estimates, about 12.7 million cancer cases and 7.6 million cancer deaths are estimated to have occurred in 2008, of these, 56% of the cases and 64% of the deaths occurred in the economically developing world. ^[2] Cancer is not uncommon in India, where the number of people living with the disease is estimated to be around 2.5 million, with over 0.8 million new cases and 0.55 million deaths occurring each year. ^[3] From the population based registries in India covering 28-30 million population from different parts of the country, the age adjusted incidence rates vary from 44 to 122 per 100,000 population in males and 52 to 128 per 100,000 females. ^[4,5,6]

Patan, the 14th largest district in Gujarat state spreads in an area of 5,742.19 square kilometers includes 7 talukas – Patan, Sami, Harij, Chanasma, Sidhpur, Radhanpur

and Santalpur. The patan district has a population of 11, 82,709 with 6, 12,100 males and 5, 70,609 females as per the 2001 census. The Male: Female ratio in Patan district was 932 females per 1000 males. The density of population is 206 persons per square kilometers.

The objectives of this study are to determine valid estimates of annual incidence rates of cancer cases, to study cancer profile in the male and female population and to observe method of diagnosis of all the cancer cases registered in the patan district in 2011.

MATERIALS AND METHODS

Cancer Registration system of Patan district covers more than 100 sources. The trained field staff visits various sources of registration in all government hospitals, private hospitals, nursing homes and diagnostic laboratories besides the base Institution (GCRI) and death registration units in defined area and actively pursued and collected information on cancer cases reported. Trained staff fills the core performa by direct interview with patient or relative at time of registration in GCRI everyday. The inclusion criteria for registration of cases is that patients who have lived in the defined areas of Patan district for a minimum period of one year of first diagnosis of cancer.

Correspondence Address : **Dr. Parimal J. Jivarajani**
A-301, Ashirwad Residency, Opp. Jalarammandir, Paldi,
Ahmedabad-380006

Every cancer death not traceable or not matched with registered cases in record files, with same year or with previous years, was labeled as an 'unmatched death' and the date of death was then taken as the date of first diagnosis, and was so registered in the corresponding year's data file as Death Certificate Only (DCO) cases.

As per the National Cancer Registry Programme, (ICMR) this study has started work with data collection, data entry, coding and analysis.^[7] The sites of all cancers were classified on the basis of ICD-10 for site coding.^[8] Third Edition of the International Classification of Disease for Oncology is being used for morphology coding.^[9]

Only invasive cancers (5th digit morphology code 3 or 6) were reported. Benign tumors and insitu cancers are not included for analysis. In this study, Crude Incidence Rate (CIR), Age Specific Incidence Rate (ASpR) and Age Adjusted Incidence Rate (AAR) are used for analysis. The CIR is calculated by dividing total number of new cases registered during a year by corresponding population of that year and multiplying the result by 100,000. Age Specific Incidence Rate refers to the rate obtained by dividing the total number of cancer cases by the corresponding estimated population in that age group and multiplying by 100,000. As age increases, the incidence of cancers also increases therefore with an increase in the median age of population the cancer incidence also increases in the community. In order to make rates comparable between two populations or countries, the five year age distribution of the world standard population is taken into account to obtain the age adjusted rates (AAR). The distribution of cancer cases by method of diagnosis for males and females are calculated. Primary histology, Secondary histology, Cytology and Bone marrow examinations are considered as microscopic diagnosis. Other methods describes as X-ray or Imaging and Death Certificate Only (DCO).

OBSERVATIONS

The number of cancer cases registered in 2011 was 472 with 310 males and 162 females. The Crude Incidence Rate among males and females were 43.90 and 24.92 per 100, 000 populations respectively. The corresponding Age Adjusted Incidence Rates (AAR) was 61.84 and 28.63. The truncated incidence rate among males and females were 128.17 and 63.77 per 100,000 persons respectively. The Male: Female ratio of cancer cases in Patan district was 1.91:1. Oral cavity, Pharynx and lung were the three commonest primary sites of cancer in males with the rates of 15.44, 10.68 and 7.6 per 100,000 population respectively.(Figure:1) In females, Cancers of the breast, cervix uteri and oral cavity were the three most common cancers with the rates of 7.26, 3.72 and 2.81 per 100,000 population respectively.(Figure:2) The Age Specific Incidence Rates ranges between 2.4 (10-14 year

age group) to 277.1 (70-74 year age group) per 100,000 population among males and 1.56 (0-4 years age group) to 116.08 (55-59 years age group) per 100,000 population among females. Graphical representation of leading cancers in patan district is shown in figure: 1 and figure: 2. Estimated numbers of cancer cases, Age Specific Incidence Rates, Crude Incidence Rates, Age Adjusted Incidence Rate (AAR) and Truncated Incidence Rate (TR) for cancer sites for males and females are presented in table: 1 and table: 2.

The highest crude incidence rate (CIR) per 100,000 population among males was observed in Ahmedabad-Urban (88.2) followed by Ahmedabad- Rural (52.6) and Gandhinagar (52.47). Similarly among females the highest CR was observed in Ahmedabad-Urban (77.2) followed by Ahmedabad – Rural (47.5) and Gandhinagar (39.0). Age Adjusted Incidence Rate per 100,000 populations in males ranged from 68.53 in Gandhinagar to 119.2 in Ahmedabad- Urban. Similarly in females, it ranged from 42.1 in Gandhinagar to 89.2 in Ahmedabad-Urban. The truncated rate per 100,000 populations in males ranged from Gandhinagar district (131.3) to Ahmedabad-Urban (205.8). Again the truncated rate per 100,000 populations in females ranged from Gandhinagar district (99.4) to Ahmedabad-Urban (185). Crude Incidence Rate, Age Adjusted Incidence Rate and Truncated Incidence Rates per 100,000 populations in different Population Based Cancer Registries of Gujarat State were presented in table: 4.

The distribution of cancer cases by method of diagnosis for males and females are presented in table: 3. A total of 453 (95.97%) cases were microscopically confirmed. The percentage of cases with microscopic verification of cancer diagnosis was slightly more in males compared to females. The numbers of case registered through death certificates only (DCO) are 13 (2.75%) and X-ray or imaging techniques are 5 (1.06%). The distributions of cancers by detailed microscopic diagnosis and gender are presented in Figure: 3. In males 85.95% of cases were diagnosed through primary histology, 4.01% through cytology and 6.03% through bone marrow. Among females 86.36%, 5.19% and 4.55% were diagnosed through primary histology, cytology and bone marrow respectively. The diagnosis through secondary histology was 4.01% and 3.90% for males and females respectively.

DISCUSSION

The major concern of this study is to calculate cancer incidence rates and to know cancer profile in the male and female population in Patan district. Total 472 cancer cases were reported in Patan district during 2011. The estimated Age Adjusted Incidence Rates of all cancers in Patan were 61.84 and 28.63 per 100,000 populations in

Table: 1 Average Annual Age Specific, Crude (CR), Age Adjusted (AAR) and Truncated (35-64 years) Incidence Rate per 100,000 Population, 2011-Males, Patan district.

Male Site	ICD (10th)	0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	All Ages	CR	AAR	TR
Oral Cavity	C00-08	-	-	-	-	-	2	16	10	28.7	19	53.2	76.8	52.8	31	63.9	42.4	80	11.32	15.44	36.38
Pharynx	C09-10,C12-14	-	-	-	-	-	-	-	2	7.18	6.2	32.8	35.5	68.6	47	42.6	84.7	47	6.66	10.68	21.68
Nasopharynx	C11	-	-	-	-	-	-	-	-	-	-	-	-	7.8	-	-	-	1	0.14	0.24	0
Oesophagus	C15	-	-	-	-	-	-	-	-	6.2	8.19	11.8	15.8	7.8	-	21.2	12	1.56	2.55	6.09	
Stomach	C16	-	-	-	-	-	-	2	2.39	-	-	-	-	24	-	-	5	0.71	0.97	0.85	
Colon & rectum	C18-21	-	-	-	-	-	-	3.9	-	7.18	-	8.19	-	15.8	-	21.3	21.2	13	1.84	2.56	4.75
Liver	C22	-	-	-	-	-	-	-	2	-	3.1	-	-	-	7.8	-	-	3	0.42	0.54	0.98
Larynx	C32	-	-	-	-	-	-	-	-	-	9.3	12.3	17.7	15.8	7.8	21.3	-	15	2.12	3.17	8.11
Bronchus, lung	C33-34	-	-	-	-	-	-	-	2	9.58	9.3	32.8	23.6	21.1	55	21.3	42.4	35	4.96	7.6	15.09
Skin & melanoma	C43-44	-	-	-	-	-	-	2	-	2.39	3.1	4.09	-	5.28	-	21.3	-	7	0.99	1.29	2.4
Prostate	C61	-	-	-	-	-	-	-	-	-	-	-	-	10.6	7.8	-	-	3	0.42	0.66	1.36
Testis	C62	-	-	-	1.3	-	-	-	-	-	-	-	-	-	-	-	-	1	0.14	0.11	0
Penis	C60	-	-	-	-	-	-	-	2	-	-	-	-	-	-	10.7	-	2	0.28	0.33	0.38
Bladder	C67	-	-	-	-	-	-	-	-	-	-	-	5.91	5.28	-	-	-	2	0.28	0.45	1.44
Thyroid	C73	-	-	-	-	-	-	2	-	-	-	-	-	-	-	21.3	-	3	0.42	0.54	0
Hodgkin's disease	C81	-	1.2	-	1.3	-	-	-	-	-	-	-	-	-	-	-	-	2	0.28	0.23	0
NHL	C82-85,C96	-	-	-	-	-	2	-	2	-	3.9	-	-	5.28	-	-	-	4	0.57	0.82	1.12
Leukaemia	C91-95	3.84	1.2	1.2	-	1.6	-	5.9	2	2.39	12	-	-	-	-	-	-	15	2.12	2.17	3.23
All sites	C00-97	5.1	3.5	2.4	2.5	4.7	4	35	30	83.8	99	168	201	264	243	277	254	310	43.9	61.84	128.2

Table: 2 Average Annual Age Specific, Crude (CR), Age Adjusted (AAR) and Truncated (35-64 years) Incidence Rate per 100,000 Population, 2011-Females, Patan district.

Female Site	ICD (10th)	0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	All Ages	CR	AAR	TR
Oral Cavity	C00-08	-	-	-	-	-	2	1.9	7	2.64	6.4	8.74	-	4.73	19	9.65	10.5	16	2.46	2.81	5.03
Pharynx	C09-10,C12-14	-	-	-	-	-	-	-	-	-	-	4.37	4.84	-	-	-	-	2	0.3	0.41	1.33
Nasopharynx	C11	-	-	-	-	-	-	-	-	-	-	-	-	4.73	-	-	-	1	0.15	0.19	0.61
Oesophagus	C15	-	-	-	-	-	-	-	-	0	-	-	9.67	4.73	-	-	-	3	0.46	0.58	1.86
Stomach	C16	-	-	-	-	-	-	-	-	5.27	-	-	4.84	-	-	-	-	3	0.46	0.51	1.64
Colon & rectum	C18-21	-	-	1.5	-	1.6	-	3.9	2	-	-	-	9.68	-	-	-	-	7	1.08	1.02	1.66
Liver	C22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-
Larynx	C32	-	-	-	-	-	-	-	-	-	-	4.37	-	-	-	-	-	1	0.15	0.22	0.71
Bronchus, lung	C33-34	-	-	-	-	-	-	-	-	2.64	-	4.37	-	-	6.4	9.65	-	4	0.62	0.76	1.22
Skin & melanoma	C43-44	-	-	-	-	-	-	-	-	-	-	4.37	-	4.73	6.4	9.65	-	4	0.61	0.79	1.32
Breast	C50	-	-	-	-	-	-	5.8	9	10.5	9.6	30.6	48.4	14.2	19	29	-	40	6.15	7.26	18.59
Cervix uteri	C53	-	-	-	-	-	2	-	11	15.8	6.4	4.37	4.84	9.47	6.4	19.3	10.5	22	3.38	3.72	8.95
Corpus uteri	C54	-	-	-	-	-	-	-	-	2.64	-	-	-	-	-	-	-	1	0.15	0.16	0.51
Ovary	C56	-	-	1.5	-	-	-	-	4	-	3.2	4.37	9.67	4.73	-	-	-	8	1.23	1.38	4.02
Bladder	C67	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-
Thyroid	C73	-	-	-	-	-	2	1.9	-	-	-	-	4.84	-	-	-	10.5	4	0.62	0.68	0.62
Hodgkin's disease	C81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NHL	C82-85,C96	-	-	-	-	-	4	-	-	-	9.6	-	-	-	-	-	-	5	0.77	0.9	1.86
Leukaemia	C91-95	-	-	-	1.5	-	-	1.9	2	0	3.2	8.74	-	-	-	9.65	-	7	1.07	1.2	2.45
All sites	C00-97	1.56	0	4.4	1.5	3.3	10	17	41	52.7	45	87.1	116	66.3	108	96.5	42.1	162	24.92	28.63	63.77

Table: 3 Distributions of Cancers by Method of Diagnosis and Gender.

Method of Diagnosis	Male		Female		Total	
	n	%	n	%	n	%
Microscopic (Total)	299	96.45	154	95.06	453	95.97
-Primary Histology	257	85.95	133	86.36	390	86.09
-Secondary Histology	12	4.01	6	3.9	18	3.97
-Cytology	12	4.01	8	5.19	20	4.42
-Bone marrow	18	6.03	7	4.55	25	5.52
X-ray/Imaging	4	1.29	1	0.62	5	1.06
Others	1	0.32	-	-	1	0.22
DCO	6	1.94	7	4.32	13	2.75
Total	310	100	162	100	472	100

men and women respectively. The age adjusted incidence rates for all sites together in males varied from 68.53 in Gandhinagar (2011) registry to 68.9 in Ahmedabad - Rural (2009) and for 119.2 Ahmedabad - Urban (2009) registry. In females, the age adjusted incidence rates for all sites together varied from 42.1 in Gandhinagar (2011) registry to 52.9 in Ahmedabad - Rural (2009) and for 89.2 Ahmedabad – Urban (2009) registry.

The leading sites of cancer for each gender were decided on the basis of proportion relative to all sites of cancer. The major leading sites in male were oral cavity, pharynx and lung which constituted 52.26% of the total cancers in male. The major leading sites in female were breast, cervix uteri and oral cavity which constituted 48.15% of

the total cancers in female. According to Gandhinagar, population based cancer registry (2011) oral cavity, lung and esophagus were the commonest sites among males while for females breast, cervix uteri and oral cavity were the most common sites of cancer.^[10] The population based cancer registry in Ahmedabad – Rural (2009) was founded oral cavity, lung and hypopharynx as the leading sites in males and cancer of the breast, cervix, ovary and myeloid leukemia were the leading sites among females.^[11] In Ahmedabad – Urban (2009), the most common sites were oral cavity, lung and esophagus among males, while breast, cervix, ovary and esophagus were the commonest sites among females.^[12] Clearly from the all population based cancer registries in Gujarat state, cancer of the oral cavity and lung are the commonest sites in males where as cancer of the breast and cervix are the commonest sites in females. We could consider some other study estimates in India. Oral cancer is a major problem in the Indian subcontinent where it ranks among the top three types of cancer in the country.^[13] Age adjusted rates of oral cancer in India is high, that is, 20 per 100,000 population and accounts for over 30% of all cancers in the country.^[14] Lung cancer is ranked as the leading cancer in Bhopal, Chennai, Delhi, Kolkata and Mumbai, besides north-eastern registries.^[15] Breast cancer accounts for 5.8% of all cancer in India,^[16] it is the most common cancer of urban Indian women, and the second most common in the rural women^[17] and the incidence is on the rise.^[18] The incidence of cervical cancer per 100,000 Indian women of all ages varied between 30.0 and 44.9. India bears about one fifth of the world's burden of cervical cancer.^[19]

On the basis of method of diagnosis 95.97% cases were microscopically confirm in this study. Similarly, Gandhinagar shown 99.09%^[10], Ahmedabad – Rural recorded 98.68%^[11] and Ahmedabad – Urban reported 96.75%^[12] microscopically confirmed cases.

Table: 4 Crude Rate (CR), Age Adjusted (AAR) and Truncated (TR) Incidence Rates per 100,000 population in different PBCRs of Gujarat State.

Registry	Male			Female		
	CR	AAR	TR	CR	AAR	TR
Patan (2011)	43.9	61.84	128.17	24.92	28.63	63.77
Gandhinagar (2011)	52.47	68.53	131.32	39	42.1	99.4
Ahmedabad -Rural (2009)	52.6	68.9	138.1	47.5	52.9	121.4
Ahmedabad -Urban (2009)	88.2	119.2	205.8	77.2	89.2	184.8

Figure: 1 Male Leading Cancer sites in Patan, 2011.
(Age Adjusted Incidence Rates per 100,000 populations)

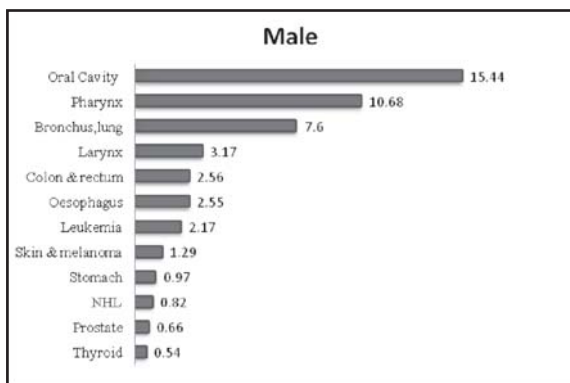


Figure: 2 Female Leading Cancer sites in Patan, 2011.
(Age Adjusted Incidence Rates per 100,000 populations)

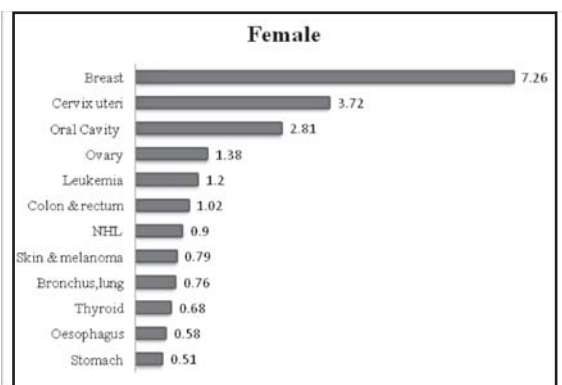
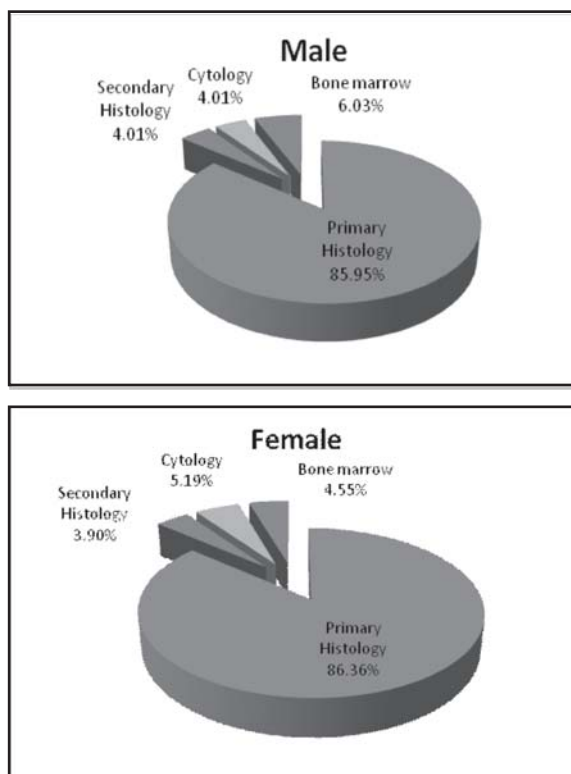


Figure: 3 Distribution of Cancers by detailed microscopic diagnosis and gender in Patan district, 2011.



