Print ISSN: 0972-9798

Medical Journal of Western India

Official Publication of the Research Society, BJ Medical College & SGH, Pune

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Medical Journal of Western India

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Publisher
The Research society of
B J Medical College &
Sassoon General Hospitals,
Pune - 411001(MS). India.
Phone: 91-20-26128000
Fax: 91-20-26126868

Printer
Rashmi Enterprises
C-42, DSK Chintamani, 514/517/519,
Shaniwar Peth, Pune - 411 030.
Website: www.rashmi-enterprises.com
E-mail: director@rashmi-enterprises.com

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Official Publication of the Research Society, BJ Medical College & SGH, Pune

Volume 43, No. 2, August 2015

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Violence Against Doctors

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Introduction

"A good physician nurtures affection for his patients exactly like the mother, father, brothers and kinds. The physician having such qualities gives life to the patients and cures their diseases"—Charak

Traditionally doctors have played such multiple roles other than just health care givers. Up until now their position in society had been next to none other than God himself. Violence, if any, against doctors was generally limited to psychiatric patients. However over the years, there has been a rapid decline in general attitude of the public towards doctors, leading to an alarming state of affairs, wherein doctors are being targeted by the general public. Such violence is unjustified in most cases and doctors are clueless as to what went wrong as they have been following traditional teachings and methods. There is therefore a need to examine the root causes of such unprecedented violence, as also the changing mind set of society at large, role of media, relevant laws and checks being put in place as well as the remedial measures which need to be taken.

Causes of Violence

- **Unexpected deaths**

  Violence is generally seen after an unexpected death in wards or operation theater. Though uncommon, the patient's relatives who have suffered sudden loss of a near and dear one, may react with violence instead of just grief.

  All possible care should be taken to anticipate such incidents and proper measures should be taken. Proper hospital registration and adequate insurance cover is mandatory.

  A crucial step is to ensure availability of life saving drugs with expiry date along with instruments all working in order, so also Oxygen, suction, ventilator support (Minimum-Ambu Bag), light source and fluids.

  The other main causes of violence by patients' relatives are unnecessary investigations, delay in attending patient, request of advance payments, or withholding a deceased body until settlement of final billing. [1]

- **Extreme Ethical and Moral Corruption**

  In private sector, some doctors engage in unethical practices, such as advising expensive and unnecessary radiological, endoscopic or laboratory investigations. This is often resorted to, in order to recover the hefty fees spent in studying in private medical colleges. In government hospitals, doctors are overworked and under pressure from politicians, affecting doctors' self-esteem.[1]

- **Growing intolerance in society**

  Changing value systems and mind sets have led to a paradigm shift in the way society views doctors. The situation has deteriorated to such an extent that an NCERT textbook has recently printed highly objectionable and factually incorrect study material showing doctors in poor light. This sends out a wrong message to students, teachers and to the entire education system!!

  Some blame low health literacy among the public, while some of the intolerance may be justified when medical care falls below expectations.

  Another point to be noted is that violence is used as a measure to avoid exorbitant fees which patient and relatives have to pay. Vandalism and attempts to damage hospital properties serve to distract the attention from the fact that bills need to be paid.

- **Political interference**

  Doctor politician nexus is now a well known fact,

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where doctors are entertaining politicians for favors, violating all basic principles of ethics. A fall out of criminalization of politics is that even corporate hospitals fail to resist acts of vandalism on part of politicians. An example that can be quoted is of a big private sector hospital in Mumbai suburb, where following news of death of a political leader, a mob of his followers went on a rampage, destroying all furniture and equipment. The damage to the hospital was estimated to be around Rs 10 crore which is was not only a criminal waste of resources, but also caused a lot of inconvenience to the other patients in the area. As doctors it is our ethical responsibility to fight such political motivated violence [2]

Manhandling, such as incidence of Bihar MLA's body guard shooting at doctors in Gaya last year and mob violence at BC Roy Memorial Hospital, Kolkata on July 01, 2011 created feeling of vulnerability among staff. Unfortunately, care givers are not trained or coached to manage such hostile situations.

- **Bad media publicity**

Equally to blame are the media barons who are found lacking in their homework or who even indulge in purposeful and systematic attack on integrity of doctors. They sensationalize news give misleading and false information while highlighting the odd case here and there while failing to project the routine daily services being done by efficient doctors even at cost of their personal health and neglect of families. In cases of dispute a one sided approach is being taken wherein doctors are made soft targets through no fault of their own. Pharmaceutical industry always gets away scot free as also corporate hospitals on basis of sheer muscle and money power. The brunt of this violence is being faced by small hospitals and nursing homes.

- **Poor legal protection**

Lack of awareness of doctors rights in case of disputes, compounded by non cooperation from police and slow and ineffective judiciary make a practicing doctor vulnerable in current scenario. It is no longer enough to just treat patients, doctors must be armed and equipped with thorough legal knowledge and be prepared to face law confidently as and when need arises. All decisions taken in treatment of patients must be within ambit of law and as per conventional methods and with due written informed consent of patients. Doctors must not fall prey to patient's requests as well as pressures from regulatory authorities to falsify evidence or give false statements in court.

Reporting from Medical fraternity

75% of doctors across the country have faced at least some form of violence, initial findings of an ongoing study by the Indian Medical Association (IMA) have revealed.

Doctors faced maximum violence when providing emergency services, with as many as 48.8% of such incidents reported from intensive care units (ICUs) or after a patient had undergone surgery.

However, experts said the findings did not reflect the actual situation as not all cases were reported. The gravity of the problem is much more. 'All cases of violence are not reported. Doctors often understand the situation of relatives who are in distress and do not report such cases .Mostly, those cases are reported where the doctor feels serious threat of life or has already faced so. [3]

Many medical organizations declared that medicine had become a 'dangerous' profession and doctors should be provided 'security'. Some stated that 'doctors should stop treating politicians.'

There have been reports of Post Traumatic Stress Disorder in those doctors who have faced violence; some have been known to leave their jobs, fear being a major factor.

Prevention and Safety Measures

- **Share responsibilities :** Take additional opinions if required, sharing the responsibilities while making crucial decisions saves one from unnecessary prosecution and litigations.
- **Communications :** Duly filled written and Informed Consent explained in language of preference saves many a headache. Breaking bad news must be done by a senior taking all due precautions. One should have a counseling room with CCTV. Family members must be counseled periodically and document of records carried out

with their signatures and witnesses.

- **Documents :** Due attention must be given to filling certificates, OPD notes, operative, postoperative notes which must be done within shortest possible time frame to avoid missing out on details. It is equally important to regularly log visits to wards on paper with date and time which can later serve as evidence in cases of negligence.
- **Empathy :** is of utmost importance while dealing with potential casualties. Mere expertise and efficiency is not enough. Communicating with patients and their relatives from time to time and appraising them of the situation and prognosis is crucial and saves doctor from violent outburst in case of eventuality.
- **False hope :** Important not to give false hopes and at the same time reassure patient and their relatives that the best possible treatment is being carried out.
- **Information** : about available insurance policies and their status and cover saves both parties anxiety and acrimony later at time of settlements of bills.
- **Role of media :** A day after a doctor in Allahabad's Anand Hospital was assaulted brutally by infuriated relatives of a deceased patient, city doctors tied black ribbons on their arms in protest. The doctors, who protested under the banner of the Indian Medical Association (IMA), did not stop work. However when the video of the doctor being assaulted went viral on social media, there was a state wide protest by doctors asking for immediate arrest of the accused. Irked over the incident, Allahabad Medical Association (AMA) had blocked roads and shutdown health services in the city. Thus media helps in quick dissemination of information as well garners mass support for the assaulted doctors, creating a feeling of solidarity and brotherhood[4].
- **Local self help groups :** One of the effective strategies is to form Rapid Action Group which can be activated instantly in case of problem, using social media such as Whatsapp, Facebook etc. There was a case in Amravati in which a patient died post LSCS 2nd day post operative. A mob of 200 people gathered which were effectively handled by 60-70 active IMA members who reached within minutes.
- **Education of public and communicating via Mass media :** A dialogue is necessary at all times to keep the media informed about doctors and their predicaments in handling critical cases. A sane and logical attitude needs to be employed while interpreting each so called case of medical negligence. One must be vigilant about wrong messages being sent out in society such as recent case of NCERT publication in standard seven textbook, as also articles in newspapers books etc.
- **Awareness of existing laws and doctors rights**

✓ Medical practitioners like other professionals are liable under Consumer Protection Act (CPA), 1986 as per Supreme court ruling in 1995.

✓ Indian Penal Code 1860 sections 52, 80, 81, 83, 88, 90, 91, 92 304-A, 337 and 338 contain the law of medical malpractice in India.

A physician can be charged with criminal negligence when a patient dies from the effects of anesthesia during an operation or other kind of treatment, if it can be proved that the death was the result of malicious intention, or gross negligence. Before the administration of anesthesia or performance of an operation, the doctor is expected to follow the accepted precautions.

In such cases, the physician should be able to prove that he used reasonable and ordinary care in the treatment of his patient to the best of his judgment. He is, however, not liable for an error of judgment. The law expects a duly qualified physician to apply a degree of skill and care, that an average man of his qualifications ought to have and does not expect him to apply the highest possible degree of skill in the treatment of his patients, or to be able to guarantee cures.

✓ Noting that the frivolous complaints against doctors have increased by leaps and bounds, the Supreme Court on 17th February 2009, held that the police cannot arrest doctors over complaints of medical negligence without prima facie evidence. The apex court also restrained courts, including consumer fora, from issuing notices to doctors for alleged medical negligence without seeking an opinion from experts. A bench of Justices Markandeya Katju & R M Lodha ruled that courts must first refer

complaints of medical negligence to a competent doctor or a panel of experts in the field before issuing notice to the allegedly negligent doctor. The court also warned the police officials not to arrest or harass doctors, failing which the policemen would themselves have to face legal action. Police cannot directly lodge an FIR against doctors until Medical Board headed by Civil Surgeon certifies the negligence. [5]

- ✓ In Maharashtra assault on doctors is now a cognizable and non-bailable offence with the `Maharashtra Medical Services Persons and Medical Institutions (Prevention of Violence & Damages or Loss of Property) Act has come into force in the state.

  The ordinance includes a provision to award three years imprisonment for assault on doctors or hospital staff and a fine of Rs 50,000. If the kin of a patient damages hospital property; they were liable to pay double the cost of the property they damaged.

  The ordinance also mentions a liability clause, holding the hospital and medical practitioner responsible if a case of negligence is proved against them.