This type of cancer burden and patterns helps in determining clues to the cause of cancer. With the help of this result certain epidemiological studies are required to ensure the quality of data and common exposure to cancer risk factors. Health education to the public for better nutrition, safe sexual practices, attention to personal self examination and genital hygiene and tobacco control will go a long way in decreasing the incidence of malignancies.^[20]

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ORIGINAL ARTICLE

Ultrasonographic and FNAC correlation of thyroid lesions.

Ankush Dhanadia*, Harshad Shah**, Asutosh Dave**

*Resident Doctor, ** Professor & Head, *** Sr. Prof.

Dept. of Radiodiagnosis, C. U. Shah Medical College, Dudhrej Road, Surendranagar - 363 001.

KEY WORDS : FNAC, Thyroid, USG.

ABSTRACT

Introduction : The thyroid gland is the largest of all endocrine glands and is the only one which is amenable to direct physical examination because of its superficial location. Superficial location of the thyroid gland allows excellent visualization and evaluation of its normal anatomy and pathologic condition by high resolution real-time grey-scale sonography. The aim of this study is to assess the role of high resolution real time grey scale ultrasonography in evaluating patient with thyroid enlargement.

Materials and Methods : This prospective study was carried out on 100 patients who came our department from period of May 2011 to December 2011. Gray scale ultrasound of neck followed by USG guided FNAC of thyroid swelling in 100 patients aged 10 to 80 years was done.

Results : Out of 100 cases, 8% were malignant, 66% were benign and 26% were indeterminate lesions on grey scale ultrasound. All the 8 malignant cases were correctly diagnosed as malignant on pathology. Out of 66 benign cases, 2 benign cases proved to be malignant on pathology as papillary carcinoma. Both cases on USG presented as a hypo echoic lesion with well defined margin and coarse calcification. Due to coarse calcification they were diagnosed as benign on ultrasonography but turned out to be malignant on pathology as papillary carcinoma. Out of 26 indeterminate cases, 2 cases proved to be malignant and 24 cases benign on pathology.

Conclusion : High resolution grey scale ultrasound has emerged as an initial imaging modality of choice for the evaluation of patients with thyroid enlargement Ultrasound can detect solitary nodule, multiple nodules and diffuse thyroid enlargement .It can also differentiate solid and cystic lesions.

INTRODUCTION

The thyroid gland is the largest of all endocrine glands and is the only one which is amenable to direct physical examination because of its superficial location. Superficial location of the thyroid gland allows excellent visualization and evaluation of its normal anatomy and pathologic condition by high resolution real-time grey-scale sonography.

Ultrasound is generally the first choice for the evaluation of thyroid morphology because of its high sensitivity for small nodule detection. The spatial resolution achieved by ultrasound is of the order of 0.7 to 1 mm, not achieved by any other imaging method.⁵ The advantages of ultrasound are that it is an easily accessible, inexpensive, non-invasive and highly sensitive imaging modality for distinguishing cystic from solid lesion. Color Doppler study helps in assessment of blood flow in addition to depiction of the morphology.

The aim of this study is to prove usg as the best first line investigation for thyroid lesions supported by FNAC correlation.

MATERIAL AND METHODS

This prospective study was carried out on 100 patients who attended the various OPD and/or IPD of in C. U. Shah Medical College and Hospital, Surendranagar, Gujarat, from May 2011 to December 2011. Gray scale ultrasound of neck followed by USG guided FNAC of thyroid swelling in 100 patients aged 10 to 80 years was done.

Patient selection

It was based on following criteria:

Physical examination suggestive of palpable thyroid swelling in lower neck in midline or on either side.

Sign and symptoms suggestive of thyroid disorder (Hyper/ Hypothyroidism)

Exclusion criteria

Patient already diagnosed and treated for thyroid lesion

FNAC showing inadequate aspirated material.

RESULT

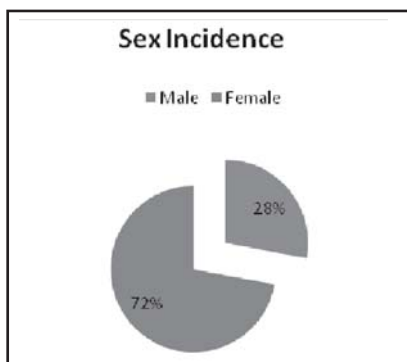
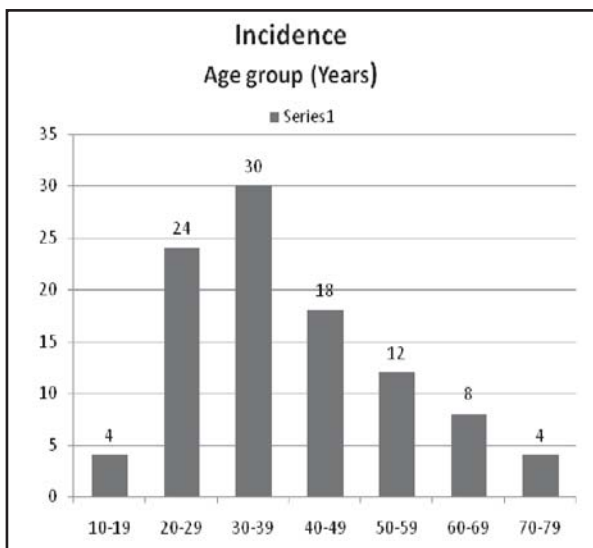
Out of 100 cases, 8% were malignant, 66% were benign and 26% were indeterminate lesions on grey scale

Correspondence Address : Dr. Ankush Dhanadia Resident, Dept. of Radiodiagnosis
C. U. Shah Medical College, Dudhrej Road, Surendranagar, 363 001.
Mob. No.: 9601546424 FAX : (02752)-256006 E- Mail: ankush160284@gmail.com

ultrasound. All the 8 malignant cases were correctly diagnosed as malignant on pathology. Out of 66 benign cases, 2 benign cases proved to be malignant on pathology as papillary carcinoma. Both cases on USG presented as a hypoechoic lesion with well defined margin and coarse calcification. Due to coarse calcification they were diagnosed as benign on ultrasonography but turned out to be malignant on pathology as papillary carcinoma.. Out of 26 indeterminate cases, 2 cases proved to be malignant and 24 cases benign on pathology.

Table 1 : Age Incidence

Age group (years)	No. of patients	Percentage
10-19	4	4%
20-29	24	24%
30-39	30	30%
40-49	18	18%
50-59	12	12%
60-69	8	8%
70-89	4	4%
Total	100	



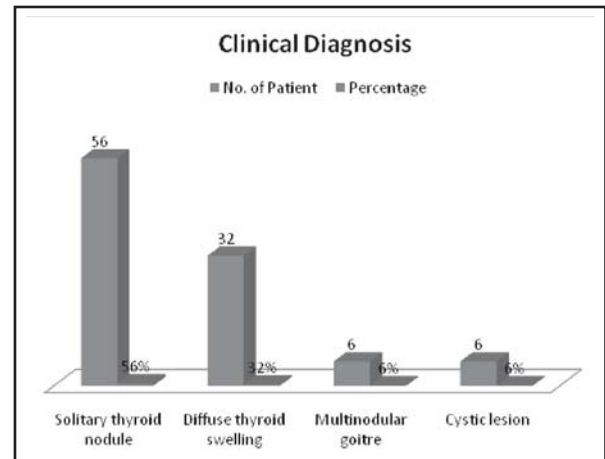
Sex Distribution : Thyroid Lesion

Table 3 : Clinical Symptomatology

S.No.	Clinical Symptoms	Patients	Percentage
1.	Thyroid Enlargement	100	100%
2.	Pressure effects	13	13%
3.	Signs of Hyperthyroidism	6	6%
4.	Pain	15	15%
5.	Fever	10	10%
6.	Fracture Bone	2	2%
7	Convulsion	1	1%

Table 4 : Clinical Diagnosis

Clinical diagnosis	No. of patients	Percentage
Solitary thyroid nodule	56	56%
Diffuse thyroid swelling	32	32%
Multinodulargoitre	6	6%
Cystic lesion	6	6%
Total	100	100%



DISCUSSION

Age Distribution

In the present study most of the patients (30%) were in 30-39 years age group, the youngest being 18 years old and the eldest 74 years old. The mean age was 39 years. In a similar study by I. S. Nam Goong⁷⁶ et al., the age range was 26-75 years with mean age of 51 years.

Gender Distribution

In the present study, 72% patients were female and 28% were male. The male to female ratio was 1:2.5. So, females are more commonly affected than males. In a study by I. S. Nam Goong⁷⁶, et al. 78% patients were females and 22% males.

Clinical Presentation

All the 100 patients presented with clinical thyroid enlargement, either in the mid line or on the lateral aspect. 94% patients presented with gradual onset and 6%

Table 5 : Distribution of Various Thyroid Pathologies in relation to Age and Sex

Age Group (In Yrs.)		Benign			Malignant				Total
		Goiter	Thyroiditis	Follicular Adenoma	Follicular	Papillary	Anaplastic	Medullary	
10-19	M	0	0	0	0	0	0	0	0
	F	4	0	0	0	0	0	0	4
20-29	M	2	1	2	0	0	0	0	5
	F	16	1	2	0	0	0	0	19
30-39	M	5	1	2	2	0	0	0	10
	F	19	1	0	0	0	0	0	20
40-49	M	2	0	0	0	0	0	0	2
	F	8	2	4	0	2	0	0	16
50-59	M	3	0	0	0	1	0	0	4
	F	5	0	0	0	2	1	0	8
60-69	M	4	0	0	0	2	0	0	6
	F	2	0	0	0	0	0	0	2
70-79	M	1	0	0	0	0	0	0	1
	F	1	0	0	0	0	2	0	3
Total	M	19	2	2	2	3	0	0	28
	F	53	4	8	2	3	2	0	72
		72	6	10	4	6	2	0	100

Table 6 : Pathological Diagnosis of Thyroid Lesions

Pathological diagnosis	No. of patients	Percentage
Goitre	72	72%
Thyroiditis	6	6%
Follicular adenoma	10	10%
Carcinoma	12	12%
Total	100	100%

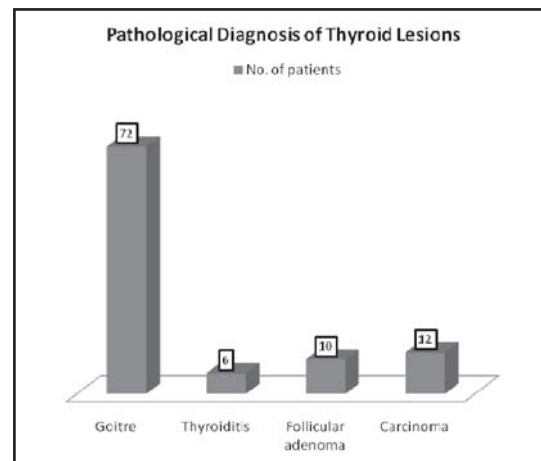


Table 7 : Sonographic Features of Various Thyroid Lesions

Sonographic Features	Benign			Malignant				Total
	Goiter	Thyroiditis	Follicular Adenoma	Follicular	Papillary	Anaplastic	Medullary	
Hyperechoic	18	0	0	0	0	0	0	18
Hypoechoic	18	6	0	0	6	0	0	30
Anechoic	22	0	2	0	0	0	0	24
Isoechoic	8	0	8	2	0	0	0	18
Mixed Echo.	6	0	0	2	0	2	0	10
Single Nodule	52	0	10	2	6	2	0	72
Multiple Nodules	16	0	0	2	0	0	0	18
Diffuse	4	6	0	0	0	0	0	10
Peri-lesional Halo	20	0	8	0	0	0	0	28
Calcification	22	0	2	2	6	2	0	34
Comet-Tail Artifact	12	0	0	0	0	0	0	12
Well-Defined Margin	56	0	8	2	4	0	0	70
Ill-Defined Margin	16	6	2	2	2	2	0	30
Solid	30	6	8	2	6	2	0	54
Cystic	24	0	2	0	0	0	0	26
Solid + Cystic	18	0	0	2	0	0	0	20

Table 8 : Radiological Diagnosis of Thyroid Lesions

Radiological diagnosis	No. of patients	Percentage
Benign thyroid lesion	30	30%
Goitre	26	26%
Diffuse thyroid enlargement	10	10%
Malignancy	8	8%
Indeterminate lesion	26	26%
Total	100	100%

Table 9 : Correlation of Radiological Diagnosis with Pathological Diagnosis

Radiological diagnosis	No. of Cases	Pathological diagnosis	
		Benign	Malignant
Benign	66	64	2
Malignant	34	24	10
Total	100	88	12

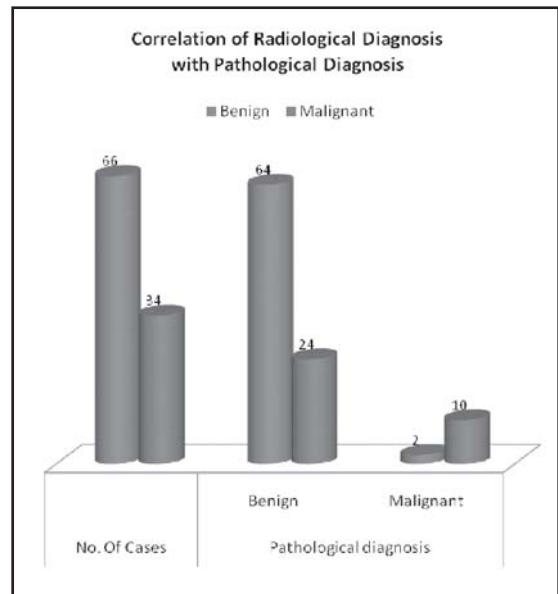


Table 10 : Correlation of Sonographic findings with Pathological Diagnosis

Sonographic Findings		Histopathology			
		Benign		Malignant	
		Reading	%	Reading	%
(a)	Single/Multiple Nodules				
	Single	62	62%	10	10%
	Multiple	16	16%	2	2%
	Diffuse	10	10%	0	0
(b)	Echogenecity				
	Hyperechoic	18	18%	0	0
	Hypoechoic	24	24%	6	6%
	Anechoic	24	24%	0	0
	Isoechoic	16	16%	2	2%
	Mixed echoic	6	6%	4	4%
(c)	Halo				
	Present	28	28%	0	0
	Absent	60	60%	12	12%
(d)	Calcification				
	Present	24	24%	10	10%
	Absent	64	64%	2	2%
(e)	Comet-tail Artifact				
	Present	12	12%	0	0
	Absent	76	76%	12	12%
(f)	Margin				
	Well defined	64	64%	6	6%
	Ill-defined	24	24%	6	6%
(g)	Component				
	Solid	44	44%	10	10%
	Cystic	26	26%	0	0
	Solid + Cystic	18	18%	2	2%

presented with sudden onset of thyroid swelling. Pressure effects from thyroid swelling (Dyspnoea, Dysphagia, Hoarseness of voice) was seen in 13 (13%), signs of thyrotoxicosis (loss of weight in spite of good appetite, insomnia, tremors, irritability, exophthalmos, menstrual irregularities, dry skin, hair loss, lethargy, hoarseness of voice, failing memory) was present in 6%, pain in 15% fever 10%, pathological fracture due to metastases from thyroid malignancy seen in 2% and convulsion in 1% from CNS metastases. Clinically 56 (56%) presented with solitary thyroid nodule out of which 8 (14.2%) had multiple nodules on ultrasound. In a study by William Scheible and

George Leopold, et al.⁵⁵ out of 73 solitary nodule 36 (48.6%) showed multiple nodules on USG.

Thus, USG is helpful in finding other nodules in cases of clinically suspected solitary thyroid nodule, though the detection rate was lower in our study as compared to others.

Pathological Diagnosis

Out of 100 cases, 88% were benign and 12% were malignant. Out of 12 malignant cases, 5 (41.6%) seen in male and 7 (58.4%) seen in female with wide age distribution between 30-79 years. Percentage of

malignancy in male is 5 (17.85%) out of 28 and female is 7 (9.72%) out of 72. Papillary carcinoma seen in (50%) cases, follicular carcinoma in 4 (33.37%) and anaplastic carcinoma in 2 (16.7%) of cases. In a study by Joseph F. Simeone, et al.⁵⁶ in 1985, 87.2% cases were benign and 12.7% cases were malignant. Out of 17 malignant cases, 9 (52.9%) had papillary carcinoma, 2 (11.7%) had medullary carcinoma, 2 (11.7%) had follicular carcinoma, 2 (11.7%) had anaplastic carcinoma and 2 (11.7%) had metastases.

Most common benign pathology in the present study was benign goiter seen in 72% cases. Follicular adenoma was found in 10% and thyroiditis in 6% of patients.

BENIGN THYROID LESION (88 Cases)

Ratio (Male:Female)

In the present study ratio of Male : Female was 1: 2.7, While in study by Eun-Kyuny Kim³⁴ in 2002, the ratio of Male to Female and 12 (10.34%) were diagnosed to be thyroiditis.

Goitre (72 Cases)

In the present study, maximum 30.5% lesions were anechoic, 25% each were hyperechoic and hypoechoic, 11.1% were isoechoic and 8.3% showed mixed echogenicity.

Perilesional halo was seen in 27% cases, calcification in 30.5% cases and comet-tail artifacts in cystic lesion due to cholesterol crystal were seen in 16.6% cases.

Single nodule noted in 72.2% cases, multiple nodules in 22.2% and diffuse thyroid enlargement in 5.5% cases.

Margin was well-defined in 77.7% and ill-defined in 22.3%.

Out of 72 cases, 41.6% were solid, 33.3% were cystic and 25% had solid-cystic components.

In a study by A. Ahuja et al.²⁶, all 100% patients with comet-tail artifact proved to be benign by FNAC.

Follicular Adenoma (10 Cases)

Out of 10 cases, 8 (80%) were isoechoic and 2 (20%) were anechoic. Perilesional halo was seen in 80% cases which help to identify isoechoic lesion surrounded by peripheral sonolucent rim. In a study by Joseph F. Simeone et al.⁵⁶, 81% of follicular adenoma showed decreased echogenicity relative to normal thyroid gland, 12.6% showed increased echogenicity and 6.4% were isoechoic. A cystic lesion was seen in 1.5% cases. Perilesional halo was seen in 54.4% cases.

Thyroiditis (6 Cases)

Two were seen in male and 4 in female patients. The ratio of male to female being 1:2. All the 6 (100%) cases were diffusely enlarged hypoechoic thyroid with ill-defined margin. In a study by Joseph F. Simeone et al.⁵⁶, all 100% patients showed diffusely abnormal echo-pattern

consisted of multiple small low-level echoes with a decrease in overall echogenicity.

MALIGNANT THYROID LESIONS (12 Cases)

In present study out of 12 cases, 66.6% were in the age group of 30-60 years and 33.3% patients were more than 60 years of age. Mary C. Frate, Casol B. Benson, Peter M. Doubilet et al.⁹ showed that malignancy was more common in patients who were younger than 20 years or older than 60 years of age; than in patients between 20 and 60 years of age.

Percentage of malignancy in male was 17.85% and in female it was 9.72% in present study.

In a study by Kim E. K. et al.³⁴, the rate of malignancy was significantly higher in women than in men (23.6% in women and 11.9% in men).

In present study 50% malignant lesions were hypoechoic, 33.3% were mixed echogenic and 16.7% were isoechoic.

In our study, 10 (83.3%) malignant lesions had single nodule and 2 (16.7%) had multiple nodules.

In present study 83.3% malignant cases had calcification within nodules.

Study done by Mary C. Frates, Benson C.B., Doubilet P M, et al.⁹ noted that the presence of any calcification within nodule raises the likelihood of malignancy. In particular microcalcification in a predominantly solid nodule is associated with approximately three-fold increase in cancer risk as compared with solid nodule without calcification.

Margin of lesion was well-defined in 50% and ill-defined in 50% of cases in present study.

L. Solbiatiet al.³⁹ in 1985 showed that margin was ill-defined and irregular in 69.7% and well-defined in 30.3%. Thyroid lesion with well-defined margin suggests benign pathology. However, results are equivocal in our study.

None of the malignant lesions showed perilesional halo or comet-tail artifacts due to cholesterol crystal.

Sensitivity/Specificity of ultrasound for detecting malignant thyroid Lesion

In our study for detection of malignancy ultrasound had sensitivity of 83.3%, specificity 72.7%, PPV 29.4%, NPV 96.9% and accuracy of 74%. In study by Eisuke Koike et al.³⁵, the sensitivity was 81.8% and specificity was 91%.

CONCLUSION

High resolution grey scale ultrasound has emerged as an initial imaging modality of choice for the evaluation of patients with thyroid enlargement. Ultrasound can detect solitary nodule, multiple nodules and diffuse thyroid enlargement. It can also differentiate solid and cystic lesions.

Ultrasound has detected additional occult nodules in 8 patients out of 56 presented with solitary thyroid nodule clinically.

Various sonographic features like number, echogenicity, solid/cystic component, margin, peripheral halo, calcification and comet tail artifact help to characterize the thyroid lesion which is not possible on any other imaging modality.

Neck masses can be differentiated whether they are arising from thyroid or extrathyroidal tissue. Thyroid lesions with capsular invasion, displacement of adjacent structure and cervical lymph nodes enlargement can also be detected.

Thyroid malignancy cannot be diagnosed on ultrasonography but various sonographic features in combination can be used to predict malignancy in thyroid lesions. Using these multiple features grey scale ultrasound has accuracy of 74% with sensitivity of 83.3% and specificity of 72.7% for detecting thyroid malignancy, considering USG guided FNAC as a standard. FNAC is always suggested for the final confirmation of diagnosis in sonographically detected suspicious thyroid nodule.

Real time sonography is a valuable tool to guide the needle for FNAC, especially for the small size thyroid nodule (< 1.5 cm) as well as for the aspiration of cysts.

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ORIGINAL ARTICLE

Prospective Comparative study of sclerotherapy by hypertonic saline and absolute alcohol for the treatment of hemorrhoids

Dr. Vineet F. Chauhan, Dr. Kavach Patel, Dr. M.M. Anchalia

Dept. of General Surgery, B.J. Medical College, Ahmedabad.

KEY WORDS : Hemorrhoids, Sclerotherapy, Absolute alcohol, hypertonic saline

Abstract :

Background : Hemorrhoids are tortousity of rectal veins affecting almost 4.4% of the population. Various operative and non operative therapeutic options are in practice to treat hemorrhoids, yet none has been proven cent percent effective. Sclerotherapy is a simple, safe and cost effective procedure that is widely practiced globally to treat hemorrhoids. Many sclerosants are being used with variable efficacies. This prospective and comparative study was conducted to find out the safety and efficacy of two sclerosants- Hypertonic saline and Absolute alcohol as an office procedure in hemorrhoids.

Material & Methods : 134 patients of both gender having hemorrhoids who attended OPD at our center from January 2007 to April 2009 were included in this prospective study. P/R and proctoscopy was used to confirm the disease. The patients were randomly distributed into two groups A and B of 67 patients each with first, second and third degree hemorrhoids. Group A were given Hypertonic Saline as sclerosant while Group B were given absolute alcohol as sclerosant. Sclerotherapy is repeated at interval of 3 weeks till symptomatic relief is achieved. Maximum four sittings of sclerotherapy were given. Patients were called for follow up at 6 months and 1 year.

Results : Group A (Hypertonic Saline) had overall success rate of 76.1% whereas group B (Absolute Alcohol) had a success rate of 80.5% in control of bleeding. The effectiveness in treating prolapse was 76.9 % and 75% in group A and Group B respectively. 54.9% patients in group A and 51.8% patients in group B required single session of sclerotherapy. There was no statistically significant difference in results between the two sclerosants. These results were comparable with results of other sclerosants in literature. Moreover both sclerosants proved to be more cost effective than other sclerosants in use.

Conclusions : Injection sclerotherapy is a suitable office procedure for treatment of hemorrhoids. Hypertonic saline and Absolute alcohol are two cost effective sclerosants which can be used treat hemorrhoids.

INTRODUCTION

Hemorrhoids is a common disease with a prevalence of 4.4% with a peak occurring in both sexes between 45-65 years¹. Many misunderstandings regarding hemorrhoid complaints still exist amongst common men. A precise definition of hemorrhoids does not exist but they can be described as varicosities in rectum and anal canal.

Sclerotherapy is time honored, out patient procedure that is widely practiced globally to treat hemorrhoids. It started about one and a half century and ago and was first advocated in US by Blackwood in 1866. This method initially gained wide acceptance but died down soon rapidly due to complications attributable to sclerosing solution and the procedure used by the charlatans and ignorant practioners. Recently enthusiasm on the use of sclerosing agent in the treatment of internal hemorrhoids is the result of exceptionally good experience of its use in control of variceal and non variceal bleeding in upper GIT,

and availability of newer and safer sclerosants. Moreover the procedure is simple, safe, cost effective, and painless which can be administered as an out patient setting. Various sclerosants such as 5% Phenol in almond oil, Phenol in Arachus oil, Sodium tetradecyl sulphate, Polidocanol, Quinine, Ethanalamine oleate, Aetoxisclerol, Xiao Zhi lign(XZL) and most recently OC-108, .Hypertonic saline and Absolute alcohol have been used in clinical trials previously^{1,2}. However the long term results and efficacies are yet to be established.

Keeping in view the above mentioned factors, the world wide changing trends in the treatment of hemorrhoids and because of very few available studies, a randomized prospective study of sclerotherapy with Hypertonic saline and Absolute alcohol in cases of hemorrhoids has been undertaken, which aims to compare the results of these two sclerosants as well as with other sclerosants in terms of persistence of symptoms, number of sessions required, complications and cost effectiveness.

Correspondence Address : Dr. Vineet F. Chauhan
Dept. of Surgery, B.J. Medical College, Civil Hospital,
Ahmedabad-16.

MATERIALS AND METHODS

In our study all patients who attended out patient clinic having cardinal symptoms of hemorrhoidal disease were included. Per rectal examination and proctoscopic examination was used to confirm the disease. A total of 134 patients, of both gender having 1st, 2nd, and 3rd degree hemorrhoids were included and divided into two groups randomly: Group A of 67 patients received hypertonic saline and Group B of 67 patients received Absolute alcohol.

Hemoglobin% was done in all patients. Coagulation profile was also done. Other investigation like Barium enema, sigmoidoscopy, & colonoscopy was done if there was suspicion of cause of bleeding other than hemorrhoids.

Sclerotherapy was not performed in those patients having history of intolerance to other sclerosants, bleeding diathesis, pregnancy (first and last trimester), breast feeding, acute severe cardiac disease, and history of recent thrombosis. Patients having acute prolapsed and thrombosed hemorrhoids, and inflammatory anorectal conditions like fissures, fistula, and ulcerative colitis were also not included in the study.

Materials required : Absolute alcohol(99.5%), Hypertonic Saline(20%), 2% lignocaine solution, spinal needle(23/24Guaze), 5cc syringe, anoscope with illumination(torch) lignocaine jelly, gloves and gauze piece.

Preparation of sclerosant : Hypertonic Saline solution 4:1 proportion of hypertonic saline with lignocaine to form 3cc solution for a single sitting. Absolute alcohol solution 3:1 proportion of absolute alcohol with lignocaine was made to form 3cc solution for single sitting.

Procedure : After taking consent, patient is laid on left lateral (Sims') position. Sub mucosal injection(around pedicle) of pre defined sclerosant(1cc) is injected raising bleb(Blanchard method) which turns mucosa pale in contrast to surrounding mucosa which is pink of the identified hemorrhoid. Injection should be given above dentate line where little or no pain should be felt. Maximum three injections are given per session.

Post procedure : Needle was withdrawn slowly after 10 to 15 seconds so as to avoid bleeding and leakage of sclerosant. Slight bleeding after the injection was controlled by topical application 1:10000 adrenaline solution and a gauze piece was left in place for a while. Patient were kept in supine position for a few minutes and observed for any side effects. Patients were advised Hot Seitz bath, high fiber diet, plenty of fluids and non steroidal anti inflammatory drugs if there is dull pain or discomfort.

Follow up : Sclerotherapy was given every 3 weeks for a maximum of four sessions. Failure of this modality was

considered if patient was not relieved after four sessions. Patient was called for follow up at six months and at one year. P/R and proctoscopy was done to evaluate the hemorrhoids.

RESULTS

Both Group A and B had 67 patients each. Age of the patients varied from 15 to 77 years, with a mean age of 41 years. All patients of Group A and Group B had pretreatment symptoms of bleeding P/R. Other symptoms included prolapse in 13 and 8 patients, constipation in 7 and 8 patients and painful defecation in 6 and 3 patients respectively. The results were declared as relief of bleeding P/R and prolapse which comprised the main symptom of the patients.

Both Group A and B had 67 patients each. Age of the patients varied from 15 to 77 years, with a mean age of 41 years. All patients of Group A and Group B had pretreatment symptoms of bleeding P/R. Other symptoms included prolapse in 13 and 8 patients, constipation in 7 and 8 patients and painful defecation in 6 and 3 patients respectively. The results were declared as relief of bleeding P/R and prolapse which comprised the main symptom of the patients.

Group A (Hypertonic saline) : At the end of follow up, 51(76.1%) patients were symptomatically relieved, 11(16.4%) continued to have bleeding and 4 (7.5%) were lost to follow up (Table1). Out of 13 patients having prolapse in this group, 10(76.92%) were symptomatically relieved, 2(15.38%) continued to have some degree of prolapse, while 1(7.69%) patient was lost to follow up (Table 2). In this group 54.9% of patients needed single injection session, 19.6% required two sessions, 15.6% needed three sessions while 9.8% of patient's required four sessions (Table3).

Group B (Absolute Alcohol) : At the end of follow up 54(80.5%) patients were free from bleeding, 11(16.4%) were not relieved and 5(7.5%) of the patients were lost to follow up (Table 1). Prolapse was present in 8 patients, 6(75%) had resolution of symptoms, 1(12.5%) continued to have some degree of prolapse while 1 (12.5%) patient was lost to follow up (Table 2). In this group 28(51.8%) required one injection session, 14(25.9%) required two sessions, 8(14.8%) required three sessions and 4(7.4%) patients required four sessions (Table3).

Some of the patients had momentary pain and discomfort. In 26(38.8%) and 35(52.2%) patients in group A and B respectively it lasted from 30 minutes to three hours. It was found that absolute alcohol group had more pain compared to hypertonic saline group due to its irritant nature. Minor spotting was observed in both groups (Table 5). One patient of group B had vasovagal shock that was managed immediately. There was no other serious complication in this series.

DISCUSSION

Out of total 134 patients, 105 patients got relief of symptoms, 20 were not relieved while 9 patients were lost to follow up. Out of these 20 patients who were not relieved, 11 were of the hypertonic saline group while 9 were from Absolute alcohol group. 16 of these patients underwent hemorrhoidectomy while 4 took some form of ayurvedic treatment.

For comparison of the results obtained for group A and Group B, Z test was used. On comparing the effectiveness of bleeding, a Z value of 1.314 was obtained which was less than 1.96 hence statistically not significant. Similarly comparing the effectiveness in prolapse, a Z value of 0.234 was obtained and hence having no statistical significance.

Bleeding is the most common symptom of hemorrhoids³. Occasionally the bleeding may be large in quantity. Injection sclerotherapy is a simple, safe and effective method for the treatment of bleeding hemorrhoids. Sclerotherapy is one of the oldest forms of treatment⁴.⁵ Sclerotherapy is given by injecting a liquid (sclerosant) into the base of the hemorrhoid. Inflammation sets in, and ultimately scarring takes place. The scar tissue, which is firm and thick, holds nearby tissue and veins in place so they don't bulge into the anal canal. This procedure is done as an outpatient procedure. Pain may occur after sclerotherapy but usually subsides within a short time.

Table 1 Effectiveness of Hypertonic Saline and Absolute Alcohol in control of bleeding

Group	Degree	Total no. (%)	Relieved No.(%)	Not relieved No.(%)	Lost to Follow up No.(%)
Hypertonic Saline	First Degree	43 (64.2%)	36(83.7%)	6(14%)	1(2.3%)
	Second Degree	14 (20.9%)	10(71.4%)	2(14.3%)	2(14.3%)
	Third Degree	10 (14.9%)	5(50%)	3(30%)	2(20%)
	Total	67 (100%)	51(76.1%)	11(16.4%)	5(7.5%)
Absolute Alcohol	First Degree	41 (61.1%)	35(85.3%)	3(7.3%)	3(7.3%)
	Second Degree	15 (22.3%)	12(80.0%)	3(20.0%)	0(0%)
	Third Degree	11 (16.4%)	7(63.6%)	3(27.2%)	1(9.09%)
	Total	67(100%)	54(80.5%)	9(13.4%)	4(5.9%)

Table 2 Effectiveness of Hypertonic Saline and Absolute alcohol in Prolapse

Group	Total patients	Symptoms Relieved	Symptoms Not Relieved	Lost to follow up
Hypertonic Saline	13(100%)	10(76.92%)	2(15.38%)	1(7.69%)
Absolute alcohol	8(100%)	6(75%)	1(12.5%)	1(12.5%)

Table 3 Number of sessions required and effectiveness of Hypertonic saline and Absolute alcohol

Group	Degree	Number of patients	Number of sessions			
			One	Two	Three	Four
Hypertonic Saline	First	36	26	6	2	2
	Second	10	2	3	4	1
	Third	5	0	1	2	2
	Total	51 (100%)	28 (54.9%)	10 (19.6%)	8 (15.6%)	5 (9.8%)
Absolute Alcohol	First	35	25	8	1	1
	Second	12	3	5	2	2
	Third	7	0	1	5	1
	Total	54 (100%)	28 (51.8%)	14 (25.9%)	8 (14.8%)	4 (7.4%)

Table 4 : Complications in both groups

Complications	Group A	Group B
Pain and discomfort	26(38.8%)	35(52.2%)
Spotting	8(11.9%)	14(20.8%)
Vasovagal shock	0(0%)	1(1.4%)
Others	0(0%)	0(0%)

Table 5 Different sclerosants used in past

Author	Sclerosant	Number of patients	Effectiveness
Ambrose et al (1985)[12]	5% phenol in almond oil	62	26%
Gartell et al (1985)[13]	5% phenol in almond oil	109	70%
Abdur rehmal et al (2001)[14]	Sodium tetradecyl sulphate 3%	25	70%
Abdur rehmal et al (2001)[14]	Phenol	25	80%
Dudenko et al (1968)[2]	Novacaine +Alcohol	10000	93.3%
Imbert et al (1980)[15]	Aetoxisclerol	35	54%
Akram et al (2007)[6]	Sodium tetradecyl sulphate 3%	25	70%
Akram et al (2007)[6]	Phenol	25	80%
Takano et al (2005)[16]	OC-108	80	94%
Present study(2009)	Hypertonic saline(20%) + 2% lignocaine	67	76.1%
Present study (2009)	Ethanol(99.5%)+2% lignocaine	67	80.5%

The most common sclerosing agents used include 5% phenol in almond oil, ethanolamine oleate and sodium tetradecyl phosphate⁶. These agents are relatively expensive and may not be readily available in every setup. Other agents include Phenol in Arachis oil, Polidocanol, Quinine and urethane, Aetoxisclerol, Xiao zhi ling (XZL) (consisting of Chinese nutgalls and aluminium potassium sulphate), OC-108, and 50%Dextrose⁷. Despite these large numbers of sclerosants, there is little literature comparing their efficacies⁸. Other non excisional procedures such as infrared coagulation or electronic probe coagulation have little proven advantage over injection therapy. These procedures are more time consuming and additional expensive instruments are needed to perform them.

Problems associated with injection sclerotherapy are due to the sclerosing agent used or incorrect placement.