Basic Tips For Doctors Today For A Safe Practice.

Protect Yourself Before You Protect Others.

1. Install CCTV in all relevant places.
2. You should have a counseling room with CCTV.
3. Keep photo Identity card and residence proof of patients and kinship.
4. Collect daily fee. Don't keep billing till the last. Many assaults happen just to avoid bill payments.
5. Keep armed security round the clock. One should have personal licensed pistol only to be used in dire necessity. (Only when your life is at risk)
6. Keep the legal proceedings and punishments in clear expression and bold letters in English, local language and Hindi in all important places.
7. When any patient dies, take all necessary precautions before declaring death.
8. Give full security to On duty doctors.
9. Keep alarm bells at hand, and phone applications to inform all administration, other doctors, nearest police station in all circumstances.
10. All doctors, nurses, paramedics, security in vicinity should stand united to face any expected and/ or unexpected situations.
11. Doctors should form a fighting platform collectively with a body of legal experts. They should set aside all selfish motives, personal differences and fight till justice is done.
12. Today some doctor is attacked. Tomorrow it may be your turn.
13. Send a strong message to the community that doctors are not weak. They should not be taken granted for any assault.

World Scenario

Violence against doctors seems to be a global phenomenon. Grave concern about growing incidence of violence against doctors across the globe has been expressed by the World Medical Association. At their meeting in Oslo, delegates from 40 National Medical Associations reported violence in every part of the world which included verbal to physical attacks and even kidnaping and murder. Violence against doctors is totally mindless, uncalled for and only serves to negatively impact the health care system and final price being paid by patients themselves. They have advised adopting a zero tolerance policy towards work place violence.

China has seen a sharp deterioration of doctor patient relationship in recent years. Patient dissatisfaction in China should be considered not as the cause of violence against doctors, but rather a symptom of a flawed system that victimizes both patients and doctors alike. In 2006, around 5,500 medical workers were injured by patients or their relatives. However, in 2010, such cases increased to 17,000. [6]

In the UK (April 1994) the Department of Health, in response to doctors' concerns, amended GPs terms of service to allow the immediate removal of a patient from a GPs list following an act of actual or threatened violence. The British Medical Association have

subsequently circulated guidance on combating violence in general practice, stating that: To tolerate abusive or violent behavior invites the perpetrator to repeat his or her actions. Therefore, the prevention of violent and threatening behavior is vital to our professionalism.

Conclusions

The onus of communicating reality to patients and their relatives is on us, if we want to protect ourselves. We need to drive home 2 messages. One that doctor is a human being with his own need to take care of his family, pay bills etc. To expect charity from doctors is grossly unfair. The second message is that in spite of best treatment available and best possible care, doctors cannot guarantee life, as death is an inevitable aspect of life. It is patients and their relatives who need to come to terms with their emotions while facing such situations and be reassured that doctors only act in the best interest of the patients. An apt conclusion would be to state that, the best that a doctor can offer to the patient is the hope of a good outcome and the promise of his best intentions.

"Not to take the hope away from the patient under any circumstances ...eternal hope which comes to us all "Sir William Osler

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REVIEW ARTICLE

Giant Cell Tumour

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Dean and Professor, **Associate Professor, ***Assistant Professor, ** Registrar, Dept. of Orthopedics B.J.G.M.C. & S.G.H., Pune.*

ABSTRACT

Giant cell tumor (GCT) of bone is one of the commonest benign bone tumors encountered by an orthopedic surgeon. The World Health Organisation has classified GCT as "an aggressive, potentially malignant lesion", which means that its evolution based on its histological features is unpredictable. GCT is a true neoplastic process originating from the undifferentiated mesenchymal cells of the bone marrow. The main clinical symptoms are non-specific, local swelling, warmth, and pain radiating independently of weight-bearing. Pathological fracture is the first sign in approximately 15% of cases. Plain radiographs remain the mainstay of the diagnosis of GCTs, however, MRI and CT are important for staging and therefore surgical planning.

The treatment of GCT is directed towards local control of GCT without sacrificing joint function. Multitude of treatment options available should be optimised taking into account location, grading of tumor, patient's expectation and recurrence rate of surgical procedure. Metastatic disease in GCT does not carry the same poor prognosis as malignant tumors. Therapy should be directed at achieving adequate local control.

In the future, histochemistry, DNA cytometry, examination of the expression of certain oncogenes, proteins, cytokines and the quantitative-qualitative measurement of molecular genetic instability of the tumour will have a greater influence on the surgical planning. Because of the relative rarity of the tumour and the special operative techniques involved, it is recommended that GCT be treated in tumour clinics.

Keywords : Giant cell tumor, Multinucleated giant cells, Intralesional curettage, Local recurrence.

Introduction

Giant cell tumor (GCT) of bone is one of the commonest benign bone tumors encountered by an orthopedic surgeon. The reported incidence of GCT in the Oriental and Asian population is higher than Caucasian population and may account for 20% of all skeletal neoplasms.[1] The World Health Organisation has classified GCT as "an aggressive, potentially malignant lesion", which means that its evolution based on its histological features is unpredictable. Statistically, 80% of GCTs have a benign course, with a local rate of recurrence of 20% to 50%. About 10% undergo malignant transformation at recurrence and 1% to 4% give pulmonary metastases even in cases of benign histology.[2]

Pathogenesis

GCT is a true neoplastic process originating from the undifferentiated mesenchymal cells of the bone marrow. Multinucleated giant cells and mononuclear stromal cells can be distinguished by light microscopy. These giant cells are derived from stromal cells, either by the fusion of mononuclear cells or, less probably, by amitotic division or nuclear segmentation of the stromal cells without the corresponding cytoplasmic division.[3] These multinucleated giant cells resemble osteoclasts in their phenotype and function: their size is approximately 60 μm; their numerous nuclei are centrally located in the cytoplasm. They stain positive for tartrate-resistant acid phosphatase and naphthyl alpha esterase enzymes, and possess receptor sites for calcitonin, a phenotypic marker for osteoclasts.[4]

Further histochemical, immunohistochemical, cytogenetic, and molecular-genetic studies in cell culture derived from GCTs have confirmed that there are two different cell lines within the mononuclear stromal cells. One population consists of mononuclear round cells, which are non-neoplastic and express monocyte-macrophage markers (tartrate-sensitive acid phosphatase, naphthyl alpha esterase) and react with monoclonal antibodies to CD 13 and CD 68 which suggests that these cells have a monocytic macrophage origin.[5] The second cell line which appears as mononuclear spindle- shaped (fibro-osteoblast-like) stromal cells is considered to be responsible for the neoplastic character of the GCT. This cell line is genetically unstable, as has been found in recent

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molecular genetic studies. It shows chromosomal abnormalities, a higher incidence of expression of p53 protein and alterations in different oncogenes (C-myc, C-fos, N-myc) which are also found in frankly malignant osteosarcomas.

These features support the hypothesis that the genetically unstable spindle-shaped neoplastic mononuclear stromal cells stimulate the immigration of blood monocytes into the tumour tissue and promote the formation of the osteoclast like giant cells. The characteristic cell types, the monocytes and osteoclast-like giant cells, are therefore simply reactive components of the GCT, while the spindle-shaped stromal cells represent the neoplastic component of the tumour.[5-9]

Clinical appearance

Giant cell tumor represents 15% of benign and 3% to 8% of all bone tumours and is more common in China and India where it constitutes approximately 20% of all bone tumours.[10] Nearly 50% of cases occur in the region of the knee, but other frequent sites are the distal part of the radius, the proximal humerus and fibula, and the pelvic bones. It is usually situated in the epiphysis, grows eccentrically, and may later also affect the metaphysis. It appears most often in the second to fourth decades of life (60% to 75% of all cases) and the male:female ratio is 1:1.5.

The main clinical symptoms are non-specific, local swelling, warmth, and pain radiating independently of weight-bearing. Pathological fracture is the first sign in approximately 15% of cases. The duration of symptoms varies between two to six months and by then, in one-third of cases, the size of the tumour exceeds 50% of the diameter of the affected bone, it has destroyed the cortical bone and reached the subchondral region. GCT appears as a pure lytic cystic lesion, growing often but not exclusively eccentrically in the epimetaphyseal region of the bone. The affected part of the bone may be expanded and the cortical bone thinned. In an advanced stage, the GCT breaks through the cortex and there is a lack of periosteal reaction with formation of spicules around the tumour.[11]

Imaging

GCT demonstrates a lytic lesion centered in the epiphysis but involving the metaphysis and extending at least in part to the adjacent articular cortex , less than 2% present in the metaphysis or diaphysis. In the major long bones such as the femur and tibia, all lesions begin in the intramedullary region, are eccentric, but become symmetric and centrally located with growth. Most cases show circumscribed borders i.e. geographical destruction. In 10% the edges may appear permeative to moth-eaten. Early lesions are contained within the original bone contours. With growth, the tumor usually bulges beyond the confines of the cortex, which undergoes varying degrees of resorption. A significant percentage may cause eccentric or concentric cortical erosion and extend into soft tissue. Lysis is common to all GCT, probably due to massive osteoclastic proliferation. Peripheral bony ridges of a lobulated tumor give the radiographic appearance of trabeculations. (Figure 1) The margins of the lesion bordering the adjacent cancellous bone may be well defined or ill defined and seldom a thin shell of reactive bone may be present. Apart from a thin shell of subperiosteal new bone outlining the outer surface of the tumor, no periosteal reactions are appreciated unless a

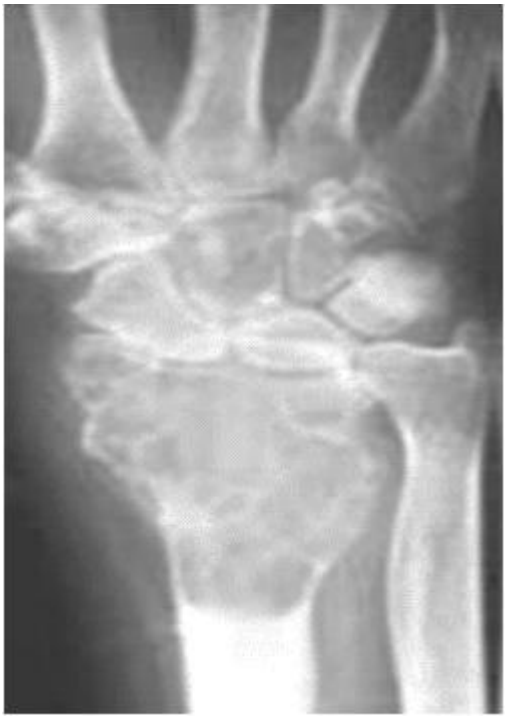

Figure 1 - GCT of Distal end radius with soap bubble appearance

pathological fracture is present .[12]