Serious complications from sclerotherapy are rare- they occur only in 0.02% or 1 in 5000 injections and arise mostly from improper technique⁹. Most common post-injection symptom is pain which is normally short lived and subsides within 24 hours. This occurs when injection is given below the dentate line or the sclerosant spreads below the dentate line. Usually this pain can be managed by topical pain killers or analgesics. Complication of bleeding can occur by accidentally puncturing the artery and can be stopped by pressure gauze. Delayed bleeding may occur after 7 -14 days if too much solution is injected or by wrongly injecting the mucosa instead of beneath it. Other complications include allergic reactions, psychogenic reactions (collapse, vasovagal shock), infection, incontinence, prostatitis, prostatic abscess and very rarely retroperitoneal sepsis, necrotizing fasciitis of rectum and life threatening sepsis^{10,11}. Urological

complications are due to anteriorly misplaced injections in the substance of prostate/urethra or periprostatic venous plexus¹². Jaundice has been reported following phenol induced hepatotoxicity following injection sclerotherapy¹³. Even a rectal perforation has been reported in literature¹⁴. Most of the complications occur due to faulty technique while giving the injection. In our study there was no complication except for momentary pain and mild discomfort (Table 4). Only one patient had vasovagal shock who was managed immediately. This indicates the safety of the injection.

Various sclerosants have been used in the past for hemorrhoids. Most of the sclerosants proved to be effective in relieving bleeding, and frequently alleviated prolapse. Results of various studies are shown in Table 5. One of the largest series reported by Dudenko et al in 1968 treated 10000 patients with hemorrhoids with Novocain + alcohol mixtures². Their study showed that in 93.3%, hemorrhage stopped while 83.8% hemorrhoidal nodes didn't prolapse while inflammation was liquidated in 95.6% of patients. On long term follow up, positive effect was noted in 8664 (92.2%). Our results of the current randomized trial of using hypertonic saline and alcohol in management of 1st, 2nd, 3rd degree hemorrhoids compare favorably with those in literature.

In this series the total cost per session were just Rs. 52.20 and Rs. 53 for Hypertonic saline and Absolute alcohol respectively. We found the procedure to be very cost effective compared to other sclerosants as well as other modalities of treatment. Cost of hypertonic saline is Rs. 0.40/ml and ethanol is Rs. 1.00/ml. Lignocaine costs Rs. 1.00/ml, Spinal needle costs Rs. 40.00 and syringe Rs. 6.00. Therefore per session cost of hypertonic saline is Rs. 52.20 while that of Ethanol is Rs. 53.00 when given in all three primary hemorrhoids. This is at least 40-50% cheaper than Polidocanol, Sodium tetradecyl sulphate and Ethanolamine Oleate.

CONCLUSION

In our study we found injection sclerotherapy to be a suitable office procedure for the treatment of hemorrhoids. Hypertonic Saline and Absolute Alcohol are two sclerosants which are effective in relieving symptoms of bleeding and prolapse with least complications. Both sclerosants are very economical and readily available even in remote areas. They are simple to administer, reasonably painless and requires no fancy equipments. Being an office procedure, surgery is avoided even in uncomplicated third degree hemorrhoids. Hence these should be strongly considered as a modality in the treatment of symptomatic 1st, 2nd and 3rd degree hemorrhoids.

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ORIGINAL ARTICLE

Role of CT Scan In Staging of Carcinoma of Esophagus – A Study of 100 Cases

Dr. Kavita U Vaishnav*, Dr. Umesh G. Vaishnav**, Dr. Shreedevi B. Patel*, Dr. Chhaya J. Bhatt***, Dr. Dharita S Shah****, Dr. Mukesh S Shah*

*MD, **MS, ***MD, DNB, ****MD; DMRE

Sheth V.S. General Hospital & Smt. NHL Medical Collage, Elisbrdige, Ahmedabad-380 006.

KEY WORDS : Esophagus carcinoma- CT scan, staging.

ABSTRACT

Aim :-The aim of our study was to evaluate the role of computerized tomography scan (CT scan) in detecting various findings, for staging of the disease and comparing its findings with operative findings.

Material and Methods :- A Prospective study of 100 adult patients was conducted from November 2003 to June 2006 at Gujarat Cancer and Research Institute, Ahmedabad. Three dimensional reconstructions were done. Oral and IV contrast was used. CT findings were correlated and confirmed by endoscopy, biopsy, histopathology and postoperative findings.

Results :- The carcinoma of esophagus was common in age group between 40-60 yrs (44%). Males were more affected than females. Out of 64 male patients 50 patients had associated history of smoking or alcohol. Hence our study shows that there is a high association between occurrence of carcinoma of esophagus in patient with smoking and alcohol. Out of 100 patients 68 were operated, so CT staging was compared with operative and histopathological staging. Sensitivity of CT scan in T stage were 77.94%, in N stage 79.41% and for M stage 99%.

Conclusion :- CT scan is excellent in the diagnosis of distant metastasis and lymphadenopathies and helpful for the oncosurgeon regarding the management of the patient.

INTRODUCTION

Carcinoma of esophagus remains one of the most lethal of all cancers. Its late presentation and early extramural disease spread lead to poor long term prognosis with a 5 year survival rate of less than 10%. The American cancer society estimates that 17,990 persons in the United States will develop cancer of esophagus in 2013 with 15,210 deaths in the past. Squamous cell carcinoma accounted for 95% of esophagus malignancies over the past two decades. However, there has been a dramatic increase in the incidence of adeno carcinoma arising in columnar cell lined Barrett's mucosa. In some patients squamous carcinoma and adeno carcinoma of the esophagus have different demographic, pathologic, therapeutic and prognostic features. Heavy smoking and heavy drinking combine to increase the rise 25 to 100 fold, males are 4-6 times more likely than females, now carcinoma esophagus appears to affect younger healthy patient. It is notorious for its biological behavior. It infiltrates locally involving adjacent lymph nodes and metastases widely by hematogenous spread. Imaging studies play a key role in the detection; staging and post treatment follow up of patients. Proper staging of carcinoma of esophagus is essential as treatment options

and patient prognosis are directly related to stage at time of presentation. The usefulness and limitations of computed tomography is also discussed.

AIMS

- To evaluate various CT scan findings in carcinoma esophagus.
- To stage the disease using worldwide accepted criteria of TNM staging system.
- To evaluate diagnostic accuracy of CT scan for carcinoma esophagus by comparing CT scan findings with operative findings.
- To correlate CT scan findings with histopathological diagnosis.

METHODS AND MATERIAL

A prospective study of the role of CT scan in staging of carcinoma of esophagus was conducted from November 2003 to June 2006 at Gujarat Cancer and Research Institute, Ahmadabad. 100 adult patients, presenting with clinical symptoms and signs pertaining to carcinoma of esophagus were included. All patients were followed up with their histopathological diagnosis. CT findings were

Correspondence Address : Dr. Kavita U. Vaishnav, MD.
Assistant Professor, Radiology department.
8- Bhaleshwar Society, Vibhag -2, Opposite Jivraj Police Chowky, Jivraj Park, 132 Feet
Ring Road, Ahmedabad 380051. Phone: 9824310739 E mail: kavitaradio@gmail.com

confirmed by biopsy report, postoperative study or follow-up CT scan. Oral and IV contrast were used for the study. Comparison was done of probable histopathological diagnosis on the basis of radiological imaging appearances and final histopathological diagnosis.

Criteria included in diagnosing the lesion were age of the patients, site of involvement, degree of wall thickening, length of the involved segment, symmetric or asymmetric thickening, homogeneous or heterogeneous enhancement and associated findings like soft tissue mass, lymph nodal and distant metastases.

All patients were randomly selected for study.

RESULTS

Patients of age group between 20 to 90 years were included. The peak age prevalence in the study was between 41-60 yrs. Out of 100 patients 64% male and 36% female was affected. There is a significant male preponderance among the patients studied, which again corresponds favorably with similar studies worldwide.

Out of 64 male patients 50 patients gave a history of smoking or alcohol. No single female patient gave same history. Hence our study shows that there is a high association between occurrence of carcinoma of esophagus and smoker or alcohol.

Table-1 Histological Cell Type of Carcinoma Esophagus

Sr. No.	Types	No. of cases	% of cases
1	Squamous cell Ca	79	79%
2	Adeno Ca	19	19%
3	Lymphoma	1	1%
4	Small cell Ca	0	0
5	Spindle cell Ca	0	0
6	Leiomyosarcoma	0	0
7	Malignant melanoma	0	0

This shows a preponderance of squamous cell type of carcinoma esophagus over other types. The ratio between squamous cell carcinoma and adeno carcinoma was around 4:1.

Table 2 Clinical Symptoms V/S Percentage of Cases

Sr. No.	Symptoms presentations	No. of cases	% of cases
1	Dysphasia	100	100%
2	Weight loss	45	45%
3	Abdominal pain	28	28%
4	Chest pain	26	26%
5	Vomiting	15	15%
6	Regurgitation	7	7%
7	Cough	2	2%
8	Neck swelling	2	2%
9	Others	5	5%

As seen in above table in the study, Dysphasia (100%) is the most common symptom followed by weight loss (45%), abdominal pain (28%) and Chest pain (26%).

Table 3 Esophagus Involvement

Sr. No.	Esophagus involvement	No. of cases	% of cases
1	Upper	8	8%
2	Middle	35	35%
3	Lower	27	27%
4	Lower+EGJ+Stomach	23	23%
5	Middle+Lower	6	6%
6	Upper+Middle	1	1%

From the above table it is evident that the middle and lower third of esophagus is more affected by carcinoma esophagus than upper third esophagus.

Table 4 Barium Swallow Findings

Sr. No.	Barium Swallow Findings	No. of cases	% of cases
1	Mucosal irregularity with filling defect	100	100%
2	Proximal dilatation	75	75%

In our institution patients presented with a dysphasia, Barium Swallow is a routine investigation.

Table 5 Cect Findings

Sr. No.	CECT findings	No. of cases	% of cases
1	Wall thickening <10mm	6	6%
	10-20mm	84	84%
	>20mm	10	10%
2	Proximal dilatation	75	75%
3	Mediastinal involvement	13	13%
4	Neck nodes	4	4%
	Mediastinal nodes	14	14%
	Abdominal nodes	20	20%
5	Metastasis	12	12%

Table 6 Ct Staging of Carcinoma Esophagus

Sr. No.	CT Staging	No. of cases	No. of %
1	T1N0M0	11	11%
2	T2N0M0	48	48%
3	T3N0M0	7	7%
4	T2N1M0	17	17%
5	T3N1M0	5	5%
6	T1-3N0-1M1	12	12%

So in our study T2N0M0 CT staging was the most frequently found CT staging for carcinoma of esophagus.

Table 7 Ct Staging V/S Pathological Staging (Tnm Staging)

T STAGE :

Sr. No	Total no of patients operated	Identical T stage	Different T stage	Accuracy
1	68	53	15	77.94%

In our study out of 100 patients 68 patients' undergone operative intervention, so we were able to know operative and pathological staging for T stage of 68 patients

CT scan cannot reliably delineate the individual layers of the esophageal wall and thus cannot differentiate T1 from T2 neoplasm. Microscopic infiltration of the periesophageal fat (T3) can be present but not evident on CT scan. When macroscopic invasion of mediastinal fat is present, CT scan demonstrates abnormal soft tissue density that is often ill defined. All though tumor infiltration in to the periesophageal fat (T3) adversely affects prognosis, en bloc resection of tumor as an attempted cure is not precluded. Tumor infiltration in to an adjacent structure (T4) is critical for patient management; direct invasion of aorta and tracheobronchial tree precludes surgical resection.

Out of operated 68 patients 53 patients had identical CT T stage with pathological and operative T stage showing accuracy of CT scan of around 77.94% in our study.

N STAGE:

Sr. No	Total no of patients operated	Identical N stage	Different N stage	Accuracy
1	68	54	14	79.41%

In our CT scan series lymph nodes with short axis measurements greater than 1 cm was considered as a predictor of metastatic adenopathies.

Out of 68 patients operated lymph node stations were confirmed operatively and lymph nodes along with resected mass was sent for pathological confirmation. Out of 68 patients 54 patients had same lymph node metastasis as diagnosed on CT scan showing that CT scan accuracy for N stage around is 79.41 %. Large lymph nodes may also results from inflammatory disease leading to false positive results of CT scan. Microscopic invasion of normal size lymph nodes, also a common manifestation of esophageal carcinoma, is another factor limiting CT scan accuracy.

M STAGE :

Sr. No	Total no of patients	Identical M stage	Different M stage	Accuracy
1	100	99	1	99%

Out of 100 patients who underwent CT scan for carcinoma esophagus in our study, 12 patients showed distant metastasis. 6 patients shows metastasis to lung, 3 patients to liver, 2 patients in brain, 2 patients to bone, 1 patient to peritoneal and 1 to supra renal. Only one patients whose CT scan was normal for distant metastasis showed peritoneal metastasis.

In our study out of 100 patients, 99% accuracy for M stage was seen. CT scan is a superb modality for detecting metastatic diseases to the liver, adrenal glands and lung.

DISCUSSION

Esophageal cancer is the 8th most commonly occurring cancer worldwide and a common cause of cancer deaths in developing countries. Jammu and Kashmir of India is one of the states with high incidence esophageal cancer, of the "Central Asian esophageal cancer belt"[1].

Esophagus is hollow tube of muscle approximately 25-30 cm long beginning at C6 vertebra, cricoid cartilage level and ending at T11 level then penetrates the diaphragm and joins the cardia of stomach. Esophagus lies anterior to vertebral column and posterior to trachea. The esophagus is usually well seen on CT images throughout its course. Periesophageal fat is visible as an interface between the esophagus and its adjacent structures; the airway, aorta, and pericardium. The anatomic relationships of the esophagus to its adjacent organs are important to keep in mind when considering the potential spread of esophageal neoplasm. The regional lymph nodes of the esophagus lie in the abdomen, mediastinum and the cervical region. About 90% of esophageal tumors consist of carcinomas, with a 40-60% incidence of squamous cell type (SCC) and 30-50% for adenocarcinoma of the gastro-esophageal junction (GEJ), with the latest representing 80% of tumors arising from Barrett's esophagus [2, 3].

Histopathological types of esophagus carcinomas are squamous cell carcinoma, adenocarcinoma, and other rare subtypes are small cell carcinoma, spindle cell, lymphoma, leiomyosarcoma, malignant melanoma and others. As shown in table number 1 in our study [4, 5].

Esophageal carcinoma presents with dysphasia, odynophagia, weight loss and other symptoms related to distant metastasis. Fistulas may develop between the esophagus and the tracheobronchial tree, increasing the risk of pneumonia and this condition presents as cough, fever or aspiration. As shown in table number 2 in our study [6].

Diagnosis of the histopathological type of carcinoma is with esophagoscopy and biopsy. Size and extent of the tumor are very important for surgical management. Localized tumors are treated with surgery. Larger mass are inoperable and hence are treated with either radiotherapy, chemotherapy or a combination of both. In

fewer cases chemo and radiotherapy can make these tumors operable. So prognosis depends on the size, extent and associated other conditions, but is generally poor [6].

In general, the prognosis of esophageal cancer is quite poor, because most patients present with advanced disease. By the time the first symptoms such as dysphagia start manifesting, the cancer has already well progressed. The overall five-year survival rate is approximately 15%, with life expectancy of less than one year [7].

African-Americans are five times more likely to develop squamous cell carcinoma than other socioeconomic group. While risk factors for squamous cell carcinoma of the esophagus are well known (e.g., tobacco, alcohol, diet), the risk factors for the esophageal adenocarcinoma are less clear [8].

Males are 4-6 times more prone to develop carcinoma than females. Within North America and Europe, the incidence of adenocarcinoma was 100% in the 1990s and it had a strong correlation with reflux and resultant Barrett's esophagus, due to the chronic irritation of the mucosal lining and dietary factors [9]. The origin of this shift remains unknown; carcinoma of the esophagus appears to affect younger healthier patients. Patients with primary squamous cell carcinoma of head and neck have significantly increase risk of developing primary squamous cell carcinoma of esophagus. Prior irradiation is also probable risk factor. Over the past two decades the prevalence of adenocarcinoma has risen steadily. Nearly 90 % of adenocarcinoma develops in the lower esophagus and may extend in to gastro esophageal junction and stomach; fewer cases develop in middle third, and the smallest number in the proximal esophagus. The incidence of esophageal cancer has risen in recent years, due to shift in histological type and primary tumor location [8, 10]. Adenocarcinoma of the esophagus is now more prevalent than squamous cell carcinoma in the United States and western Europe, with most tumors located in the distal esophagus. The cause for the rising incidence and demographic alterations is unknown.

Diagnosis of carcinoma esophagus is required, if adult who complaints of dysphagia warrants esophagoscopy to rule out carcinoma. Esophagoscopy is required to diagnose and determine the extent of longitudinal intramural tumors spread. Entire esophagus is visualized and brush cytology plus biopsy tissue may be obtained for histopathological examination.

The radiologic features of carcinoma of esophagus are as follows:

On Barium swallow :

Despite the widespread application of endoscopy, barium studies remain the primary imaging techniques in

suspected esophageal disorders, particularly in cases of dysphagia. They are simple to perform, inexpensive and have a high sensitivity. In case of carcinoma of esophagus changes seen in barium swallow are mucosal irregularity, filling defects, shouldering, and luminal narrowing with proximal dilatation. In case of complete obstruction there is no evidence of barium column running down the obstruction. As shown in table number 4 in our study. [Figure 1]



Fig. 1a

Fig. 1b

Fig. 1a. Barium swallow shows there is evidence of mucosal irregularities and filling defect seen in middle third esophagus with proximal dilatation with fistulous tract to tracheobronchial tree.

Fig. 1b. Barium swallow shows there is mucosal irregularity with filling defect seen in middle third esophagus with proximal dilatation.

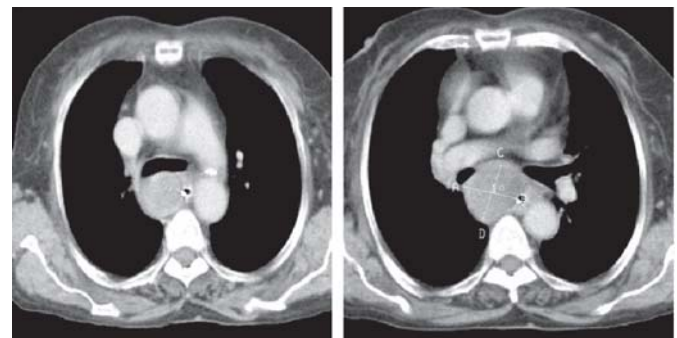


Fig. 2a

Fig. 2b

Figure 2a and 2b. Contrast enhanced axial image of CT scan thorax shows there is homogenous enhancing wall thickening of middle third esophagus with Ryle's tube in situ.