Plain radiographs remain the mainstay of the diagnosis of GCTs, however, MRI and CT are important for staging and therefore surgical planning. CT is superior to conventional radiography and tomography in outlining tumor extent especially its extra-osseous portion and its relationship to adjacent structures, as well as evaluation of cortical integrity and determination of tumor recurrence.[12]

MRI is currently the best imaging modality for GCT because of its superior contrast resolution and multiplanar imaging capabilities that allow accurate tumor delineation. MRI is also useful in assessing intraosseous and intramedullary skip lesions. GCT shows low intensity on T1 and heterogeneous high intensity on T2 weighted images. (Figure 2) Therefore intramedullary tumor is best seen on T1W, while its extraosseous portion is best appreciated on T2W images.[12]

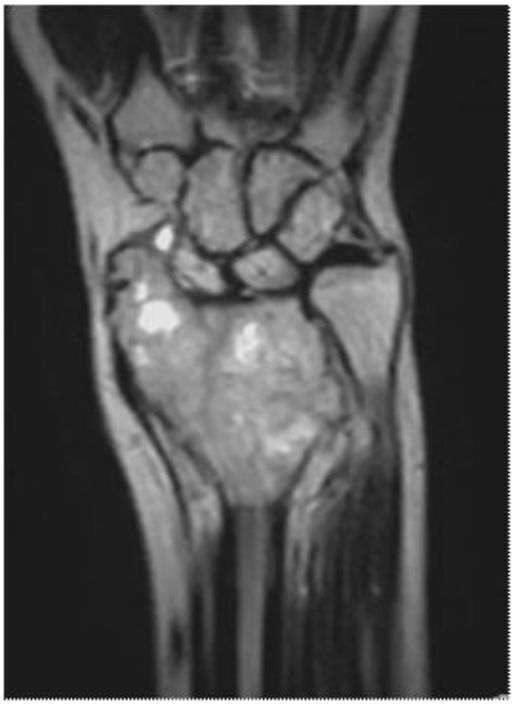

Figure 2 - T2W MRI GCT of Distal end radius

Rarely, in certain cases Angiography to evaluate vascularisation of GCT and its relation to nearby vascular structures has been used. Bone scans has been used in patients with multicentric or metastatic GCT. Positron Emission Tomograph (PET scan) holds promise for accurate diagnosis of GCT by evaluating metabolic activity of tumour surpassing histological testing.[13]

Grading and staging systems for GCT

Based on the degree of histological appearance of the stromal cells and the number of giant cells and mitoses, Jaffe et al,[14] classified GCT as benign, aggressive and malignant. Enneking[15]and Campanacci et al[13] developed a similar classification for GCT based on their clinical, radiographic and histological features. Enneking's surgical stages 1, 2 and 3 represent the clinically latent, active and aggressive forms of GCT. The radiographic grade-1 of Campanacci et al[13] represents a quiescent form, in which the cortical involvement is minimal, if at all. Only 10% to 15% of GCTs belong to this rare stage which can even be asymptomatic. The most common active grade-2 lesions show extensive cortical thinning and bulging. The aggressive grade-3 lesions break through the cortical bone and have a soft tissue component covered by a pseudocapsule and periosteum.

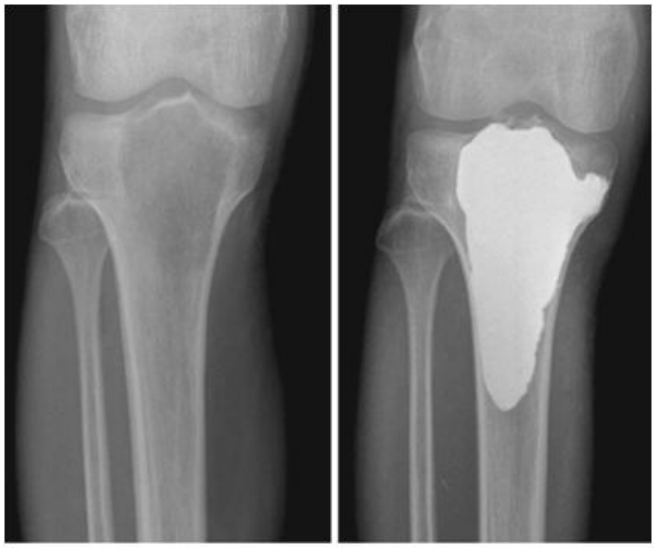

Figure 3 - Intralesional curettage with
Bone cementing for Proximal tibia GCT

Special forms of GCT[16]

A. GCT is typically a monostotic process, but multicentric (polyostotic) forms have been described occasionally. This rare condition can appear simultaneously or metachronal with an interval of more than ten years.[16]

B. A rare form is the malignant GCT, which can be divided into primary and secondary groups. The

primary form (1 to 3% of all GCTs) is malignant from the onset. Secondary malignant GCT (5% to 10% of all GCTs) may develop during recurrence of a benign GCT or undergo a malignant transformation after radiotherapy.[16]

C. Benign metastasing GCTs have been described in 1% to 3% of all and 6% of the recurrent GCTs. In these cases the histology of the nodules found in the lung is identical to that of the benign tumour of the primary site. Some authors explain this as secondary to the tumour emboli often seen in the peripheral vessels of GCTs and regard the nodules found in the lung as implants and not as true metastases. Lung metastases usually appear two to three years after the treatment of the primary tumour. They have also been occasionally observed at the first presentation of a benign GCT. A chest radiograph is therefore justified both at the first presentation and in the course of the follow-up.[16]

Treatment

The treatment of GCT is directed towards local control of GCT without sacrificing joint function. Multitude of treatment options available should be optimised taking into account location, grading of tumor, patient's expectation and recurrence rate of surgical procedure.

- **Intralesional Curettage[1]**

The key to ensuring an adequate curettage with complete removal of tumor is obtaining adequate exposure of the lesion. This is achieved by making a large cortical window to access the tumor so as to avoid having to curette under overhanging shelves or ridges of bone. Use of a head lamp and dental mirror combined with multiple angled curettes helps to identify and access small pockets of residual disease which may otherwise result in recurrence. A high power burr to break the bony ridges helps extend the curettage and is recommended. A pulsatile jet lavage system used at the end of the curettage helps to bare raw cancellous bone and physically wash out tumor cells.

- **Use of additional adjuvants to augment curettage**

Adjuvants such as phenol and hydrogen peroxide used after completion of curettage may be of additional benefit in helping to decrease recurrence rates after curettage. Cementation using methylmethacrylate has shown encouraging results. It is postulated that exothermic reaction of methylmethacrylate generates local hyperthermia which induces necrosis of any remaining neoplastic tissue, yet it does not extend to the normal tissues to result in local complications. In theory, the possibility that the polymerization of methylmethacrylate may produce local chemical cytotoxic effect cannot be excluded.[17] Cytotoxic agents like methotrexate and adriamycin have been incorporated in bone cement and other drug delivery systems in an attempt to reduce recurrence.[18,19] Cryosurgery using liquid nitrogen first propagated by Marcove, though used in some centres, is associated with local wound and bone complications.[20]

The use of cement has advantages in that it is cheap, and immediate weight-bearing is allowed. Furthermore, a local recurrence is easily recognised around the cement both by radiographic and MR investigations. Extended curettage and application of bone cement are therefore the most accepted methods in the treatment of GCT.[16]

The use of adjuvants combined with careful curettage may decrease the rates of local recurrence, which were reported in the historical series of Goldenberg et al[21] and Campanacci et al[13] as being from 30% to 43% and 8% to 17%. Some authors found no recurrence either with or without the use of additional adjuvants, but the number of the patients reported was small.[16]

Reconstructing the defect after curettage can be quite challenging. In case the gap left behind after the curettage is small and does not jeopardize the structural integrity of the bone it can be left alone and the cavities fill up with blood clot which then gets ossified to form bone.[22] For larger defects the traditional methods of reconstruction have been cementation or use of bone graft with each method having its advantages and disadvantages.[1]

To try and forestall potential problem of late articular degeneration in subarticular lesions where the amount of residual subchondral bone after an extended curettage is less than 5 mm, a multilayer reconstruction technique (Figure 4) is recommended. A mixture of morsellized auto and allograft (about 5-8 mm thick) is packed adjacent to the subarticular surface. A layer of gelfoam is layered over this and the remaining cavity is packed with cement. This helps reduce heat damage from the curing

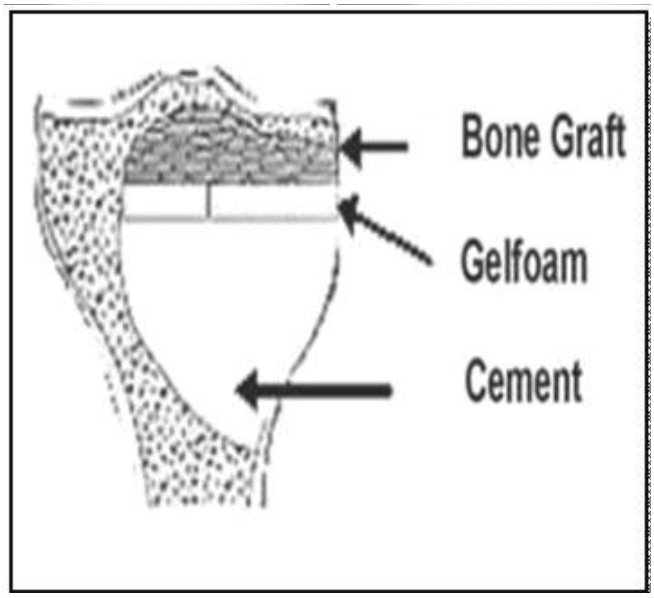

Figure 4 – Diagrammatic scheme of Multilayer 'Sandwich' technique for bone cementing to prevent late degeneration of cartilage

cement, the subarticular bone graft after consolidation should theoretically prevent articular degeneration. Another perceived advantage is that should recurrence occur, the danger of damage to articular cartilage during removal of cement is reduced.[1]

En bloc resection

Complete removal of the tumour tissue is more difficult when the tumour is in the distal part of the radius or in the metacarpal bones. There are reports that GCT in the radius is more aggressive and metastasises more often to the lung.[23-26] En-bloc resection is strongly recommended especially in grade-3 tumours. En-bloc resection usually requires sacrifice of the articular surface and a complex reconstruction procedure, which can lead to complications, revision operations, and decreased quality of life in the long term. Resection is usually performed in GCTs found in the proximal fibula, radius, distal ulna or in the wing of the ilieum in which a reconstruction is not necessary, or in malignant types of GCTs. Stage-3 GCTs, which have already destroyed the cortex tend to recur more often and when the defect is large and the joint surface destroyed, resection is indicated.[16]

If marginal / wide local excision is elected as the treatment of the lesion, either primarily or in recurrence, then reconstruction necessarily implies reconstruction of the joint surface, since GCT invariably involves the end of a long bone and causes significant dysfunction of the joint surface.[1]

The options include[1]

- Megaprosthetic joint replacement: These afford stability and mobility, however, are prone to ultimate loosening, wear or breakage and require revisions.
- Biologic reconstruction: These are technically demanding, but durable procedures affording stability at the cost of mobility. They include
  - I. Autograft arthrodesis (knee, wrist, shoulder) with internal / external fixation
  - II. Live microvascular fibula reconstructions (e.g., around knee and shoulder, distal radius.
  - III. Ilizarov Reconstruction.

When the distal part of the radius is removed, an ulnocarpal arthrodesis can be performed[27] or vascularised[28] autologous fibula or the defect can be replaced by either nonvascularised autologous fibula or the defect can be replaced by nonvascularised fibular graft [29, 30]. Treatment is especially difficult when the GCT has affected the vertebral column, the sacrum or the periacetabular region of the pelvis. Marcove et al[29] successfully performed an incomplete curettage of the sacrum with cryosurgery in a patient with GCT.

- **Chemotherapy And Radiotherapy**

Occasional GCT of bone demonstrate profound responses to chemotherapy but these cases are anecdotal and their incidence is disappointing.[1]However, recently Denosumab, monoclonal antibody to RANK-L ligand found to be effective in subset of patients with previously unresectable GCT or recurrence.[31] The literature documents a close association of secondary sarcomatous transformation in the region of GCTs treated by radiation therapy. In lesions involving the axial skeleton, with exception of sacrum, excision with stabilization of the spine and biologic reconstruction of the anterior column followed by reduced levels of irradiation (45 Gy in 4.5 weeks), on assumption that you are dealing with microscopic residual tumour would offer the patient the best chance.[32,33]

- **Embolization**

Unresectable GCT like in some cases in sacrum or pelvis or for palliation of pain or for preoperative prevention of blood loss can be hastened by transcatheter embolization of GCT. For palliation of pain or for unresectable tumor, monthly embolization is recommended.[34]

- **Bisphosphonates**

Recent reports of localised or systemic administration of pamidronate or zoledronate can be a novel adjuvant therapy for giant cell tumor. Bisphosphonates act by targeting osteoclast-like giant cells inducing apoptosis and limiting tumor progression.[35,36]

Metastasis in GCTs

The incidence of metastases is estimated to be from 1-6%. The metastatic lesions are histologically identical to the primary lesions, showing no tendency to dedifferentiate. The majority of metastatic lesions are to the lung. Solitary metastasis to regional lymph nodes, the mediastinum and the pelvis have been reported, as has involvement of the scalp, bone and paraaortic nodes.[37-38] The mean interval between the onset of the tumor and metastasis is around five years. The natural history of metastatic lesions is unpredictable. Complete excision of metastases has been very successful with good long-term survival, but those with inoperable disease may die from metastases. Hence, metastatic lesions should be resected if possible. Radiation and chemotherapy have enjoyed limited success. Steroids have been successfully used in the control of unresectable metastases. Though rare, there are several reports where the metastases have completely regressed spontaneously or have remained static for years. There have been several reports of long-term survival even with residual pulmonary tumors. Metastatic disease in GCT does not carry the same poor prognosis as malignant tumors. Therapy should be directed at achieving adequate local control.

Local recurrence

Local recurrence appear to be related to the surgical margin and are clinically characterized by pain and

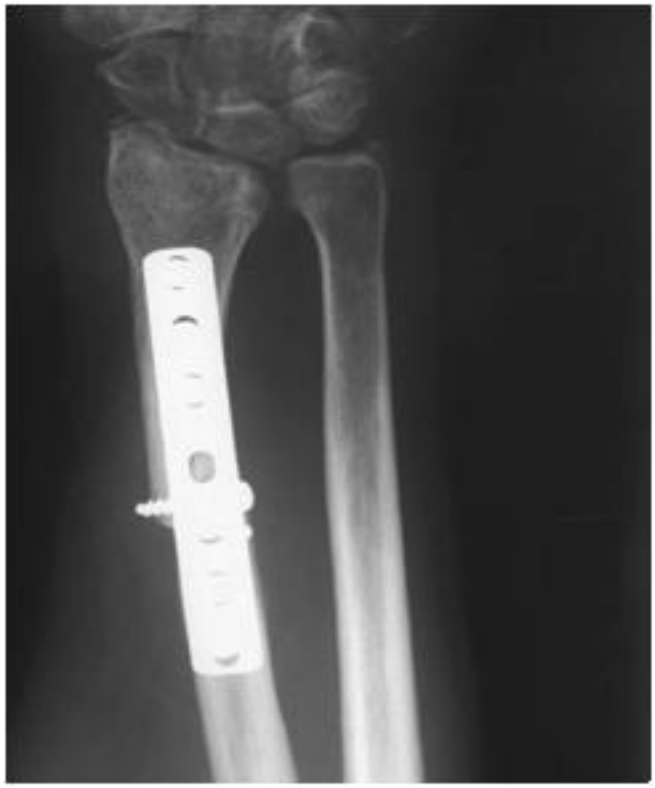

Figure 5 – En bloc resection of distal radius GCT and Reconstruction with Non vascularised fibular autograft

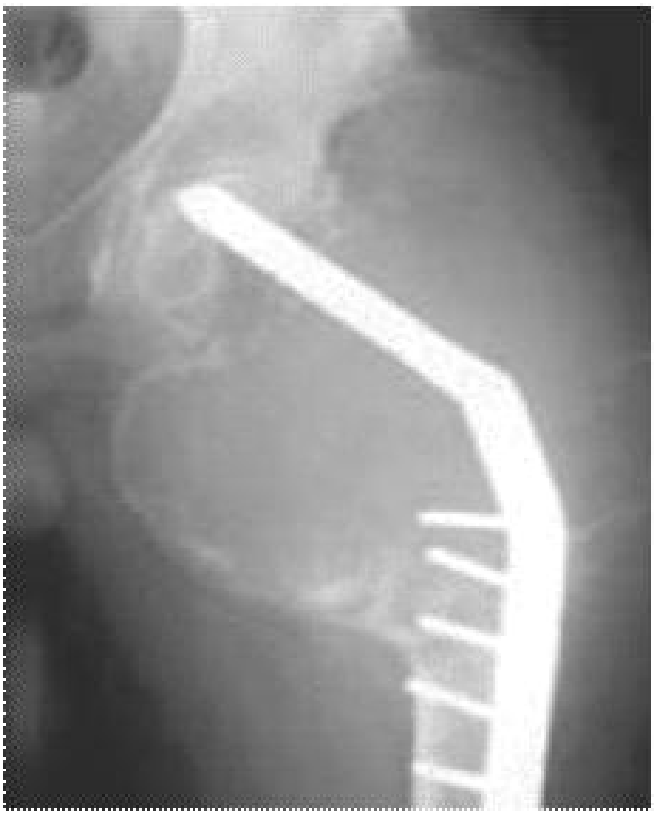

Figure 6 - Recurrence of GCT in Proximal Femur after intralesional curettage and Grafting

radiologically by progressive lysis of the bone graft or the adjacent cancellous bone. Following curettage and cementation an osteolytic zone caused by thermal injury measuring 2 mm surrounds the cement. This radiolucent zone is bordered by a thin outer sclerotic rim for about six months. Lysis or failed development of the sclerotic rim between the cement and cancellous bone may suggest recurrence.[33] Soft tissue recurrence is visible on plain radiographs because of its tendency towards peripheral calcification. According to Akhane, Total Serum Acid Phosphatase (TACP), as tumor marker for monitoring response to treatment.[1] The principles of management remain the same even in recurrent tumor.

In the future, histochemistry, DNA cytometry, examination of the expression of certain oncogens, proteins, cytokines and the quantitative-qualitative measurement of molecular genetic instability of the tumour will have a greater influence on the surgical planning. Because of the relative rarity of the tumour and the special operative techniques involved, it is recommended that GCT be treated in tumour clinics. Inadequate primary intervention by a non-specialist can lead to major technical challenges at an advanced stage of the tumour.[1]

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REVIEW ARTICLE

MicroRNA - A New Dawn on Horizon for Osteoarthritis assessment?

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ABSTRACT

The etiology of osteoarthritis (OA) is complex, with genetic, developmental, biochemical, and biomechanical factors contributing to the disease process. Chondrocytes in articular cartilage must express appropriate genes to achieve tissue homeostasis, and this is altered in OA. One facet of the aberrant gene expression in OA is the replay of chondrocyte differentiation with the expression of genes associated with chondrocyte hypertrophy. The importance of microRNAs in different biological processes has already been documented.

Generally, the generation of microRNA is a multistep process that starts in the nucleus and finishes in the cytoplasm. Dicer, an essential component for microRNA biogenesis, is essential for normal skeletal development. Dicer deficiency in chondrocytes results in a reduction in the number of proliferating chondrocytes by two distinct mechanisms: decreased proliferation and accelerated differentiation into postmitotic hypertrophic chondrocytes. Changes in DNA methylation are likely to be important in determining the complex gene expression patterns in OA chondrocytes, their role in transcriptional regulation and possible demethylation mechanisms that might be applicable to OA. As more studies are performed on different microRNAs, a better understanding will be gained of their pro-inflammatory and catabolic/anabolic roles in the pathophysiology of OA.