On CT scan :

CT gives information regarding to tumor size, extension, resectability, mediastinal lymphadenopathy that is not evident from these primary diagnostic methods. The CT findings of carcinoma of the esophagus may include. As shown in table number 5 in our study. [Figure 2]

- (a) An intraluminal mass.
- (b) Esophageal wall thickening, often sufficient to cause a soft tissue mass.
- (c) An irregular or eccentric esophageal lumen
- (d) A dilated lumen, with or without a fluid level proximal to the obstructing tumor.
- (e) Obliteration of the fat plane between the tumor and adjacent structures
- (f) Perforation or sinus tract into the mediastinum or fistula with the tracheo bronchial tree.
- (g) Lymphadenopathies in the mediastinum, supra clavicular region and in the abdomen.
- (h) Distant metastasis to liver, lung, or other distant organs.

Computed tomography has not played a role in detecting early esophageal tumors. Because most esophageal tumors are so advanced at the time of diagnosis, abnormal findings on CT are almost always readily visible in untreated patients. After resection or radiotherapy for esophageal carcinoma, the normal soft tissue planes in the mediastinum are altered or obliterated. Recurrent tumor can be very difficult to identify in this setting.

Barium swallow and upper GI endoscopy remains preferred diagnostic technique for patients with known or suspected carcinoma esophagus. CT scan cannot reliably delineate the individual layers of the esophageal wall and thus cannot differentiate T1 from T2 neoplasm. Microscopic infiltration of the periesophageal wall (T3) can be present but not evident on CT scan. Macroscopic invasion of mediastinal fat is present CT scan demonstrates abnormal soft tissue density that is often ill defined that adversely affect prognosis.

Following CT criteria are used to diagnose invasion of adjacent organs and to predict unresectability. [Figure 3]

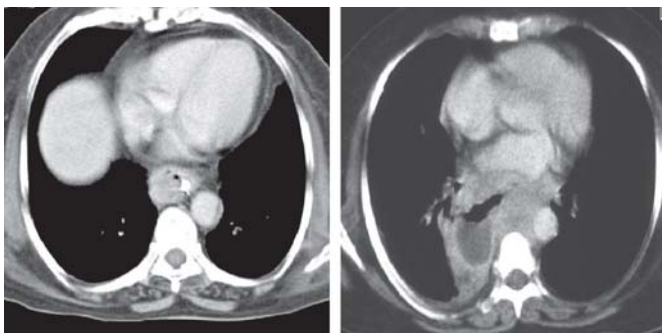


Fig. 3a

Fig. 3b

Fig. 3a. Contrast enhanced axial image of CT scan thorax shows there is homogenous enhancing wall thickening of lower third esophagus with fat plane preserved with adjacent mediastinal structures.

Fig. 3b. Contrast enhanced axial image of CT scan thorax shows there is homogenous enhancing wall thickening of lower third esophagus with fistulous communication with right side bronchus, right side minimal effusion and loss of fat plane with descending aorta.

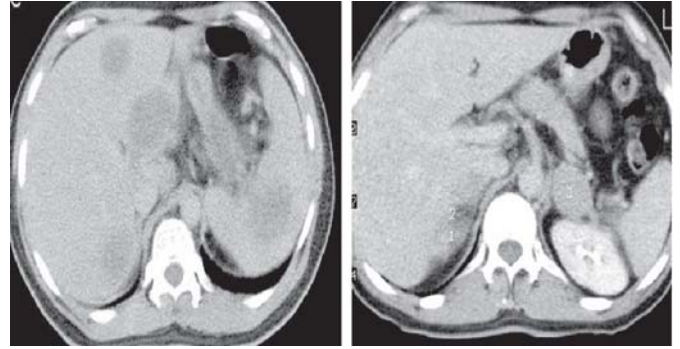


Fig. 4a

Fig. 4b

Fig. 4a. Contrast enhanced axial image of CT scan abdominal cuts shows few well defined mildly enhancing lesions in liver and spleen, suggestive of metastasis.

Fig. 4b. Contrast enhanced axial image of CT scan abdominal cuts shows well defined mildly enhancing lesions in both suprarenal gland, suggestive of metastasis.

When any of the following CT findings is present.

- Thickening of tracheobronchial wall adjacent to the tumor.
- Intraluminal mass in the airway.
- Extension of tumor between trachea and aortic arch or between left main bronchus and descending aorta.
- Intimate contact between the tumor and 90 degree or more of the aortic circumference and deformation of the aortic lumen.
- Amputation or lack of opacification of a pulmonary vein.
- Pericardial effusion.
- Pleural thickening or effusion adjacent to the tumor.
- Lymph node enlargement (>6 mm) in mediastinum, >10 mm in subcarinal and celiac region.

Though the other techniques, are used but MDCT currently remains the most commonly used examination in preoperative esophageal cancer staging because it gives information regarding the local extension of the mass and to detect distant metastases and lymphadenopathies rapidly and noninvasively, with overall diagnostic accuracy values of 59-82% [11, 12, 13, 14-16].

MRI presents the same diagnostic capability as CT, although some experiences have reported sensitivity and specificity values of 100% and 84% respectively for MRI and 100% and 80% respectively for CT in the evaluation of the mediastinal invasion [12, 17].

CT scan is used most frequently in diagnosis. While it clearly shows the presence of tumor, it is only 49% to 60% accurate in staging the depth of the tumor, according to published reports [18-23]. Endoscopic ultrasound is

significantly better in evaluating T stage, with an accuracy ranging from 76% to 92% [19, 20, 22–25]. While few studies have showed MRI's success in determining T stage, it appears to be very promising, with an accuracy rate of 96% to 100% [26].

Lymphoma occurs only rarely in the esophagus, but it is being seen with somewhat greater frequency in recent years because of its association with acquired immune deficiency syndrome (AIDS). CT typically shows marked, diffuse thickening of the esophageal wall. Enlargement of thoracic or abdominal lymph nodes also can be seen and nodes appear to be larger than those seen in case of carcinoma.

Leiomyosarcoma is another rare malignant tumor that can affect the esophagus. It may appear as an exophytic mass lacking rim enhancement. Central necrosis or cavitation can occur. It can be primarily intraluminal in location.

The treatment is determined by the cellular type of cancer (adenocarcinoma or squamous cell carcinoma v/s other types), the stage of the disease, the general condition of the patient and other diseases present.

Concurrent chemotherapy and radiotherapy is now a standard for the nonsurgical management of locally advanced esophageal cancer. Preoperative chemotherapy and combined preoperative chemo radiotherapy are also standards of treatment based on recent clinical trials.

For surgical management, surgeons use several techniques: 1) the Ivor Lewis, a thoracoabdominal approach; 2) the transhiatal, involving the abdomen and neck while avoiding the thoracic incision; 3) the transabdominal, used particularly for cancers of the lower gastro esophageal junction; and 4) the thoracoscopic / laparoscopic, a minimally invasive approach.

CONCLUSION

Though various diagnostic techniques used for carcinoma esophagus, MDCT currently remains the most commonly used diagnostic technique in preoperative esophageal cancer staging because it is a rapid and noninvasive modality to evaluate local extension of the tumor and to detect lymphadenopathies and distant metastases.

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ORIGINAL ARTICLE

Relationship of a new visual field index, the VFI, with Mean deviation (MD) in 30-2 and 24-2 threshold tests examined by Humphrey field analyzer in POAG patients

Dr. Gazala Mansuri*, Dr. Arpan Chawala*, Dr. Saurin Gandhi**, Dr. Reema Raval***, Dr. Nitin Trivedi****, Resident Doctor*, Fellow, Oculoplastics, Ophthalmology**, A Professor, Ophthalmology***, Professor & Head of Unit, Ophthalmology****

Shri C. H. Nagri Municipal Eye Hospital & Nagri Eye Research Foundation, Nr. Gujarat College, Ellisebridge, Ahmedabad, 380006

KEY WORDS : VFI, visual field, POAG

ABSTRACT

AIM : The correlation between visual field index (VFI) and mean deviation (MD) in 24-2 and 30-2 threshold tests examined by Humphrey field analyzer in patients of POAG **METHODS** : A retrospective study of 111 eyes of 100 patients each performed a standard automated perimetry test (Humphrey SITA Standard), 53 were 30-2 and 58 were 24-2 tests. In 30-2 and 24-2 group there were 18 and 24 early POAG ($0 > MD > -6$ dB), 11 and 14 moderate POAG ($-6 > MD > -12$ dB), 24 and 20 advanced POAG ($MD < -12$ dB) respectively. They were also studied according to the type of defect. The VFI values compared with MD **RESULTS** : A significant correlation between MD and VFI was shown in all eyes {24-2 ($r = -0.97$, $P < 0.0001$); 30-2 ($r = -0.96$, $P < 0.0001$)} which was negative linear; except in paracentral area which was not strictly linear. In 24-2 and 30-2 fields with MD better than -6 dB, where 16 (67%) of 24 and 13 (72%) of 18 eyes exhibited a ceiling effect ($VFI > 97$). Based on this relationship, the predicted VFIs for MDs -6 , -12 , and -20 dB were 90, 71, 46 respectively. **CONCLUSIONS**: Our results indicate MD and VFI provide equivalent information and significant correlation exists. The ceiling effect shows VFI have reduced sensitivity to early damage.

INTRODUCTION

In patients with optic neuropathies such as glaucoma, the visual field is the most important functional measure of the severity of the disease and its progression. In conjunction with other tools such as gray-scale plots, total and pattern deviation probability maps, and ranked deviation analysis, global indices such as mean deviation (MD) are widely used to summarize and interpret various aspects of the visual field.

The MD expresses the overall reduction in sensitivity, averaged across the visual field, relative to a group of healthy, age-matched observers. Visual field index (VFI) was introduced for estimating rates of change in glaucoma. This index is meant to address several shortcomings of the MD and is incorporated into the Statpac software of the Humphrey Field Analyzer (HFA; Carl Zeiss Meditec, Dublin, CA).

The objective of this study was to determine the properties of the VFI for characterizing global visual field damage in glaucoma.

MATERIAL AND METHOD

A retrospective cross sectional study of 111 eyes of 100

patients each performed a standard automated perimetry test (Humphrey SITA Standard) [Fig. 1]



Fig 1 : Humphrey automated perimeter

Eligibility criteria

- A clinical diagnosis of open-angle glaucoma based on optic disc and visual field changes,
- Patients with family history of glaucoma in immediate blood relative
- ≥ 18 years
- Best-corrected visual acuity of $\geq 20/40$

Correspondence Address : **Dr Nitin Trivedi**,
Shri C. H. Nagri Municipal Eye Hospital & Nagri Eye Research Foundation,
Nr. Gujarat College, Ellisebridge, Ahmedabad, 380006 ;
Email : trivedinitin@hotmail.com

The exclusion criteria

- History of diabetes and eyes with signs of retinal or ONH pathology other than glaucoma,
- Significant media opacity
- Eyes with any intraocular trauma or surgery except for uneventful cataract or glaucoma surgeries at least 6 months before recruitment.
- Subjects with neurologic conditions that affect VF

Calculation of MD and VFI

- The MD was calculated as the weighted mean of the total deviation values, and the weight assigned to each location was the inverse of the variance in the healthy reference group^{3,5}
- The VFI was calculated as described by Bengtsson and Heijl.⁵ At each location, the measured sensitivity was expressed as a percentage of the sensitivity expected in a healthy observer of the same age, and the VFI was calculated as the weighted mean of all locations with pattern deviation probability outside normal limits (<5%). The weights increased from 0.45 for the most peripheral locations to 3.49 for the four most central locations closest to fixation.

Comparison of MD and VFI in Single Tests: Cross-Sectional Analysis

- Statistical analysis was done. Because both indices are derived from the same measured threshold data, orthogonal regression was used to derive an equation describing the relationship, irrespective of which index is selected to be the dependent or independent variable

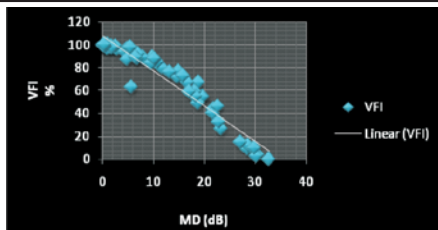
RESULTS

- In single visual fields, there was a close relationship between MD and VFI. A significant correlation between MD and VFI was shown in all eyes{24-2 (r = -0.97, P < 0.0001);30-2 (r = -0.96, P < 0.0001)} which was negative linear .

[Chart I & Chart II]

Chart I: Comparison of MD and VFI in 30-2 threshold test

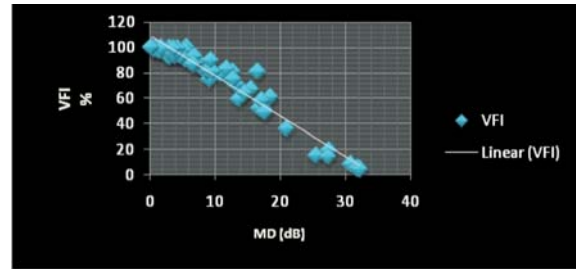
Total	0>MD>-6 dB	6>MD>-12dB	MD< -12 dB
53	18	11	24



correlation coefficient (r) is -0.9617
 95 confidence interval ; -0.9778 to -0.9342
 the two tailed P value is < 0.0001 extremely significant

Chart II: Comparison of MD and VFI in 24-2 threshold test

Total	0>MD>-6 dB	6>MD>-12dB	MD< -12 dB
58	24	14	20



correlation coefficient (r) is -0.9722
 95 confidence interval ; -0.9835 to -0.9533
 the two tailed P value is < 0.0001 extremely significant

- However, a ceiling effect was apparent with the VFI. Fields with MD better than -6 dB, where 16 (67%) of 24 and 13 (72%) of 18 eyes exhibited had a VFI at the upper limit of 100%. (VFI>97).

[Chart III & IV]

Chart III : 30-2 threshold test (0>MD>-6 dB)

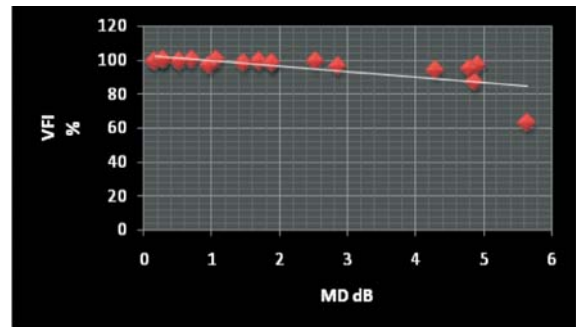
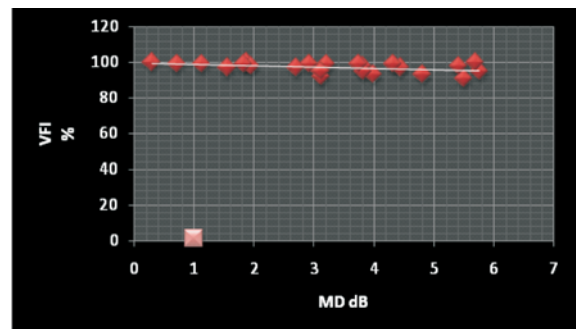


Chart IV: 24-2 threshold test (0>MD>-6 dB)



- For eyes with MD worse than approximately -5.0 dB, the relationship between both indices appeared linear and was best described by the

equation

$$VFI = 108\% + 3.1 \times MD$$

predicting VFIs of 90%, 71%, and 46% for visual fields with MDs of -6, -12, and -20 dB, with prediction intervals of approximately ±9%

DISCUSSION

Despite minor differences in how the MD is defined in various instruments, this index has become an accepted standard for describing the overall status of visual fields in individuals as well as in groups of patients enrolled in research studies.^{1,2}

Recently, Bengtsson and Heijl introduced a visual field index (VFI) for estimating rates of change in glaucoma.⁵ This index is meant to address several shortcomings of the MD and is incorporated into the Statpac software of the Humphrey Field Analyzer (HFA; Carl Zeiss Meditec, Dublin, CA). Unlike the MD, which is scaled in the original decibel units of measurement, the VFI expresses the amount of visual field loss as a percentage relative to the sensitivity of a reference group of healthy observers. A completely normal visual field would be associated with a VFI of 100%, whereas a perimetrically blind field would have a VFI of 0%.⁵ To reduce the potentially confounding effects of cataract, the VFI disregards reductions in sensitivity unless they are associated with a pattern deviation probability outside normal limits. Locations at which the pattern deviations are within the 95th percentile of healthy observers are treated as normal and assigned a value of 100%.^{3,5} In addition, locations in the center of the visual field are more heavily weighted and therefore make a greater contribution to the VFI than do those in the periphery.

CONCLUSION

- Our results indicate MD and VFI provide equivalent information and significant correlation exists.
- The ceiling effect shows VFI have reduced sensitivity to early damage
- It can provide a useful tool for patient education as well.

Limitation

- Small sample size
- VFI was introduced for progression analysis and the study requires a follow-up of same patients for establishment of accurate relationship

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CASE REPORT

Perioperative anaesthetic management of patients with cardiac pacemakers in non-cardiac surgery- A Case Report

Dr Priti R Sanghavi***, Dr Kinna G Shah**, Dr Nikunj J Patel*, Dr Gaurav Sharma*, Dr Surbhi Goyal*, Dr Bipin M Patel****

*Resident, **Assistant Professor, ***Professor, ****Professor & HOD Dept. of Anaesthesiology,

Department of Anaesthesiology, Gujarat Cancer and Research Institute, Ahmedabad

KEY WORDS : Pacemaker, Anaesthesia, Mastectomy.

ABSTRACT

Patients with cardiac disease presenting for non-cardiac surgery pose a considerable challenge to the anaesthesiologists. Care of the pacemaker during surgery as well as understanding its anaesthetic implication is crucial in management of these patients. We hereby present a case of 60yr old female with permanent cardiac pacemaker posted for modified radical mastectomy.

INTRODUCTION

Cardiac pacemakers have revolutionized the treatment of patients with cardiac arrhythmias. First pacemaker was implanted in 1958, since then cardiac device therapy is under steady expansion due to its phenomenal progress in device technology and software sophistication. Recent data suggest that the indications for cardiac pacing and implantable defibrillators are set to expand further, including heart failure, sleep apnoea disordered breathing and even in routine defibrillator implantation in patients with myocardial infarction and poor ventricular function. This will inevitably result in more patients with cardiac devices being encountered by anaesthesiologists¹.

CASE REPORT

A 61yr old, female weighing 55kg was scheduled for Modified Radical Mastectomy. She had undergone permanent pacemaker implantation 10 years back for symptomatic bradycardia & syncope. She had medical history of Hypothyroidism since 7 yrs. and taking tablet Thyroxine 50 ug once daily regularly. She was not having hypertension or diabetes. A general preoperative assessment of patient was done including thyroid profile.