Keywords : Osteoarthritis, microRNA, Dicer Deficiency, DNA Methylation, Chondrocytes

Introduction

The etiology of osteoarthritis (OA) is complex, with genetic, developmental, biochemical, and biomechanical factors contributing to the disease process. Chondrocytes in articular cartilage must express appropriate genes to achieve tissue homeostasis, and this is altered in OA. One facet of the aberrant gene expression in OA is the replay of chondrocyte differentiation with the expression of genes associated with chondrocyte hypertrophy. The pattern of gene expression and the transcription factors that control chondrogenesis are known in some detail. Mechanisms that lead to altered gene expression in OA, however, are less well understood.[1]

The importance of microRNAs in different biological processes has already been documented. Intensive research has established that are microRNAs powerful regulators of gene expression. These molecules, which are typically 22 nucleotide long, are produced from larger precursors that contain approximately 70 nucleotides, by enzymes belonging to the Argonaute family and the RNase III, Dicer . After incorporation of microRNA into the RNA-induced silencing complex (RISC), suppression of the translation or degradation of the target mRNA occurs, resulting in an inhibitory effect on the synthesis of protein product of the gene. The RISC complex is guided to its mRNA target by a single microRNA strand, which binds imperfectly to its complementary sequence in the 3'UTR of the target microRNA. Thus far, more than 2500 human mature microRNAs have been discovered.[2]

Osteoarthritis

Osteoarthritis is a chronic degenerative joint disorder and a major cause of disability in the elderly. Approximately 10% of men and 18% of women over the age of 60 are affected with osteoarthritis. Approximately 80% of those affected with OA have significant movement limitations and 25% are unable to perform activities of daily living. OA is characterized by progressive structural changes in the articular cartilage, accompanied by new bone formation, changes in the subchondral bone and a low-grade synovitis.[3] The disease eventually leads to the loss of joint function, pain and immobility. Despite high frequency of the disease,

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its cause is still not completely elucidated.[4] Many factors may play a role in its onset and progression including: age, obesity, overuse or genetics. Articular cartilage undergoes several molecular changes during its lifespan, one of these being chondrocyte activity. Over time, chondrocytes synthesize less aggrecans and proteoglycans and become more susceptible to mechanical stress and joint loading.[5]

Articular cartilage damage is characterized by degeneration of the extracellular matrix (ECM).[6] Matrix degrading enzymes, such as the matrix metalloproteinases (MMP), and a disintegrin and a metalloproteinase with thrombospondin motifs (ADAMTS) play important roles in this process due to their ability to cleave type II collagen or aggrecans, which are two major components of the ECM.[7]

MicroRNA synthesis and function

MicroRNA are 20 – 22 nucleotides long, non-coding RNA molecules that were first discovered in 1993.[8] Since then, numerous studies have discovered various microRNAs in almost all multicellular organisms. To date, the microRNA sequence database 'miRBase' includes over 8000 predicted microRNAs from many species of plants, animals and viruses.[9] For humans alone, miRBase lists over 800 predicted microRNAs and other bioinformatics predictions indicate that as many as one-third of all mRNAs might be regulated by microRNA.[10] In the past decade, the role of microRNA has received extensive interest. The importance of microRNA regulation in cellular function is becoming increasingly clear as new microRNA targets are discovered. Although the biosynthesis of microRNAs has now been well established, control of microRNA transcription is not fully understood[11,12] and regulatory mechanisms at the transcriptional level are beyond the scope of this review. Here, recent progress in elucidating the complexity of microRNA processing and posttranscriptional regulation is reviewed.

Generally, the generation of microRNA is a multistep process that starts in the nucleus and finishes in the cytoplasm. First, microRNA genes are transcribed by RNA polymerase II or RNA polymerase III to form long RNA precursors, which contain a single or several stem loops. This structure is called primary (pri)-microRNA; it has a hairpin appearance, with partially complementary sequences in the stem region, which harbours the future microRNA.[13,14] The pri-microRNA is subjected to cleavage by an microRNA processor – a protein complex composed of Drosha (a highly conserved RNase-III-type enzyme) associated with DGCR8 (DiGeorge syndrome critical region gene 8) – to form a shorter precursor microRNA called pre-microRNA, characterized by a stem loop or hairpin structure of 70 – 100 nucleotides in the nucleus.[14,15] Alternatively, many microRNAs are found in polycistronic units that encode more than one microRNA and these microRNAs are also formed in the same way. Additionally, some microRNAs are generated from introns of mRNA, such as miR-140, though a not-fully understood mechanism that involves a spliceosome. A small number of pre-microRNAs, named mirtrons – which are directly formed from pri-microRNA processing by a spliceosome instead of Drosha – have also been reported.[14]

In the processing of these mirtrons, the microRNA processor activity is not required. Pre-microRNAs are exported to the cytoplasm through the exportin-5 pathway and are sliced by another RNase III, Dicer, and its cofactor transactivation-response RNA-binding protein. This results in a double-stranded microRNA duplex that is approximately 22 nucleotides in length, which contains the mature microRNA and the passenger microRNA strand.[14] The passenger microRNA strand is degraded, while the mature microRNA enters the RNA-induced silencing complex (RISC), of which the main components are Argonaute proteins (Agos). Although both strands can generate two mature microRNAs, it is usually only the one with the thermodynamically less stable 5′-end that is incorporated into RISC, while the other strand is degraded. microRNA induces gene silencing through translation repression or targeted mRNA cleavage, depending on the degree of base-pairing complementarity between the microRNA and the 3′-untranslated regions (3′-UTRs) of the target mRNA. microRNA causes cleavage or degradation of target mRNA when perfect base-pairing between microRNAs and their targets occurs.[7,14,15,16]

Role of microRNA in cartilage function and its involvement in OA

Although the precise role of microRNA is unclear, its importance in cartilage and chondrocytes has been

established. Dicer, an essential component for microRNA biogenesis, is essential for normal skeletal development.[17,18,19] Dicer deficiency in chondrocytes results in a reduction in the number of proliferating chondrocytes by two distinct mechanisms: decreased proliferation and accelerated differentiation into postmitotic hypertrophic chondrocytes. Recently, Kobayashi et al.[19] demonstrated that microRNAs are important for cartilage function. In that study, Dicer-deficient chondrocytes in Dicer-null mice resulted in skeletal growth defects and premature death. Because Dicer is a crucial component in microRNA synthesis, these findings indicated the indirect involvement of microRNA in the biological roles of chondrocytes.[20,21,22]

At the same time, Iliopoulos et al.[23] tested the expression of 365 miRNAs in articular cartilage obtained from patients with OA and total knee arthroplasty, and from normal individuals with no history of joint disease. They identified 16 microRNAs that were differentially expressed in osteoarthritic cartilage versus normal cartilage, which can be used to distinguish osteoarthritic from normal chondrocytes. Thus, accumulating evidence suggests that microRNA deregulation can have effects in OA, and may also be involved in obesity and inflammation. Additionally, Jones et al.[24] investigated the expression of 157 human microRNAs and identified several that were differentially expressed in human OA cartilage and bone, compared with normal tissue. Here, some typical microRNAs in determining the complex gene expression patterns of OA chondrocytes are introduced, and their roles in transcription regulation and possible demethylation mechanisms that might be applicable to OA are discussed.[25]

The miR-140 gene is located between exons 16 and 17 of the E3 ubiquitin protein ligase gene Wwp2 on murine chromosome 8 and the small arm of chromosome 16 in humans.[23] Tuddenham et al.[26] reported that miR-140 was specifically expressed in cartilage tissues of mouse embryos during long and flat bone development, and they detected that histone deacetylase 4 was down-regulated by this miRNA. Miyaki et al.[25,27]compared gene-expression profiling using miRNA microarrays and quantitative polymerase chain reaction in human articular chondrocytes and human mesenchymal stem cells (MSCs). They demonstrated that miR-140 had the largest difference in expression between chondrocytes and MSC. An in vitro study showed that interleukin (IL)-1β can suppress miR-140 expression in chondrocyte. Transfection of chondrocytes with ds-miR- 140 also inhibits IL-1β-induced ADAMTS5 expression and rescues IL-1β-dependent repression of aggrecan gene expression. ADAMTS5 plays an important role in the process of OA; this evidence indicates that miR-140 regulates cartilage development and homeostasis, and its loss could contribute to the development of age-related OA-like changes.[27] Tardif et al.[28] used miR-140 and miR-27a to manipulate two significant factors – insulin-like growth factor- binding protein 5 (IGFBP-5) and MMP-13 – in human OA chondrocytes. They found that IGFBP-5 was present in human chondrocytes at a significantly lower level than in OA. These data suggest that IGFBP-5 is a direct target of miR-140; nevertheless, miR-27a indirectly downregulates MMP-13 and IGFBP-5.[28] Additionally, Kim et al.[29] found that miR-27 a suppressed adipocyte differentiation through targeting peroxisome proliferator activated receptor-γ and, therefore, down regulation of miR-27a might be connected with adipose tissue dysregulation in obesity. Obesity is a strong risk factor for OA.[29] Some weight-bearing joints, particularly the knee and hip, are readily affected by OA as a result of increased joint loading.[30,31] Adipose tissue is a true endocrine organ that can release cytokines: for example, IL-1 and tumour necrosis factor (TNF)-α.[32,33] Recently,an in vitro study of IL-1β stimulation of chondrocytes demonstrated that a sequence in the 3′-UTR of MMP-13 mRNA is complementary to the seed sequence of miR- 27b.[34] Increased expression of MMP-13 correlates with down-regulation of miR-27b. This illustrates that microRNA-27b plays a role in regulating the expression of MMP-13 in human chondrocytes, which could open up novel avenues for OA therapeutic strategies.[34] Another study, by Ohgawara et al.,[35] demonstrated that microRNA-18a is connected to chondrocyte differentiation and confirmed the functionality of an microRNA-18a target in the 3′-UTR of connective tissue growth factor (CCN2) mRNA, which had been predicted in computer models. Studies revealed a regulatory role for microRNA-18 a in chondrocyte through CCN2, which is a central conductor of endochondral ossification.[36-40] Increasing evidence has suggested that microRNA-146 is a novel gene that has an independent effect on immune mediated diseases. For example, Taganov et al.[41] found that miR-

146a/b is a nuclear factor (NF)-κB-dependent gene, which can inhibit expression of the IRAK1 gene (encoding IL-1-receptor-associated kinase 1) and the TRAF6 gene (encoding TNF-receptor associated factor 6) by binding to the 3′-UTR of their mRNA; microRNA-146a/b expression is mediated by inflammatory cytokines.

Additionally, when Yamasaki et al.[42] investigated the expression pattern of microRNA-146a in cartilage from patients with OA, they showed that miR-146a was intensely expressed in low-grade OA cartilage, and that its expression was induced by stimulation with IL-1. The results suggest that microRNA-146a has target genes that play a role in OA cartilage pathogenesis. In the early stages of OA, according to Jones et al.,[24] microRNA-146 is associated with a substantial number of genes within the NF-κB pathway. These authors suggested that microRNA-146 is down-regulated in late-stage OA cartilage and that reduced microRNA-146 expression could be a factor in the promotion of inflammatory OA. Investigations of the role of microRNA-34a in chondrocytes have indicated that its expression is significantly up-regulated by IL-1β. That study revealed that silencing of microRNA-34a might be a novel intervention for OA treatment, through prevention of cartilage degradation.[43]

An increasing number of studies in macrophages, monocytes and whole animals have shown that activation through the Toll/IL-1 and TNF-α receptors leads to rapid up-regulation of many microRNAs, including microRNA-9. In addition, one of the targets of microRNA-9 is to downregulate proteins that are involved in the TIR signalling pathway. MicroRNA-9 can also be induced by Toll-like receptor (TLR)2 and TLR7/8 agonists, and by the proinflammatory cytokines TNF-α and IL-1β.[44-46] Each zone has a different pattern of gene expression that has a particular role in articular cartilage development and maintenance. Dunn et al. showed that microRNA-222 expression in articular cartilage is greater in the weight bearing anterior medial condyle than in the posterior non-weight-bearing medial condyle. These data indicate that microRNA-222 is a potential regulator of an articular cartilage mechanotransduction pathway, which may lead to novel ways to treat OA.[46]

Changes in DNA methylation are likely to be important in determining the complex gene expression patterns in OA chondrocytes, their role in transcriptional regulation and possible demethylation mechanisms that might be applicable to OA.

Preliminary evidence suggests that changes in DNA methylation, together with cytokines, growth factors and matrix composition, are likely to be important in determining the complex gene expression patterns that are observed in OA chondrocytes.[47] This is because primary and secondary OA are characterized by the abnormal expression of cartilage-degrading proteases that correlate with epigenetic DNA demethylation of CpG sites in the promoter regions of these enzymes.[47,48] Wu et al.[49] believe that DNA methylation may be mediated by an miRNA. In their study, miRNAs directed DNA methylation at the same loci from which they were produced, as well as in the trans regions of their target genes affecting gene regulation. Considered together, their findings define an miRNA pathway that mediates DNA methylation.[48,49] As more studies are performed on different miRNAs, a better understanding will be gained of their pro-inflammatory and catabolic/anabolic roles in the pathophysiology of OA.

Conclusions

In summary, given the role of microRNAs in mediating the translation of target mRNAs into proteins, the identification of differentially expressed microRNAs in OA tissue and the crucial contribution that microRNAs play in the progression of OA, microRNAs may have important diagnostic and therapeutic potential, and provide a novel means of treating OA.

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REVIEW ARTICLE

Composite : A Magic material in Dentistry

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ABSTRACT

During the past 25 years, advances in adhesive technology and composite-based resins have provided dentists and patients with new treatment options. This technology provides patients with more tooth-conserving and highly esthetic restorations.

A composite, as its name implies, is made by combining two or more dissimilar materials in such a way that resultant material is bestowed with properties superior to any of its parental material.

This article reviews some of the basic facts about the composites in general and advances in composite-based resin materials in dentistry in particular. It discusses composition and classification of current resin-based composite.

Keywords : Composite, Fillers, Additives

Introduction

A composite, as its name implies, is made by combining two or more dissimilar materials in such a way that resultant material is bestowed with properties superior to any of its parental material.

Unlike an alloy or chemically manufactured compound, however, the components of composites neither take part in the chemical reaction nor they dissolve or entirely fuse with each other. Nonetheless they are firmly bounded together while conserving an interface between each other and act in harmony to give much better results.

Composites are materials based on the controlled distribution of one (or more) material(s), termed reinforcement, in a continuous phase of second material is called the matrix.

The reinforcement is added to give strength and firmness to the composite. The matrix is well-known as binder material. Its function is to make the composite impervious to degradation.

There is an additional, elective class of constituents in the composites. This consists of fillers, additives and auxiliary chemicals.

Additives are specifically selected and added to enhance some specific property. These are generally added in minuscule quantities. Auxiliary chemicals are typically added to aid or ease the processing of composites.

The adding together of fillers, additives and auxiliary chemicals is a matter of conscious choice by which the qualities of composites are augmented.

The eventual functioning of composite depends on the matrix and reinforcement but also on the matrix - reinforcement interface.

The matrix and reinforcement vary in their chemical nature and surface characteristics and there is thus bound to be a gap in the two phases of composite no matter how closely they may be bounded. Coupling agent or compatibilizers come into play at this junction. They are as their names indicate, a " go- between " for the matrix and the reinforcement. The use of compatibilizers forms a closer association between the matrix and the reinforcement. Thus, there is continuity and uniformity of properties throughout the composite. This even dispersion means that the eventual strength of the composite is increased. This also prevents environmental moisture, gas, and chemicals that unfavorably affect composite performance from permeating it.

The selection of coupling agent depends on the function of matrix and the nature of reinforcement. The characteristic of the coupling agent that is to be used is governed by the desired mechanical properties of the interface. The coupling agent themselves are also a new class of compounds that have evolved in last two decades to cater to different matrices, reinforcement and composite fabrication techniques.

The interface control is regarded as the most important area and is usually evaluated by commercial expertise

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and closely guarded as secret data by the manufacturers.

The use of different types of matrices and reinforcements have resulted in the adaptation of different methods for the production of the composite. The fabrication method has to suit the properties and physical nature of the particular type of resin and reinforcement used. Thus, the fabrication technique has also evolved to a great extent in the past few years for it is also a major factor in deciding the ultimate strength of the composite.

The composite matrix may be plastic (resin), a metal or a ceramic. It is responsible for the integrity of composite compound. Plastic matrix based composites comprised more than 95% composite material in use today.

Plastics are of two main types thermoplastics and thermosets.

Thermoplastics melt or soften when heated but become rigid and hard when cooled. Thermoset plastics, however, do not become soft on heating and do not melt once they are set. Very high temperature cause them decompose.They are tougher and harder than thermoplastics.

Generally composites are made up of two unrelated materials. But in a few cases there are exceptions also. 'Ceramic ceramic' composites are one among them. In these composite ceramic matrixes are reinforced with ceramic fibers. These are considered composites even though both the matrix and reinforcement are ceramic as the two are in different forms. The matrix may be a sheet or fluid and the reinforcement present as fiber. Ceramic matrices reinforcement with ceramic fibers is in demand for making biomedical implants.

While matrix and reinforcement are no doubt the two main items that decide how in a good way the composite will work, by and large the functioning of a composite also depends on the kind of bond between the matrix and reinforcement. This is because this bond or interface regulate the transfer of stresses and strains from matrix to reinforcement thus controlling the mechanical performance of composite.

Dental composite resin.

As with other composite materials, a dental composite typically consists of a resin-based oligomer matrix, such as a bisphenol A-glycidyl methacrylate (BISMA) or urethane dimethacrylate (UDMA), and an inorganic filler such as silicon dioxide (silica) and in most current applications, a photoinitiator.

Compositions vary widely, with proprietary mixes of resins forming the matrix, as well as engineered filler glasses and glass ceramics.

The filler gives the composite wear resistance and translucency.

A coupling agent such as silane is used to enhance the bond between these two components. An initiator package such as camphorquinone (CQ), phenylpropanedione (PPD) or lucirin (TPO)) begins the polymerization reaction of the resins when external energy (light/heat, etc.) is applied. A catalyst package can control its speed.

Composite resins have a notorious reputation for shrinking upon curing, however, uses as a dental restorative material focus on low shrinkage composites. Composite shrinkage can be reduced by altering the molecular and bulk composition of the resin. For example, *UltraSeal XT Plus* uses Bis-GMA without dimethacrylate and was found to have a shrinkage of 5.63%, 30 minutes after curing. On the other hand, *Heliomolar*, which uses Bis-GMA, UDMA and decandiol dimethacrylate, had a shrinkage of 2.00%, 30 minutes after curing. In the field of dental there have been great increases in bonding strength due to the use of dentin primers in the late 1990s, physical retention is not needed except for the most extreme of cases. Primers allow the dentin's collagen fibers to be "sandwiched" into the resin, resulting in a superior physical and chemical bond of the filling to the tooth.

Dental Composite-based resins should have a range of translucency and opacity that reflects that of enamel and dentin. Translucency and opacity have been reported in the literature for commercially available composite-based resins.[1]

Another important characteristic that should be considered is the radiopacity of the composite-based resin. The type of filler directly influences radiopacity. Radiopacity is attained through the incorporation of elements with high atomic number into the inorganic filler phase. Optimal radiopacity should be greater than enamel. However, a number of commercially available composite-based resins lack the necessary radiopacity.[2-3]

Barium is the element most commonly incorporated into composite-based resins to increase radiopacity. Excessive incorporation of radiopaque glasses results in a reduction in the translucency of these materials.

Recently, manufacturers have been paying attention to the polishing of resin composites. Proper polishing reduces wear and better simulates the appearance of enamel. A number of hybrid composite-based resins are now available with smaller and more polishable distribution of particles.

Introduction of flowable composite-based resins is a recent event.[4] An example of an advantage is that flowable composite-based resins possess the potential for flowing into a small undercut. Because of the material's flexibility, it can be used for restoration of abfraction lesions . The relative ease of flow allows these materials to be used in difficult-to-access areas and repairs of amalgam, crown, porcelain or composite restorations. [3] The application of a flowable as a liner in difficult-to-access areas is becoming popular; however, long-term clinical studies are not yet available to support the use of a flowable composite as a liner at this time.

Composite-based resins can be classified according to their particle size[5]:

- macrofilled - more than 10 μm up to 100 μm;
- midsize filled - less than 10 and more than 1 μm;
- minifilled - less than 1 and more than 0.1 μm;
- microfilled - less than 0.1 μm.

Commonly, composite-based resins are referred as hybrids or microfills. A hybrid resin is a composite in which at least seven to 15+ percent microfiller of fumed silica has been added to the mixture[6] .A composite-based microfill resin is exclusively composed of microfill particles. Hybrids incorporate fumed silica to help with the handling properties. Due to the increase in surface area when incorporating micro-fill particles, heavy loading is impossible. To circumvent the problem and increase the filler percentage, fumed silica is incorporated in a variety of manners, prepolymerized fillers, agglomerated and sintered agglomerated particles.[7]

Conclusion

Composites are going to be a great boon to the field of dentistry in years to come in newer and newer forms.