Her general and systemic examination, routine blood investigations & thyroid function tests were within normal limits. ECG showed pacemaker rhythm and echocardiography was normal. Chest X-ray showed pacemaker with impulse generator. Thorough interrogation with competent authority was carried out for obtaining pacemaker details like when it was implanted, battery life, mode, effect of magnet, baseline rate etc. Our patient base line heart rate of 70/min and on VVI-R mode.

After taking informed consent for general anaesthesia patient was premedicated with Tab. Lorazepam and was

kept nil per oral overnight. On day of surgery pacemaker was set to asynchronous mode (VVI to VOO) and baseline heart rate was reset from 70/min to 90/min. Monitors in the form of ECG, Pulse oxymetry, Non-invasive blood pressure, Capnography and Temperature were applied.

After pre-oxygenation for 3min with 100% oxygen, Anaesthesia was induced with Injection Glycopyrollate 4µg/kg, Inj. Fentanyl 2µg/kg, Inj. Thiopentone Sodium 5mg/kg, Inj. Vecuronium 0.1mg/kg and intermittent positive pressure was given for 3 mins. Patient was intubated with cuffed portex tube no 7 and was mechanically ventilated. Anaesthesia was maintained with O₂ + N₂O + Isoflurane and Inj. Vecuronium bromide. During intraoperative period care was taken to maintain normotension, normocapnea and normal temperature. A monopolar cautery was used with return pad kept below Left Scapula. Following completion of surgery patient was reversed with Inj. Glycopyrollate 10µg/kg and Inj. Neostigmine 0.04mg/kg. Patient was extubated after having adequate tone, power and consciousness. Then she was shifted to I.C.U where her heart rate was reset to 80beats/min. Analgesia in form of Diclofenac sodium was given and care was taken to prevent shivering.

On 1st post-operative day mode and heart rate were reset to pre-operative settings.

DISCUSSION

A pacemaker consists of an impulse generator and a lead or leads to carry the electrical impulse to the patient's heart. Leads can be unipolar/ bipolar/ multipolar connected to the heart chambers through vena cava or on surface of heart epicardially. Unipolar leads seem to be more sensitive to effects of electromagnetic interference and produce larger spikes on recorded ECG. Generic codes for pacemaker are mentioned below.

Correspondence Address : Dr. Priti R. Sanghavi

15, Arunodaypark Society, St Xavier's college corner, Navrangpura, Ahmedabad -380009

E mail – drpritisanghavi@gmail.com

GenericCodes for Pacemaker²

I Pacing	II Sensing	III Response	IV Programmability	V Tachycardia
O- None A-Atrium V-Ventricle	O- None A-Atrium V-Ventricle	O- None I- Inhibited T-triggered	O- None C-Communicating P-SimpleS-Shocks programmable M-Multi D-Dual Programmable R-Rate Modulation	O- None P-Pacing (P+S)
D-Dual (A+V) S-Simple (A or V)	D-Dual (A+V) S-Simple (A or V)	D-Dual (I+T)		

Important indications for pacemaker include symptomatic sinus node disease, symptomatic AV nodal disease, Long QT syndrome, Hypertrophic obstructive cardiomyopathy, dilated cardiomyopathy. In our patient pacemaker was implanted for bradycardia and repeated attacks of syncope.

Preanesthetic management of a patient with pacemaker include evaluation and optimisation of coexisting disease. Interrogation with programmer is most reliable method for evaluating battery life, battery impedance, lead performance and adequacy of current settings. Appropriate reprogramming is the safest way to avoid intraoperative problems. Reprogramming a pacemaker to asynchronous mode at rate more rapid than the patient's base line rate ensures that no oversensing during electromagnetic interference will take place. Any rate responsiveness and other enhancements should be disabled. In our patient pacemaker was reset from VVI to VOO mode and heart rate was reset from 70/min to 90/min before induction of anesthesia.

Intraoperative patient monitoring include ability to detect pacing discharge by ECG monitoring, to ensure that paced electrical activity is converted to mechanical systole. Succinylcholine, ketamine, Etomidate should be avoided as they cause myoclonic movements. We induced our patient with Inj. thiopentone sodium and Inj. Vecuronium bromide was used as muscle relaxant.

Appropriate pacing and defibrillating equipment should be available on hand to provide backup pacing or defibrillation if needed. A Bi-polar cautery is preferred over mono-polar cautery. If mono-polar cautery is used return pad must be placed close to site of surgery to prevent current flow near pacemaker system. Temperature must be kept constant in 'Temperature' rate responsive pacemakers.

Postoperatively shivering is to be avoided to prevent dislodgement of pacing leads. Special considerations are required for procedure with only mono-polar electrosurgical units which includes lithotripsy³, transurethral resection of prostate, magnetic resonance imaging⁴, electroconvulsive therapy. Pacemaker settings are to be re-programmed back to original setting post operatively⁵.

Conclusion

Pacemaker device does require some special attention. Anticipation of behaviour, both of the patient and of the device, is the key to safe management for an uncomplicated procedure. When interrogation facilities unavailable - Careful history taking, inspection of the patient's device information card and by contacting the pacing clinic that the patient attends are most important. Device manufacturers, contact details are available on device identification cards. Trans – cutaneous pacing and Trans- venous pacing facility should be present in O.T.

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CASE REPORT

A rare case of hemorrhagic ovarian cyst with torsion in a child

Dr. Krati Maheshwari*, Dr. Deepak Rajput**, Dr. Aditi Desai***

Assist.Prof.* Assist.Prof.** second year resident*** Dept of radiology, L.G.Hospital, Maninagar, Ahmedabad.

KEY WORDS : Torsion, perimenarchal, hemorrhagic cyst.

INTRODUCTION

Ovarian torsion is an infrequent diagnosis in the pediatric age group. The clinical picture is nonspecific which often makes the diagnosis a challenge. But prompt diagnosis and management are vital for increasing the likelihood of ovarian salvage.

According to Shalev et al. (1985), gonadal torsion is of particular concern in perimenarchal girls. The actual incidence of ovarian torsion in children is not well defined but recent studies have found an estimated incidence of 4.9 per 100,000 among females 1-20 years old. The mean age was 14.5 years (SD: ± 3.9)

MATERIALS AND METHODS

A 13 year old female presented with complains of severe lower abdominal pain and repeated episodes of vomiting since two days. The patient had history of similar attacks of abdominal pain in the past six months. The menstrual history revealed menarche one year ago and last menstrual period 10 days ago. There was no history of any other medical illness or operation.

Blood investigations revealed slightly raised leucocyte count.

OBSERVATION

The abdominal x-ray was normal.

On ultrasound, the right ovary was enlarged and oedematous measuring 10.6 x 6.4 cm with 6.2 x 5.2 cm sized cyst with multiple septations within it. The right ovarian pedicle and fallopian tube appear twisted with "whirlpool" appearance and no vascularity on colour Doppler and free fluid surrounding it. The uterus (anteverted) and left ovary were normal.

The findings were suggestive of right ovarian haemorrhagic cyst with torsion of right ovary, fallopian tube and its pedicle.

DISCUSSION

Adnexal torsion is an uncommon event which occurs predominantly in women of reproductive age. Pregnant

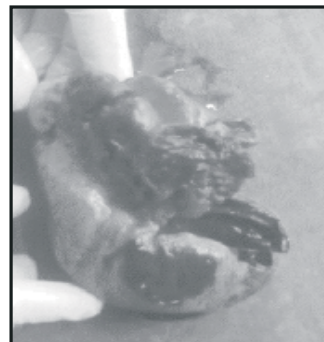


Hemorrhagic cyst with enlarged right ovary.

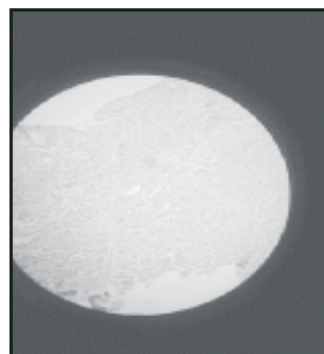


Twisted pedicle with whirlpool appearance and surrounding free fluid.

The patient was operated for exploratory laparotomy with right sided salpingo-oophorectomy.



- Sections from cut opened ovarian cyst reveal hemorrhage, foci of necrosis, inflammatory cells and vascular congestion.
- Section from fallopian tube reveals hemorrhages and vascular congestion.



The findings are consistent with torsioned and necrosed right ovary and fallopian tube with hemorrhagic ovarian cyst.

Correspondence address : Dr. Aditi Desai

301, Suvridha appartments, Opp New Madhavpura market, Shahibaug road, Ahmedabad.

women have a greater risk. Torsion usually occurs when a cystic mass is present within the ovary acting as focal point about which the twisting may occur. It can also occur in a normal ovary specially in young girls when adnexal structures are extremely mobile, allowing torsion of the mesosalpinx in response to movement or trauma. A 'hypermobile' adnexa may also be caused by hydrosalpinx, an elongated fallopian tube or previous tubal ligation.

In a study by Sommerville et al, also over a 10 year period, 11% of patients with an ovarian neoplasm had adnexal torsion. 95% of these had benign ovarian neoplasm, 3% had neoplasm of low malignant potential and 2% had malignant ovarian neoplasm. Malignancy causes inflammation and adhesion formation causing decreased mobility of adnexa

While twisting of the ovary or tube may each occur in isolation (only tubal twisting being extremely rare), torsion most often involves both structures, because the broad ligament acts as a fulcrum.

Patients present with acute onset of lower abdominal pain accompanied by nausea and vomiting. Half of the patients may relate a previous history of similar episodes, likely due to torsion and untorsion of the affected ovary. There is a **right sided predominance** with a 3:2 ratio, possibly due to the decreased space on the left side which is occupied by the sigmoid colon.

The **pathology** of ovarian torsion is related to the circulatory stasis which is at first venous and lymphatic. The continued arterial perfusion of the ovary often leads to diffuse enlargement and edema of the ovarian parenchyma and to follicular distention due to the transudation of fluid into the cysts. Ultimately, with time, arterial thrombosis and hemorrhagic infarction of the ovary will occur. Free intraperitoneal fluid is likely a transudate from the ovarian capsule secondary to obstructed veins and lymphatic vessels.

ULTRASOUND FEATURES

Gray-Scale US Features

- Unilateral enlarged ovary (>4 cm)
- Coexistent mass within the twisted ovary
- Free pelvic fluid
- Twisted vascular pedicle

COLOR DOPPLER IMAGING

The color Doppler flow manifestations of ovarian torsion are **variable** and depend **on the degree of vascular compromise**.

The classic color Doppler finding in ovarian torsion is the absence of arterial flow . However, in one study involving patients with confirmed ovarian torsion, the absence of arterial flow was found in only 73% of cases

Arterial flow can be reduced but typically only with a concomitant venous flow abnormality . However, the most frequent finding is either decrease or absence of venous flow (93%), which may reflect the early collapse of the compliant venous walls . Potential explanations for the presence of arterial waveforms are as follows: (a) Symptoms may result from venous thrombosis occurring before arterial obstruction. (b) Adnexal arterial flow may be related to the dual blood supply to the ovary.

Promising findings are **twisted vascular pedicle and the whirlpool sign**. When visualized at gray-scale US, a twisted vascular pedicle is the rotation site of the vascular pedicle itself and can be visualized as an ellipsoid or tubular mass with internal heterogeneous echoes, depending on the plane of orientation. At color Doppler, visualization of circular or coiled vessels is the whirlpool sign. Ovaries without flow in the vascular pedicle at color Doppler sonography were necrotic or infarcted at surgery .Thus, the whirlpool sign may also be instrumental in determination of ovarian viability.

CONCLUSION

Ovarian torsion in the pediatric patient is an infrequent but important finding carrying potential for high morbidity and hence warranting urgent investigations and appropriate management.

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CASE REPORT

Primary hydatid cyst of the adductor group of muscles – A rarity.

Dr. Pukur I. Thekdi*, Dr. Vikas Bathla**, Dr. Yogendra D. Shah***, Dr. Mukesh Kothari**, Dr. Soham Raut****, Dr. Vikash Agarwal****

*Professor, **Associate Professor, ***Assistant Professor, ****Third year resident

Department of Surgery, C. U. Shah Medical College and Hospital, Surendranagar. Gujarat state, INDIA.

KEY WORDS : hydatid cyst, echinococcosis, adductor muscle

ABSTRACT

Hydatid disease, which is a zoonotic infection is caused by larval forms (metacestodes) of tapeworms. Cystic echinococcosis, is caused by the larval stages of *Echinococcus granulosus*. Muscle hydatidosis is usually secondary in nature, resulting from the spread of larval tissue from a primary site after spontaneous or trauma-induced cyst rupture or after release of viable parasite material during invasive treatment procedures. Primary muscle hydatidosis is extremely uncommon, because implantation at this site would require passage through the filters of the liver and lung. We present an unusual case of a primary hydatid cyst found over the medial aspect of right thigh which was initially diagnosed as a developing abscess, but later it was confirmed to be hydatid cyst. In regions where hydatidosis is endemic, hydatid cyst should be included in the differential diagnosis of any unusual muscular mass.

INTRODUCTION

Hydatid disease, is a zoonotic infection is caused by larval forms of *Echinococcus*. The eggs of these tapeworms excreted by carnivores may infect humans as natural intermediate host¹. Echinococcal hydatid disease is known to affect almost any organ, reference but involvement of the muscular soft tissues are rare and these are mostly located in peripheral muscle groups². We describe a patient with a mass in the medial aspect of thigh for 5 months who was seen for pain and was found to have hydatid disease. Complete removal along with the pericyst is the modality of treatment.

CASE REPORT

A 58 year old woman presented to surgery department with a swelling of 10 x 12 cm over right thigh and dull aching pain which had gradually increased in size since five months. There was no history of trauma. On examination, there was no local tenderness and skin over the swelling was having reddish discoloration on the upper part of the swelling. Ultrasonography (USG) revealed a 10x12 cm cystic lesion 3 cm deep to the skin in the adductor group of muscles with multiple septa and well defined borders. A computerized tomography (CT) scan confirmed the above findings. Routine blood tests, chest X-ray (PA view) and electrocardiogram were within normal limits. Ultrasonography and CT Scan of the abdomen was normal and there was no primary hydatid cyst in liver or other viscera on the abdomen. After taking written consent for operation, under spinal anesthesia a longitudinal incision was put over the medial aspect of right thigh and multiple lobular cysts were found within a large cystic cavity on opening of the adductor muscles. Cetrimide[®] was used as scolicalid agent because of the risk of spillage. The cyst was excised totally along with the pericyst which contained more than 50 daughter cysts. The diagnosis of muscular hydatidosis was confirmed by histopathological examination. The patient followed an uneventful recovery period and was discharged from the hospital on the seventh postoperative day and was given albendazole 10 mg/kg/day for three months. Regular monthly follow up for a period of ten

months was done and the patient was in complete health with no signs of recurrence. No other cystic or mass lesion were found in systemic evaluations.

DISCUSSION

Muscle hydatidosis is uncommon, accounting only for 3-5% of all cases³ and is usually secondary to hepatic or pulmonary disease. Most of the cases reported with primary muscle hydatid in decreasing frequency are – quadriceps⁴, gluteus⁵, adductor brevis⁶, biceps brachii⁷ and adductor⁸.

Usually, intramuscular hydatid cysts are secondary, resulting either from the spread of cysts or viable larval tissue after spontaneous or trauma-induced cyst rupture or after operations for hydatidosis in distant regions. Primary muscle hydatid cysts are rare due to various factors like: efficacy of the hepatic and pulmonary barriers, unfavorable muscle environment for the growth of hydatid larvae due to high lactic acid content and muscle's contractility which hinders intramuscular growth of cyst. However, still primary muscle hydatid cysts do occur when they pass through liver and lung precapillary anastomosis between pre and postparenchymal circulation⁹. Volume of muscle mass and its rich blood supply could explain the exceptional nature of localization in the proximal muscles of the lower limb¹⁰.

Various investigations can be used to depict hydatid cyst. USG is the diagnostic tool of choice for the initial work-up, CT is best for detecting cyst wall calcification¹⁰ and MRI imaging can detect cyst wall defects as well as the complications such as rupture and infection of cysts¹⁰. Immunodiagnosis can also play an important complementary role for primary diagnosis and also for follow-up of patients after surgical or pharmacological treatment.

Complete surgical excision is the modality of treatment; but communicating fistulas involving different muscle groups may cause difficulty in complete excision and recurrence. Prior injection of a scolicalid agent into the unopened cyst and mopping the operative field with sponges soaked in a scolicalid agent are the two most commonly employed measures to

Correspondence Address : Dr. Pukur I. Thekdi (MS, MRCS (Eng))

C/9, Doctor quarters, C. U. Shah Medical College and Hospital, Surendranagar, Gujarat.

E-mail : p_thekdi@yahoo.com

Fig. 1 – Showing swelling in the medial aspect of right thigh.



Fig. 2 – CT Scan showing daughter cysts in the adductor group of muscles.

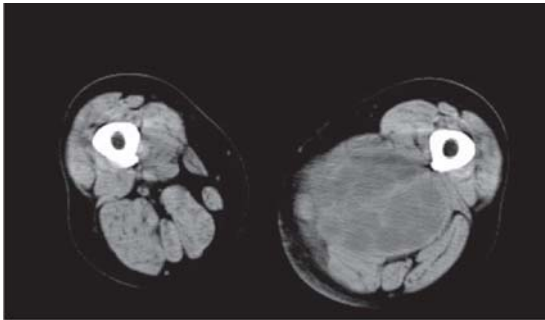


Fig. 3 – Peroperative photograph showing pericyst containing multiple daughter cysts



Fig. 4 – Kidney tray showing multiple daughter cysts



prevent recurrence. Concomitant drug treatment with antihelminthics such as albendazole or praziquantel reduces the risk of secondary echinococcosis and recurrence¹¹.

CONCLUSION

Primary muscular hydatid cysts are very rare and are difficult to diagnose clinically. Hence, the possibility of hydatid disease should always be kept in mind in the differential diagnosis of a cystic mass in the muscle, especially in endemic areas so that early treatment can be offered to the patients and prevent them from its complications and recurrence.

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CASE REPORT

Haemorrhagic Emergencies in Gestational Trophoblastic Neoplasia (GTN) and their Management : Report of Three Cases

Patel Himanshu*, Dave Pariseema**, Mankad Meeta***, Chauhan Anjana****

*Resident, **Professor, ***Professor & Head of Unit, ****Associate Professor

Department of Gynecologic Oncology, The Gujarat Cancer & Research Institute, Ahmedabad.

KEY WORDS : Gestational trophoblastic neoplasia, torrential bleeding.