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ORIGINAL ARTICLE

Expectant management and obstetric outcome in severe preeclampsia

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ABSTRACT

Severe preeclampsia is common and forms deadly triad along with haemorrhage and sepsis that contributes greatly to maternal morbidity and mortality. The specific treatment of severe preeclampsia is termination of pregnancy. The present study in rural medical college and hospital was a prospective study to decide the role of expectant i.e. conservative management of severe preeclampsia in selected group of cases. The decision depends on clinical, biochemical and sonographical observations for planning the expectant management. In period of 3years (2012-2015) 150 cases of severe preeclampsia were studied and in 60 cases expectant management was planned. The aim was to reach a fetal maturity of 36-37 weeks.

Pregnancies were continued with close monitoring of these cases, maximum upto 21 days. In 90 cases pregnancies were terminated in less than 3 days. The termination was decided after clinical evaluation, liver function tests, renal function tests, proteinuria, fundoscopy, platelet count, non-stress test and Doppler study. 28 (46%) cases could be continued upto 37 weeks without any maternal and neonatal morbidity and mortality. In 32 cases (54%) termination was required because of some complication or abnormal biochemical parameter and fetal risk. The caesarean section was required in 46.6% cases. The neonatal survival was 80% while in 20% cases there was either intrauterine death or neonatal death mostly due to abruption and prematurity.

From the study it can be said that expectant management in severe preeclampsia can be tried in selected group of cases after close clinical, biochemical and sonographical parameters without compromising maternal and fetal health.

Keywords : Severe Preeclampsia, Biochemical Parameter, Expectant Management, Neonatal Death, Doppler Study.

Introduction

Hypertensive disorder of pregnancy remains the most significant and intrigruing unsolved problems in obstetrics. They have adverse maternal and fetal effects and are end results of vasopressor, endothelial dysfunction and ischemia.

Severe preeclampsia is characterised by blood pressure 160/110mm of Hg or more with or without affecting vital systems. The incidence of preeclampsia in India varies from 5-15% with high perinatal mortality i.e. 30-50%. This is due to need of premature delivery and uteroplacental insufficiency resulting in compromise of blood flow to the fetus. In this study an attempt was made to continue the pregnancy till a functionally mature fetus could be delivered without compromising maternal health. A skilful evaluation of liver function tests, renal function tests, proteinuria, fundoscopy, platelet count, nonstress test and Doppler study and other parameters were done to plan the obstetric management of those cases of severe preeclampsia. The study was done in a rural set up within available facilities and limitations.

Aims And Objectives

The main objective of this study was to find the role of expectant management in severe preeclampsia and study the role of clinical, biochemical and sonographical parameters in planning the obstetrics management of severe preeclampsia.

Materials And Methods

All the women with severe preeclampsia after 32 weeks of pregnancy i.e. blood pressure on admission being 160/110 mm of Hg or more with or without complications were included in study. Cases less than 32 weeks of pregnancy, patients in labour, eclampsia, abruption and early DIC were excluded.

The study patients were included after giving proper information about their participation and were included after obtaining a signed informed consent.

The selected cases were evaluated. Preeclampsia profile

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(liver function tests, renal function tests, urine examination, fundoscopy, platelet count, coagulation profile) was sent. They were put on antihypertensive drugs i.e. alpha methyl dopa, labetalol, nifedipine and magnesium sulphate if required. A standard general management like bed rest, sedation, antianemic treatment, high protein diet and daily monitoring was given to all patients. A close observation was continued. Fundoscopy, ultrasound, non stress test and Doppler study were repeated as per requirement. Clinical signs of imminent eclampsia, abruption or any systemic complications were observed.

The pregnancies were continued where hypertension was controlled and all other parameters were not deranged; while decision of termination was made in cases of uncontrolled hypertension, signs of impending eclampsia, abruption, IUD, fetal distress or deranged laboratory parameters.

Observations

Table I : Distribution of cases

Serial number	Case profile		Cases (60)	%
1	Unregistered women		43	71.66
2	Primigravida		36	60
3	Symptoms/signs present on admission i.e. headache, blurring of vision, vomiting, epigastric pain, oedema		28	46.6
4	Only hypertension on admission		32	53.33
5	Average gestational age On admission	32-34	24	40
		34-36	36	60

In our study, 150 cases were diagnosed to be of severe preeclampsia. Out of those 150 cases, 60 cases were selected for expectant management (as shown in table I).

Table II : Continuation of pregnancy in expectant management group

Serial number	Weeks of gestation on admission	3-7 days	>14 days	14-21 days	NND /IUD
1	32-32+6 (8)	2	4	2	4
2	33-33+6(16)	4	8	4	4
3	34-34+6 (26)	12	14	0	4
4	35-35+6 (10)	10	-	-	-
	60	28	26	06	12

The maximum continuation was up to 21 days and minimum up to 3 days depending on gestational age at admission and response to treatment.

The continuation was successful in pregnancy 34 weeks or more. The intrauterine death were mostly due to abruption and neonatal deaths were due to prematurity (as shown in table II).

Table III : Termination Of Pregnancy

Serial No.	PARAMETER	CASES(60)	%
1	Completion of 37 weeks	28	46.66%
2	Termination before 37 weeks (single or combination of factors)	32	53.33%
a	Abnormal liver function	08	13.33%
b	Abnormal renal condition	10	16.66%
c	Increasing proteinurea	10	16.66%
d	Signs of impending eclampsia	04	06.66%
e	Abruption	04	06.66%
f	Intrauterine death	04	06.66%
g	Abnormal Doppler	08	13.33%
h	Nonreactive nonstress test	16	26.66%

In 28 cases pregnancy more successfully continued up to 37 weeks without any fetal or maternal compromise. In 32 cases, development of any or more maternal and fetal complications required termination of pregnancy (as shown in table III).

Table IV : Continuation of pregnancy outcome

Sr no	DAYS	CASES(60)	BABY SURVIVAL	IUD/NND
1	3-7	28	20	08
2	7-14	26	22	04
3	14-21	06	06	00
		60	48(80%)	12(20%)

There were four intrauterine deaths mostly due to abruption and there were eight neonatal deaths, prematurity being the important cause (as shown in table IV).

Discussion

In our study 150 cases were diagnosed to be of severe preeclampsia i.e. blood pressure on admission being 160/110 or more, with urine albumin 1+to 4+, with or without complications. Out of those 150 cases, 60 cases were selected for expectant management.(table I). Our finding are more or less similar to those of Ketz et al(2001)[1], Savita Rani Singhal et al(2009)[2], Shyamala et al(2009)[3] and 90 cases were given aggressive management i.e. termination of pregnancy within 72 hr of admission.

The maximum continuation was up to 21 days and minimum up to 3 days depending on gestational age at admission and response to treatment. The continuation was successful in pregnancy 34 weeks or more. The intrauterine death were mostly due to abruption and neonatal death were due to prematurity.(TABLE II).The average age of continuation in other study was 10 days. Sibai et al (1994)[4] had 15 days, Hall et al (2000)[5] had 10-47 days, Haddad et al (2004)[6] had 11.6 days and Olah et al(1993)[7] reported 9.5 days for continuation of pregnancy.

The biochemical investigations i.e. SGOT, SGPT, S. Total bilirubin levels, S. creatinine, S. uric acid, platelet count were found to be in normal range. Similarly fundoscopy examination, nonstress test and Doppler studies did not reveal any significant abnormality. Those investigations were repeated every 3-4 days and any deviation from normal accepted values were considered for change in plan of management. Savita Rani Singhal et al(2009)[2], Shyamala et al(2009)[3], Odendaal et al(1990)[8], Hall et al (2007)[5], Vigil de Gracia (2013)[9] follow their cases of expectant management with those observations in continuation of pregnancy.

In 28 cases pregnancy more successfully continued up to 37 weeks without any fetal or maternal compromise. In 32 cases (table -III), development of any or more maternal and fetal complications required termination of pregnancy .The minimal gestational age was 33 weeks plus 4 days at termination. Studies by Sibai et al(1994)[4], Hall et al(2000)[5], Haddad et al (2004)[6], Sheer et al (2005)[10] also report increase in complication during expectant management of severe preeclampsia like abruption, impending eclampsia, non assuring fetal testing, small for gestational age infants and perinatal deaths. They all state that conservative/expectant management should be given in centres capable of rapid intervention for fetal reasons.

Maternal complications-In our study group 4 cases had abruption, 8 had PPH, 2 had wound gap and 6 had residual hypertension. There was no renal, pulmonary, liver complication or coagulopathy. The complications were found more in aggressively managed groups like eclampsia in 8 and abruption in 16 cases requiring immediate termination. The perinatal mortality in our cases was 20% while Hall (2000)[5], Hadded (2004)[6], Sheer (2005)[10] and Shyamala et al(2009)[3] reported perinatal mortality between 3.9 to 14.6.(TABLE III)

There were 4 intrauterine deaths at 34 weeks of gestation due to abruption. The 8 neonatal deaths had maturity of 35 weeks at birth and birth weight less than 1.5 kg. Shyamala[3] reported 6 neonatal deaths-14.6% in expectantly managed group (TABLE IV).

Route of delivery-In 60 cases managed expectantly 34 delivered vaginally and 26 required caesarean section (43.3%). 10 cases were taken directly for caesarean and 16 were done for fetal distress, fetal induction, impending eclampsia and abruption.

Conclusion

Traditionally women with severe preeclampsia undergo termination immediately regardless of consequences of extreme fetal prematurity. Delaying this definite management of severe preeclampsia to at least gain some fetal maturity and to organise resources for

managing the anticipated complications is referred as expectant or conservative management which has shown improved perinatal outcome without compromising maternal well being in developing countries.

Our study was planned to confirm the importance of various clinical biochemical and radiological parameters in severe preeclampsia for deciding the management plan for those cases. Our study confirms the role and prognostic values of those parameters in planning expectant management. But it should be remembered that preeclampsia has a potential for rapid progression during expectant treatment. Therefore it should be performed only in select group of patients after maternal counselling regarding benefits and risks of such treatment. It should be performed only in selected hospitals with adequate maternal and neonatal intensive care facilities and should include close maternal and fetal surveillance and target gestational age for delivery and indication for delivery before the target.

Acknowledgment

We sincerely thank Dr Deshmukh, Dean S.R.T.R. GMC Ambajogai, all department staff and postgraduate students and the patients of our study group.

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ORIGINAL ARTICLE

Epidemiological, Clinical And Laboratory Findings In Serologically Confirmed Patients Of Leptospirosis

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ABSTRACT

Introduction:- Leptospirosis is a seasonal zoonotic disease occurring in rainy seasons.