ABSTRACT :

Metastatic gestational trophoblastic neoplasia (GTN), the most virulent form in the spectrum of gestational trophoblastic diseases. GTN occasionally presents as an emergency, in the form of a hemodynamically unstable patient in shock, usually because of bleeding from primary or metastatic site. We present here three cases of metastatic GTN with haemorrhagic complication and were managed by three different ways. One patient has ruptured uterus with intrabdominal bleeding managed with total abdominal hysterectomy and right internal iliac ligation done to control bleeding from vault. Another patient had bleeding from cervical and vaginal metastasis managed with bilateral internal iliac ligation and vaginal packing. Third patient with bleeding from vaginal metastasis managed with hemostatic suture and vaginal packing. So in conclusion despite the success in inducing remission in most patients with high risk GTN, surgical procedures play an important role in management of torrential bleeding. Surgery plays a life saving role in haemorrhagic complications of GTN.

INTRODUCTION

Gestational trophoblastic neoplasia (GTN) is a malignant disease arising from placental trophoblastic tissue. Approximately 50% of GTNs occur after molar pregnancies; the remaining cases are the consequence of normal pregnancies (25%) and ectopic pregnancies or abortions (25%).

GTN occasionally presents as an emergency, in the form of a hemodynamically unstable patient in shock, usually because of bleeding from primary or metastatic site¹. Emergency surgical procedures play an important role in management. Approximately one half of patients with high-risk GTN (FIGO stages II – IV; score > 7) will require some form of surgical procedure during the course of therapy to either remove chemotherapy resistant disease or treat hemorrhagic complications². Vaginal bleeding from vaginal metastasis is one of the most common complication during treatment of GTN. Here presenting three types of cases with metastatic GTN presented with different types of haemorrhagic complications and managed in different ways accordingly.

Case 1

A young, 22 years old (gravida 2 para 1 abortion 1) patient was referred from outside in emergency hours with complaints of severe abdominal pain and bleeding per vaginum since one week. She gave history of D & E three months back, done for spontaneous abortion at 3 months of amenorrhea. Since then she was having

vaginal bleeding off & on. She also gave history of blood transfusions.

Patient was pale and anxious on general examination. She had tachycardia (pulse 110/min) with normal blood pressure. On per abdominal examination gross ascites was present and on per vaginal examination dirty discharge was present, uterus was soft & 12 week size.

Her Hb was 6.8 gm/dl. Ultrasonography revealed gross ascites with thick internal echoes s/o hemorrhagic fluid, bulky uterus with multiple dilated channels in myometrial wall along with focal breach at fundal and anterior wall with protrusion of contents outside the uterus s/o ruptured uterus. Her X-ray chest, RFT, bleeding and clotting time were normal but PT and APTT were mildly deranged. Patient was posted for emergency laparotomy with provisional diagnosis of ruptured uterus and hemoperitoneum.

On laparotomy 1.5 ltr hemoperitoneum was drained. A 2x2 cm rent was found at the fundus of uterus with contents of uterus protruding from it. Uterus was friable and margins of the rent were necrosed. A big part of the uterine content was present in pelvis, already expelled from the rupture, also removed and sent for HPE. Bilateral adnexae were normal. Total hysterectomy was done along with right internal iliac ligation to control bleeding from the vault. Four units of blood transfusion was given during and in post operative period. Her PT and APTT returned to normal on 1st post-op day. Her histopathology report confirmed the diagnosis of invasive mole of uterus. Post

Correspondence Address : Himanshu A. Patel
105, Upal Apartment, B/H, Hingdajmata Mandir, India Colony Road, Bapunagar,
Ahmedabad - 380024.

operative period was uneventful. Her pre-op β hCG was 1,06,875 IU/L which fall down to 9479 IU/L on fifth postoperative day. She was finally assigned low risk GTN (FIGO Score 2) and so was put on MTX-FA (Methotrexate-Folinic Acid) regimen. After 3 cycles of MTX-FA her β hCG was 663 IU/L. So she was put on Actinomycin D regimen. She went into remission after 3 cycles then she received 3 more cycles. After that she was put on monthly follow up after 6 months of chemotherapy her last β hCG was 0.1 IU/L.

Case 2

30 years old (gravida 6 para 1 abortion 5) patient admitted with complaints of vaginal bleeding since 5 days. She gave history of repeated first trimester abortion in last 3 years and the last abortion was 6 months back.

On examination abdomen was soft. On per speculum examination the cervix was replaced by growth with bleeding from it. Uterus was normal in size.

Her Hb was 3.9 gm/dl so anemia correction was done by blood transfusion. Ultrasonography revealed large hypoechoic, 90x90 mm, mass in cervix and vagina with large dilated venous channels within it communicating with paracervical vessels. Uterus normal in size with bilateral normal adnexa. Her pre-op β hCG was 36,557 IU/L and X Ray chest was normal.

She was finally diagnosed as high risk metastatic GTN stage II: score 7 and started on EMA-CO regimen but bleeding continued per vaginum on second day of chemotherapy so vaginal packing was done and hemostatic drugs were started. Bleeding could not be controlled with these measures hence emergency laparotomy was done and bilateral internal iliac artery ligation was done followed by vaginal repacking. Per op uterus and bilateral ovaries were normal. Vaginal packs were removed after 24 hours. There was no active bleeding. Chemotherapy was restarted. She responded very well to chemotherapy and her β hCG fell to 2301 IU/L. However she was lost to follow up after that.

Case 3

A 25 year old (gravida 2 para 1 abortion 1) patient admitted with chief complaints of bleeding per vaginal since 4 months and abdominal pain since 3 months. She gave history of dilatation and evacuation for missed abortion at 3 months of amenorrhoea four months back.

On general examination she was pale. Abdomen was soft. On per speculum examination about 2 cm sized bluish nodule was present in anterior vaginal fornix. Cervix was soft with bulky uterus on per vaginal examination.

Her Hb was 8.8 gm/dl so anemia correction done by blood transfusion. Sonography findings revealed bulky uterus.

Bilateral adnexa normal. Her β hCG was 3733 IU/L. According to FIGO scoring her score was 2.

She was diagnosed as low risk metastatic GTN and started on MTX-FA regimen. On fifth day of chemotherapy there was bleeding from vaginal metastasis. Bleeding increased in spite of routine vaginal packing and hemostatic drugs. She was shifted to OT. Vagina was full of clots. There was a bleeding sputter on the metastatic lesion at anterior fornix. A figure of eight hemostatic stitch, taken with 2-0 vicryl without handling the lesion, stopped the bleeding. Monsel's solution was also applied on the lesion and vagina was packed with roller pack. Pack removed after 24 hours and there was no active bleeding. Chemotherapy was restarted. She went into remission after 3 chemotherapy cycles and after she that she get one more cycle of chemotherapy. Then she was put on monthly follow up. Her last β hCG was 0.1 IU/L.

DISCUSSION

Approximately one half of patients with high-risk GTN (FIGO stages II – IV, score > 7) will require some form of surgical procedure during the course of therapy to either remove disease or treat complications like haemorrhage³.

Adjuvant surgical procedures may be employed to: (1) remove resistant/persistent disease in the uterus or at metastatic sites, (2) decrease tumor burden in the uterus in patients with limited metastatic disease, (3) control tumor hemorrhage, (4) relieve bowel or urinary obstruction, or (5) treat infection⁴. Vaginal metastases in GTN are extremely vascular, friable and capable of inducing severe hemorrhagic complications. While most vaginal metastases respond quickly and completely to systemic chemotherapy, their management often includes surgical and angiographic interventions⁵. Management in these patients included vaginal packing, hemostatic stitch over mets, excision, hysterectomy with internal iliac artery ligation, and selected angiographic embolization. Internal iliac artery ligation is important in both haemorrhage from uterus and vaginal metastasis. In the first patient, uterus was ruptured and continuous intraperitoneal bleeding was present and further delay in treatment could have led to disseminated intravascular coagulation. In this case hysterectomy was the ideal option. In second patient, cervix and vagina were replaced by the growth. An attempt was made to achieve hemostasis by vaginal packing which failed. So other options were internal iliac ligation or embolisation. While in third patient source of bleeding was identified from vaginal metastasis and it was managed by hemostatic suture and vaginal packing.

Hysterectomy continues to be an important treatment strategy for selected women with GTN⁶. The common indications include drug-insensitive disease, PSTT, and hemorrhagic complications.

CONCLUSION

Despite the success in inducing remission in most patients with gestational trophoblastic neoplasia (GTN), surgical procedures play an important role in management of torrential bleeding. Intensive multi-modality therapy of patients with high-risk GTN using EMA-CO chemotherapy (or some variation of it) along with adjuvant radiotherapy for brain metastases and surgery for control of hemorrhage results in primary remission early. Surgery plays a life saving role in haemorrhagic complications of GTN.

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CASE REPORT

A rare case of peptic and appendicular perforation

Dr. Bharath G.*, Dr. Vidhyasagar Sharma**, Dr. Rajendra I. Dave***

*Senior Resident, **Assistant Professor, **Dr. Sushil D. Akruwala, ***Professor & Head of Department

Department of Surgery, Gujarat Cancer Society Medical College, Hospital & Research Centre

Opp. DRM Office, Naroda Road, Ahmedabad

KEY WORDS : Perforation, peptic, appendicitis.

ABSTRACT :

In this article we report a rare case of peptic and appendicular perforation. The patient underwent emergency laparotomy for suspected intestinal perforation and was found to have gastric and appendicular perforation with faecolith. The patient is well on follow up. The relevant literature has been reviewed and management discussed in brief.

INTRODUCTION

Perforative peritonitis is a frequently encountered surgical emergency in tropical countries like India, most commonly affecting young men in the prime of life. Appendicular perforation is second commonest after gastro-duodenal perforations. Here we report a rare case of peptic and appendicular perforation in a female patient.

CASE REPORT

We report a case of 54 year old female patient who presented to the casualty department with 5 day old history of diffuse abdominal pain, loss of appetite, vomiting and fever since 2 days. She had been treated by local doctor with analgesics and antacids. On admission she was febrile, dehydrated, tachypneic, tachycardia(112 per minute) and blood pressure was 100/60 mmHg. Per abdomen there was diffuse severe tenderness with guarding. Abdominal and plain chest X-rays demonstrated free gas under both the hemidiaphragms. Ultrasonography abdomen showed moderate free fluid. Our patient's worsening clinical image and her deteriorating clinical signs alongwith the presence of her acute abdomen led us to conclude that an emergency laparotomy constituted the treatment of choice. After initial resuscitation (placement of intravenous lines, urethral catheterization and nasogastric tube followed by adequate administration of fluids), our patient underwent an emergency exploratory laparotomy. In the face of the emergency situation a computed tomography (CT) scan was not performed. Laparotomy revealed peritonitis due to a perforated ulcer on the lesser curvature of stomach, on further exploration of the intra-abdominal organs appendicular perforation with faecolith was found. After a thorough lavage of the peritoneal cavity appendectomy was carried out. Then the gastric

perforation was sutured, and the suture line was reinforced with a live omental patch. Peritoneal wash was given. Abdomen was closed with Prolene no.1 in monolayer after placing abdominal drains. Post operatively patient developed burst abdomen on postoperative day 4, which was conservatively managed. Histopathology revealed features of inflammation in both gastric tissue and appendix. Patient is now well on follow up.

DISCUSSION

The peritoneum encases the largest cavity in the body, with a surface area of about 22000sq.cm² in an adult, which is equivalent to that of the skin. Injury to such a large, permeable surface area is comparable to that of 70 to 100% skin burns¹ and can lead to severe fluid losses with potentially fatal hemodynamic consequences. Perforative peritonitis is a common surgical emergency. The relative incidence of various types of perforations is variable². The perforations of proximal gastrointestinal tract were six times as common as perforations of distal gastrointestinal tract as has been noted in earlier studies from India¹, which is in sharp contrast to studies from developed countries like United States⁴, Greece and Japan which revealed that distal gastrointestinal tract perforations were more common. Peritonitis due to peptic ulcer perforation is a surgical emergency with a high risk of mortality and morbidity. The incidence of perforated ulcer is steadily declining, though there are still incidents where it occurs.³ Causes include smoking and non-steroidal anti-inflammatory drugs (NSAIDs)⁵. We successfully managed a rare and difficult case of simultaneous perforation of gastric ulcer and appendix that could have been easily misdiagnosed and undertreated. On review of literature we couldn't find any

Correspondence Address : Dr. Vidhyasagar M. Sharma

66, Bansi Estate, Airport Road, Kotarpur, Ahmedabad-382340

M. : 09925009504 Email : sharma_vidhyasagar@yahoo.com

such case reported. Our patient had a chronic peptic ulcer. When she developed right iliac fossa pain she took NSAIDs and did not consult the surgeon. This might have led to peptic ulcer perforation and appendix perforated as well because of undertreatment. Advances in the medical

Figure 1 : Diagrammatic presentation of gastric and appendicular perforation

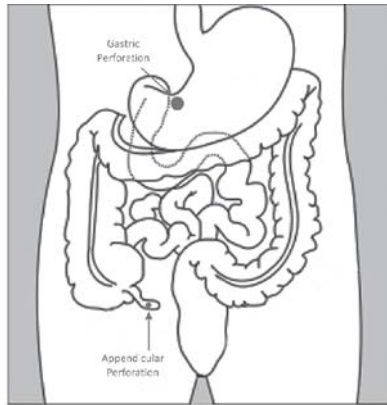


Figure 2 : Xray Film showing free gas under both domes of diaphragm.



treatment of the peptic ulcer disease have led to a dramatic decrease in the number of elective surgeries performed. However, the number of patients undergoing surgical intervention for complications such as perforation remains relatively unchanged. Patients present with the classical signs and symptoms of peritonitis, and need early surgery for a favourable outcome. Emergency Laparotomy after resuscitation is the mainstay of treatment. Treatment options vary from surgeon to surgeon but for commoner perforations of duodenum, ileum and stomach, primary closure with omental reinforcement is the preferred option⁶. In selected cases laparoscopic management can be carried out⁷.

CONCLUSION

Finally, every surgeon should strictly follow one of the basic principles of abdominal surgery and perform a thorough examination of the peritoneal cavity in every

case of diffuse peritonitis, even if the underlying pathology appears to be obvious. Surgical abdominal exploration (both laparoscopic and laparotomic) is always indicated in gastroduodenal perforation. In summary, emergency physicians and surgeons should maintain a high level of clinical suspicion as a second perforative appendicular lesion, though a rare possibility, could exist and could potentially be lethal.

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CASE REPORT

Hepatocellular carcinoma- manifesting as chest wall metastasis: Report of two cases.

Majal G.Shah*, Kriti Chauhan**, Trupti S.Patel***, Amisha Gami*, Manoj J.Shah****, Chetan M. Dharaiya***

*Junior Lecturer,**3rd year resident,***Associate Professor,****Head and Professor

Department of Pathology, Gujarat Cancer And Research Institute, Ahmedabad.

Department of Pathology, Sola Medical College, S.G.Road, Ahmedabad.

KEY WORDS : Hepatocellular Carcinoma, Extrahepatic metastasis, Fine Needle Aspiration Cytology.

ABSTRACT :

Hepatocellular Carcinoma(HCC) is the commonest malignancy of liver and Extrahepatic metastasis occurs in 37% of patients. Here, we discuss two cases of HCC which presented as extrahepatic metastasis at chest wall. Although musculoskeletal metastasis is rare but it can be seen in advanced cases.

The purpose of this paper is to report a rare occurrence of HCC to metastasis at unusual site and to demonstrate the feasibility of making diagnosis on Fine Needle Aspiration Cytology (FNAC) by safe approach.

INTRODUCTION

Hepatocellular carcinoma is the most frequent primary malignant tumor of the liver, now becoming the fifth commonest malignancy worldwide and the third leading cause of cancer related death, only after cancers of the lung and stomach.¹ With the advent of wide spread imaging modalities along with superior imaging techniques, the diagnosis and grading of HCC has remarkably improved. This has led to the increased survival of the patients and allowed them for subsequent sequelae of the disease to develop.² Extrahepatic metastases are included in this spectrum.³ The most common sites of hematogenous metastatic spread include lung(49%), intra abdominal organs(24%), bone(16%) and rarely skeletal muscle.^{4,5} Although well reported with known HCC, musculoskeletal metastases are a rare primary presentation.^{2,4} The treatment of HCC depends on the stage of tumor. For stage I and II tumor, potentially curative partial hepatic resection or liver transplantation is suggested while palliative therapy is given for advanced stage tumor.⁶

Thus, the detection of extrahepatic metastasis becomes crucial for planning potential therapy and to avoid unnecessary surgical intervention.

Here we present two cases of HCC which presented primarily with metastasis at unusual site and were diagnosed by Fine Needle Aspiration Cytology (FNAC).

CASE REPORT-1 :

A 36 years old male was admitted with complaints of backpain, decreased appetite and both upper and lower limb weakness followed by seizures. Routine investigations were done displaying normal hemogram

except anemia, altered coagulation profile, normal liver function test (LFT) except decreased serum albumin level. Serum CEA-2.17ng/ml and serum AFP-1ng/ml were within normal limits. Patient was HBsAg and HIV non reactive. CSF examination was normal. Abdominal ultrasonography showed target lesions in both the lobes of liver with a mild splenomegaly. Chest X ray showed a lytic lesion on the posterior aspect of left 7thrib, anterior aspect of right 3rd and 7thrib. Lung fields were clear.

Considering above findings, multiple metastases with unknown primary was clinically suspected and Computed Tomography scan (CT scan)of abdomen &pelvis was performed which revealed metastatic lesions involving liver, peripancreatic region and anterior chest wall. MRI brain showed multiple cerebral metastases and USG neck showed multiple hypoechoic nodes at right level V.

FNA from chest wall lesion along with biopsy from liver and level V node were performed. Patient had taken 30 cycles of chemotherapy and 10 cycles of radiotherapy. Palliative radiation was suggested for brain metastasis.

The cytomorphological features and diagnosis of both cases are discussed later on.

CASE REPORT-2 :

A 31 years old male presented with a gradually increasing soft tissue swelling over left chest wall since 3 months and right upper abdominal pain since 1 week. Routine investigations were done which revealed normal hemogram, coagulation profile and LFT except elevated ALT levels. Patient was HBsAg and HIV reactive along with elevated serum AFP level-108.3ng/ml (N:0-15ng/ml).CT thorax showed a left sided anterior chest wall mass involving left pectoral muscles with bony

Correspondence Address : Dr. Majal G. Shah

Room No.401, Cytology Department,

Gujarat Cancer And Research Institute, Civil Hospital Campus, Ahmedabad-380016.

erosion of anterior end of left 2nd rib. CT abdomen and pelvis showed a mildly enhancing hypodense lesion in the right lobe of liver suggesting malignant lesion.

Clinically soft tissue sarcoma of chest wall along with liver metastasis was thought of.

USG guided FNA from chest wall mass and biopsy from liver was performed later on. Chemotherapy-Cisplatin and Adriamycin (50mg/sq m and 75 mg/sq m) for three weeks along with ARV therapy was given.

CYTOLOGICAL FEATURES :

In both the cases, smears were prepared, fixed in 100% methanol and stained with Papanicolaou stain. FNAC revealed cellular smears composed of round to polygonal cells with round pleomorphic nuclei, large prominent nucleoli with abundant granular eosinophilic cytoplasm arranged in sheets, groups and trabeculae lined by endothelial cells. Intranuclear cytoplasmic inclusions and intracytoplasmic bile pigments along with bare nuclei in the background were also seen. Diagnosis of metastatic HCC was given. In both the cases, liver biopsy was done which showed HCC and lymph node biopsy showed reactive follicular hyperplasia.

DISCUSSION

Although extrahepatic metastasis of HCC was reported in 18% of untreated patients in a retrospective study, metastatic lesions were found at a higher incidence in an autopsy study of deaths related to primary liver cancer.^{7,8} Metastatic spread to the bones occur in 13 to 16% of HCC and is well described.^{2,4,5} It infrequently appears as the first manifestation. The most common sites of skeletal involvement in descending order are vertebra, pelvis, ribs, skull, humerus and sternum.²

Unlike these reported cases, ours is of interest that, in CASE 1, patient presented with anterior chest wall mass along with lytic lesion in the ribs and in CASE 2, patient presented with chest wall mass involving pectoral muscles and bony erosion of 2nd rib. Only a few other reports to our knowledge have patients presenting in a similar fashion.^{9,10,11,12}

Metastasis of HCC occurs frequently by way of intrahepatic blood vessels, lymphatic permeation or direct infiltration. It is difficult to trace exactly how tumor cells spreads to bones in its early stages. Metastatic spread occurs through the pulmonary circulation or the vertebral venous plexus^{13,14} because bone metastasis of HCC is seen frequently in patients without lung metastasis¹³. In these two cases also vertebral venous plexus may be a route by which the tumor cells had spread to the bones without involving pulmonary circulation as lung fields were clear radiologically.

In the study by S. Katyal et al³, 41 out of 403 patients with

HCC had musculoskeletal metastases with lytic bone lesions. Only 7 of them showed rib involvement with soft tissue mass. Another similar study by Sahin Coban et al¹⁵ has reported a case of 71 year old man who presented as a mass on the left chest wall axillary region.

To summarize, primary presentation of HCC with musculoskeletal metastasis is an uncommon finding, so it should be kept in mind as a differential diagnosis of rapidly growing lesions in unusual locations. FNAC definitely offers an early and accurate method of diagnosis in such presentation of the disease and thus helps the clinicians in clinically unsuspected cases as detection of extrahepatic HCC is crucial for patients to receive appropriate therapy.

Fig 1 : Microphotograph showing tumor cells in trabecular pattern traversed by endothelial cells with intranuclear inclusions.(10X Pap stain)

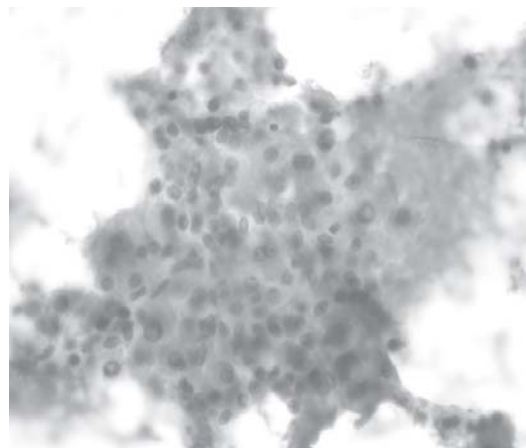
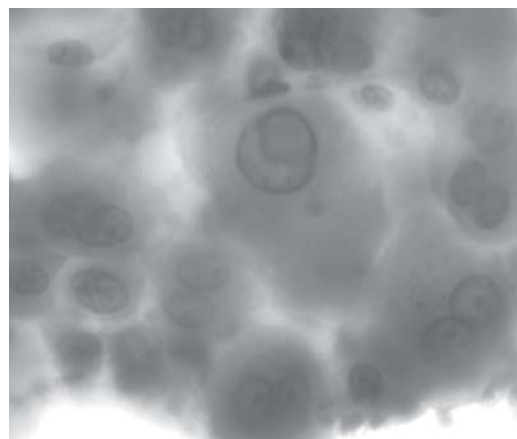


Fig 2 : Microphotograph showing tumor cells with pleomorphic vesicular nucleus, prominent nucleoli and eosinophilic granular cytoplasm.(40X Pap stain)



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CASE REPORT

Spinal Paraganglioma : A Rare Tumour

Dr. Tushar V. Soni*, Dr. Ankur Gupta**

*Professor and Head of the Unit (HOU), **M.Ch 3rd year resident
Department of Neurosurgery, NHL Municipal Medical College,
Sheth V.S Hospital, Ellis Bridge, Ahmedabad (Gujarat) Pincode - 380006

KEY WORDS : Spinal paraganglioma, Spinal tumours and Zell-ballen pattern.

Background : Spinal paragangliomas are neuroendocrine tumours of the extra adrenal paraganglionic system. These tumours are very rare encountered in adolescents and adults, with the peak incidence in the fifth decade.

Description : A 20-year-old male reported with low backache with radiating pain in right lower limb and weakness. Magnetic resonance imaging lumbosacral spine revealed an enhancing intradural lesion at L1-L2 level for which laminectomy with tumour removal done and histopathology revealed it to be a paraganglioma.

Conclusion : Spinal paragangliomas are benign neoplasms. This extremely rare pathology can usually be successfully treated by total surgical resection, which represents the gold standard. In the event of incomplete removal, long-term follow-up is mandatory. They need to be distinguished from more aggressive tumours as their prognosis is excellent.

INTRODUCTION

Extra adrenal paragangliomas are benign lesions of neuroendocrine origin, derived from chemoreceptor's cells and observed usually in the carotid body and glomus jugulare.^{1,6} Their location in the spinal canal is rare, and usually confined to the cauda equina and filum terminale. Spinal paragangliomas are encountered in adolescents and adults, with the peak incidence in the fifth decade.^{2,3}

CASE REPORT

A 20-year-old male reported to our hospital with a history of low backache for 6 months and pain radiating to right lower limb for 3 months. His general physical and systemic examinations were normal. Motor examination revealed 4⁺/5 knee flexion and 4⁺/5 dorsiflexion of foot on right side. Sensory examination, deep tendon reflexes, peri-anal sensitivity, anal tone and straight leg raising test were normal. MRI lumbosacral spine revealed a uniformly enhancing well circumscribed intradural extramedullary lesion at L1-L2 level (Figure 1). The L1-L2 laminectomy was performed. After opening the dura, total en-mass removal of the tumour was achieved.

The tumour was highly vascular, cherry red in colour, firm in consistency, well circumscribed and well encapsulated. It was contiguous with the spinal roots but adherent neither to the dura nor to the spinal cord.

Patient had an uneventful postoperative course. His radicular pain subsided completely in early post operative period and motor weakness disappeared gradually. Follow up neurological examination was normal after 4 months.

Histological evaluation of the tumour showed uniform cells arranged in large lobules, or smaller nests, known as "Zellballen". The aggregated chief cells were surrounded by capillaries, present throughout the lesion. There was a flattened layer of sustentacular cells which encompassed both the lobules and the "Zellballen". Immunohistochemical testing gave a positive reaction for chromogranin in the chief cells (Figure 2). Ultrasonography abdomen was normal. There was no evidence of multiple paragangliomas.



Figure 1 - MRI of Lumbar region showing intradural extramedullary SOL at L1-L2 level

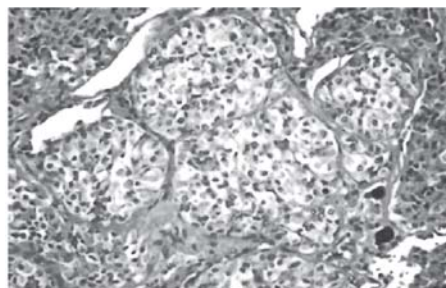


Figure 2 - Photomicrograph showing tumour cells arranged in classical Zell-ballen pattern (H&E × 20).

Correspondence Address : Dr. Ankur Gupta

Room no. B-31, Doctors Quarters, Sheth V.S Hospital, Ellis Bridge,
Ahmedabad (Gujarat) Pincode-380006 Email id: draag2112@gmail.com M. : 9227077411

DISCUSSION

Paragangliomas are neuroectodermal tumours of the autonomic paraganglia, derived from the chromaffin cells of neural crest origin. The first authors to describe this pathological entity were Miller and Torack in 1970, denominating it a secretory ependymoma⁴, whereas Lerman was the first to coin the term paraganglioma in 1972.⁵ Their location within the central nervous system is unusual. Intracranially, paragangliomas were encountered in the sellar, pineal and petrous ridge regions.⁶ The great majority of paragangliomas (85-90%) arise in the adrenal gland whereas extra-adrenal tumours are principally situated in the jugular glomus of the carotid body. Tumours affecting the carotid body and glomus region are usually parasympathetic whereas the spinal varieties are typically sympathetic. The spinal localization is uncommon, with an incidence in the general population calculated at 0.07%. In the spine, these tumours most commonly occur in the cauda equina and filum terminale region, with a slight male prevalence. Interestingly, a series of 30 spinal paragangliomas reported by Moran et al.² in 1997 consisted of nineteen tumours located in the lumbar segment of the spine, six in the cauda equina, two in filum terminale, two in the thoracic and the remaining two in the cervical region of the spinal canal.

Spinal cord paragangliomas are usually encountered at the end of the spinal column below L1 vertebral level. Less common sites include cervical and thoracic regions. Most patients of spinal paragangliomas present with back pain radiating down the leg, motor or sensory deficits, and urinary or fecal incontinence.^{2,7} The clinical presentation depends on the level of affected spinal cord and the degree of compression. Only a few patients have high blood pressure due to secretion of catecholamine from tumours.^{2,7}

On T1-weighted images, the lesion usually has an isointense appearance, whereas it is hyperintense on T2-weighted sequences with enhancement after Gadolinium administration. These features are common to other intradural lesions, such as schwannomas, ependymomas, meningiomas, dermoid tumours or lipomas.^{8,9} Currently, the functional imaging method preferred for localizing extra-adrenal or adrenal paragangliomas is Scintigraphy with I-MIBG.

Microscopically these tumours show typical nuclear monomorphism and all display "Zell- ballen" pattern (large polyhedral chief cells arranged in nests), many show granular argyrophilic and argentaffin reaction. There may be perivascular pseudorosettes. Areas of haemorrhage and necrosis may be seen.¹⁰ Immunohistochemistry is positive for chromogranin, synaptophysin, neuron specific (gamma) enolase and S-100.^{2,10}

After gross excision prognosis is good. Only 4% of spinal paragangliomas recur after gross total excision¹⁰. Subtotal excision is not infrequently followed by local recurrence and even a distant metastatic spread has been described. Radiotherapy is reserved for locally invasive tumours or where excision has been incomplete, although resistance to this form of treatment has been documented. There is no role of chemotherapy. The median free interval between surgical removal and local recurrence is estimated to be approximately 6 years.¹¹ However, the fact that isolated cases of recurrence have been observed as many as 20 years after surgical treatment¹¹ indicates that an assiduous long-term follow-up is mandatory whenever complete removal has not been achieved.

CONCLUSION

Spinal paragangliomas are benign extremely rare neoplasms which can usually be successfully treated by total surgical resection. In the event of incomplete removal, long-term follow-up is mandatory. Spinal paragangliomas should be considered as one of the differential diagnosis of spinal intradural tumours, especially of lumbar area. They need to be distinguished from more aggressive tumours as their prognosis is excellent.

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CASE REPORT

A case of Cortical deafness – A rarity in literature

Dr. Yogesh G. Gupta, Dr. Prakash Chauhan, Dr. Heilly Shah, Dr. Sudhir Shah,
Dr. Sukumar Mehta, Dr. Tushar F. Patel

Sterling Hospital, Ahmedabad

KEY WORDS : cortical deafness, auditory cortex.

ABSTRACT

Cortical deafness is one of the rare case reported in medical literature. Here we present a case report of young patient with cerebrovascular accident with cortical deafness.

INTRODUCTION

While searching the literature for cortical deafness you find few things, first it is rare occurrence, second papers are more about trying to understand the patho physiology and third there is less weightage on treatment and prognosis. Hence when this patient presented to doctor's with complain of hearing loss with no weakness he was straight forward referred to ENT specialist. This case report aims to put forward a rare differential diagnosis for hearing loss.

CASE REPORT

The patient is a 40- year old right handed male teacher who is a known case of rheumatic heart disease. He has undergone ballon mitral valvuloplasty at age of 25 and then operated for mitral valve replacement at age of 36. He has been since then on anticoagulant warfarin, lanoxin and calaptin sustained release. He also has atrial fibrillation with controlled ventricular rate. On 28th April he complained to his relative as to that I can't hear anything. Initially it was taken as some local ear problem by relatives and hence they waited. His complain continued even next day. This time he was agitated. They felt he was speaking abnormal language, repeating his own words and also without any stimulus. Hence they consulted their cardiothoracic surgeon. He was subsequently seen by an ENT surgeon whose assessment showed normal auricles and tympanic membranes. He did not respond to tuning fork tests. His Pure tone audimetry showed bilateral complete sensori-neural hearing loss . His CT scan brain showed large

hypodense area in left temporo parietal lobe suggestive of acute MCA territory infarct. He also had old infarct in right temperoparietal lobe. His Two-Dimensional Echocardiogram (2D Echo) showed normal functional prosthetic valve, with no vegetation, clot and normal LV function. His electrocardiogram showed atrial fibrillation with controlled ventricular rate.

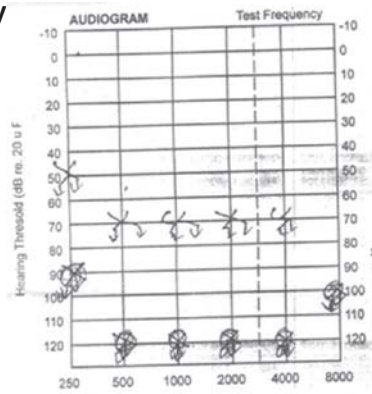
His neurological assessment showed normal power, sensory exam, cranial nerve. He had normal speech. He had abnormal language, repetition of words(pallilalia), jargon speech, and many a times words which have no relationship with one another. Though a teacher there were verbal errors in speech. His vision was normal. He did followed written commands, repeated written words or sentences. He did recognized relatives. He was at times agitated and anxious. His MRI brain and MR angiography were not done in view of non compaitability due to prosthetic valve. His carotid Doppler exam was insignificant. He was started with anticoagulant, antiplatelet. His lanoxin and calaptin were continued.

DISCUSSION

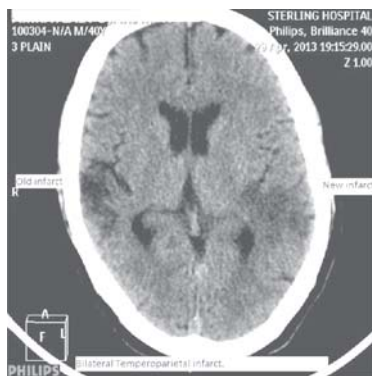
Cortical deafness is a rare disorder due to uniqueness of auditory pathway. The vestibulocochlear nerve, as part of central projections passes through intermediate stations such as the cochlear nuclei and superior olivary complex of the brainstem and the inferior colliculus of the midbrain. It eventually reaches the thalamus, and from there it is relayed to the cortex. In the human brain, the primary auditory cortex is localized

Correspondence Address : **Dr. Yogesh A. Gupta**
203, Sigma Icon2, Opposite Nutan Nagrik Bank, Near Shyamal Char Rasta,
Ahmedabad 380007 Email id: dryogeshgupta@ymail.com

Audiometry

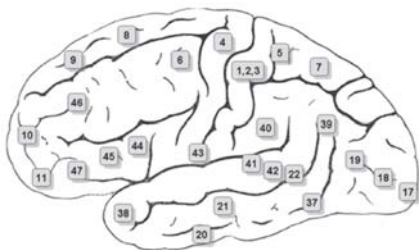


Remark: Bilateral hearing sensitivity not present.



CT scan image on admission.

Brodmann areas: Areas 41 & 42 - Primary and Auditory Association Cortex



in cortex of transverse gyri, on postero superior aspect of temporal lobe deep within the sylvian fissure i.e area 41 and 42.(1) Primary auditory cortex is interconnected with secondary auditory complex or frontotemporal system. Primary cortex is needed to identify basic characteristics of sound i.e pitch and rhythm. Secondary cortex help us to distinguish sound as music, speech or noise. Uniqueness of central auditory pathways is that each of the ears projects to both hemisphere.

Along this vascular supply of auditory system is also important. MCA territory mainly supplies auditory cortex. Posterior circulation is responsible for supply to auditory brainstem structures.

Deafness of central auditory deficits can be Cortical, Auditory agnosia or verbal auditory agnosia. If we go through the literature then it is clear that bilateral temporoparietal lesions (Heschel gyrus, area 41, 42) can cause cortical deafness and language impairment. But when there is lesion in subcortical structures like projection fibres from medial geniculate bodies or colliculi to auditory cortices then there is deafness and dysarthria. (2,3)

Cortical deafness is severe and rare form of deafness whereby patient is unresponsive to all type of sounds. In case of stroke this happens when involved artery is bilateral middle cerebral artery. One important thing to note is that this happens mainly because of pathology in bilateral cerebral hemispheres and not necessarily in auditory cortex. In experiments it is confirmed that bilateral ablations of auditory cortex does not produce complete deafness.(4)

Auditory agnosia means inability to recognize sounds, different musical notes or words. This is seen due to defects in secondary auditory cortex area 22 and part of area 21.(1) Here there is no effect on the perception of sounds and pure tones.

Word deafness or Auditory verbal agnosia is failure to decode acoustic signals of speech and convert them into understandable words. It is mainly due to left temporal lobe pathology. Such patients can speak, read, write but they cannot repeat words said to them or write to dictation. There are two type of this- dysphasia and aphasia.(1)

Treatment of this consists of mainly underlying cause, antiplatelet if infarct. Actually there is only one genuine paper which talk about the treatment and response by Burger, Wertz, and Woods. Some help can be achieved by using coping methods such as lip reading or sign language.(5)

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