Fever, chills, headache, severe myalgia, conjunctival suffusion, anorexia, nausea, vomiting, and malaise usually characterizes acute leptospirosis.[6,7]

This study was performed to examine the clinical and laboratory findings of serologically confirmed leptospirosis.

Methods : - A prospective study included 52 ELISA confirmed patients of above 18 years admitted from June 2012 to November 2014. Epidemiological, clinical and laboratory findings, complications were analysed.

Results :- Total 52 patients were included. 32 (60%) were between 21 to 40 years, 40 (76.92%) were males. The occupations were farmers 18 (34.61%), labourers 13 (25%), housewives 08 (15.38%) 35(67.30%) were from rural area. Symptomatology was <5 days in 17 (32.69%), 6-10 days in 17 (32.69%) and >10 days in 18 (34.61%). Hospital stay was >7 days in 40 (76.92%). Symptoms and signs were fever 52 (100%), jaundice 35 (67.30%), myalgia 43 (82.69%), headache 16 (30.76%), arthralgia 44 (84.61%), GI symptoms 16 (30.76%), chills/rigors 44 (84.61%) calf pains 43(82.69%), anorexia 30 (57.69%), oliguria 14 (26.92%), altered sensorium 8 (15.38), Tachycardia 30(57.69%), pallor 10 (19.23%), conjunctival suffusion 35 (67.30%), hepatomegaly 16 (30.76%), splenomegaly 7 (17.30%).

Hb was <11gm% in 24 (46.15%), leucocytosis 50 (96.15%), thrombocytopenia 36 (69.23%), AKI 23 (44.23%), hyperbilirubinemia 41 (78.84%), SGOT rise in 28 (53.54%), SGPT rise in 29 (55.76%), alk phosphatase rise in 2 (3.80%), abnormal PT16 (30.76%), hyponatremia 8 (21.15%), hypokalemia 20 (38.46%), high LDH 23 (44.23%), high CPK 20 (38.46%), proteinuria 8 (15.38%)

Complications oberved in 38(73.07%). AKI 23(44.23%), Hepatitis 16 (30.76%), multiple organ failure in17 (32.69%).

Hemodialysis required in 9 (17.30%) and MV in 2 (3.80%). Death opccured in 2 (3.8%)

Conclusion:- Leptospirosis has protean nonspecific presentation & various complications. Present study may be helpful to physicians working in limited laboratory resource settings for identifying and treating patients of leptospirosis to improve outcome.

Keywords : Leptospirosis, Serologically Confirmed Patients, Laboratory Diagnosis, Multi Organ Failure

Introduction

Leptospirosis is a worldwide seasonal zoonotic disease occurring in rainy seasons in tropical regions caused by pathogen belonging to the Leptospira spp. genus comprising 250 serovars[1] that affects predominantly men. The incidence of human infection is higher in the tropics[2,3] mainly because of the longer survival of leptospires in warm and humid environments[4] Transmission occur by direct or indirect contact with urine, blood, water or tissue from an infected animal containing virulent leptospires. Leptospirosis is associated with occupational and recreational activities[5].

Leptospirosis is characterized by the development of vasculitis, endothelial damage and inflammatory infiltrates[3].

Fever, chills, headache, severe myalgia, conjunctival suffusion, anorexia, nausea, vomiting, and malaise usually characterizes acute leptospirosis[6,7].

Two common forms of leptospirosis have been described: the anicteric (most common and mildest) and the icteric (Weil syndrome), which causes severe renal, hepatic and vascular dysfunction. Pulmonary involvement and acute kidney injury are the main causes of death in leptospirosis[8]. Renal involvement in leptospirosis is characterized by hypokalemic acute interstitial nephritis[9].

This study was performed to examine the clinical presentations and laboratory findings of serologically

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confirmed cases of leptospirosis admitted to the Sassoon General Hospital Pune.

Methods

A prospective study was conducted with 52 clinically suspected and ELISA IgM confirmed patients of above 18 years of age admitted in Sassoon General Hospital, Pune from June 2012 to November 2014. Lepto IgM ELISA was performed using Pan Bio diagnostics manufactured by Inverness Medical Innervation Austrailia. Demographic (age, sex, and occupation) and Epidemiological data (type of contact, duration between onset of symptoms and admission to hospital and place of residence), symptoms and findings related to the disease (fever, nausea, vomiting, diarrhoea, headache, abdominal pain, muscle pain, jaundice, oliguria, hemorrhagic phenomenon, hypotension, tachypnea, cough, disturbance of consciousness and neck stiffness), hepatomegaly, splenomegaly, meningism were recorded. Laboratory investigations included hemogram, Serum sodium, S. potassium, S. total bilirubin, aspartate aminotransferase, alkaline phosphatase, Prothrombin time, S. creatinine, urea, creatine phosphokinase, S. LDH and urine analysis for proteinuria. Duration of symptoms, length of hospital stay, supportive treatment, need of dialysis and complications were analyzed. Dialysis was indicated in those patients that remained oliguric after effective hydration and mechanical ventilation required with severe respiratory failure.

The study protocol was reviewed and approved by the Ethical Committee of the Institution.

Statistical Analysis:

All results are expressed as mean values ± standard deviation or as percentages. All statistical analyses were performed using the Statistical Package for the Social Sciences for Windows (Version 10.0; SPSS, Chicago, IL, USA) software package.

Results

As summarized in table I, a total of 52 patients with confirmed diagnosis of leptospirosis were included. 32 (60%) patients were between 21 to 40 years of age. Male patients accounted for more than three quarter i.e. 40 (76.92%) while females 12 (23.09%). The main occupations were farmers 18 (34.61%), labourers 13 (25%), housewives 08 (15.38%) and carpenters 05 (9.61%). Environmental factors & animal contact was present in 26(50%). 35(67.30%) patients were from rural area. Admission symptomatology mainly fever was for less than 5 days in 17(34.61%), between 6-10 days in 17 (34.61%) and for more than 10 days in 18 (34.61%) patients. Duration of hospital stay was more than 7 days in 40 (76.92%) and less than 7 days in 12 (23.07%).

As shown in table II, the main symptoms and signs at admission were fever 52 (100%), jaundice 35 (67.30%), myalgia 43 (82.69%), headache 16 (30.76%), arthralgia 44 (84.61%), GI symptoms 16 (30.76%), chills/rigors 44 (84.61%), calf pains 43(82.69%), anorexia 30 (57.69%), oliguria 14 (26.92%), altered sensorium 8 (15.38), Tachycardia 30 (57.69%), hypotension 2 (3.84%), hypertension 4 (7.69%), tachypnoea 2 (3.84%), pallor 10 (19.23%), conjunctival suffusion 35 (67.30%), hepatomegaly 16 (30.76%), splenomegaly 7 (17.30%) , dehydration in 5 (9.61%).

As summerized in table III, Hb was less than 11 in 24 (46.15%), leucocytosis 50 (96.15%), thrombocytopenia 36(69.23%), acute kidney injury 23(44.23%), hyperbilirubinemia 41 (78.84%), SGOT rise in 28 (53.54%), SGPT rise in 29 (55.76%), alk phosphatase rise in 2 (3.80%), abnormal PT 16 (30.76%), hyponatremia 8 (21.15%), hypokalemia 20 (38.46%), high LDH 23 (44.23%), high CPK 20 (38.46%), proteinuria 8 (15.38%), microscopic hematuria 2 (3.84%).

As shown in table IV - Complications were oberved in 38 (73.07%). AKI 23 (44.23%), Hepatitis 16 (30.76%), multiple organ failure in17 (32.69%).

Hemodialysis was required in 9 (17.30%) and mechanical ventilation required in 2 (3.80%) for case management. Death opccured in 2 (3.8%) patients.

Discussion

Leptospirosis is the most widespread zoonosis in the world, particularly in warm and humid places as in tropical countries like India. The transmission usually results from direct or indirect exposure to the urine of leptospiruric animals. Many cases of leptospirosis remain unrecognized because of the lack of specificity of signs and symptoms. Confirmation of the diagnosis is

also difficult because of problems associated with isolating the organism and serological testing[10]. A better understanding of the clinical and paraclinical findings of leptospirosis is required to enhance its recognition and appropriate treatment.

It is important to identify the serovars associated with leptospires as clinical presentation may differ. Andrade et al[11] identified the serovars Icterohaemorrhagiae (71%) and Copenhageni (18%). Jauréguiberry et al[12]. identified the serovars Grippotyphosa (30%), Icterohaemorrhagiae (15%) and Copenhageni (12%).We could not identify specific serovas as Lepto IgM ELISA test was performed. Lepto IgM ELISA is the test of choice for diagnosing current leptospiral infection[13]. and is more easy to perform and sensitive than microscopic agglutination test but cannot determine the infecting serovar[14]. In the present study IgM ELISA for Leptospirosis was positive in 100% patients .

Table I : Demographic & Epidemiological Findings In Patients With Confirmed Leptospirosis

Demographic Data	Age (years)	⩽ 20	03 (05.7)
		21 – 30	12 (23.07)
		31 – 40	20 (36.5)
		41 – 50	09 (19.2)
		51 – 60	06 (11.53)
		> 60	02 (03.8)
	Gender	Male n (%)	40 (76.92)
		Female n (%)	12 (23.09)
	Occupation	Carpenter	05 (09.61)
		Cattle rearing	01 (01.9)
		Clerk	01 (01.9)
		Farmer	18 (34.61)
		Housewife	08 (15.38)
		Laborer	13 (25)
		Retired	02 (03.8)
		Sewage worker	02 (03.8)
		Student	02 (03.8)
Epidemiological data	Onset of symptoms to admission (days)	<5	17 (32.69)
		6 – 10	17 (32.69)
		> 10	18 (34.61)
	Exposure Type (Environmental factors & animal contacts)	Yes	26 (50)
		No	26(50)
	Residence	Rural	35 (67.30)
		Urban	17 (32.69)

Table II : Symptoms & Signs Of Confirmed Leptospirosis (Symptoms & Signs)

Symptoms n (%)	Fever		52 (100)
	Jaundice		35 (67.30)
	Headache		16 (30.76)
	GI symptoms		16(30.76)
	Myalgia		43 (82.69)
	Arthralgia		44(84.61)
	Chills /Rigors		44 (84.61)
	Calf pain		43 (82.69)
	Retroorbital pain		02 (03.84)
	Cough		05 (09.61)
	Dyspnea		05 (09.61)
	Bleeding manifestations		12 (23.09)
	Anorexia		30 (57.69)
	Oliguria		14 (26.92)
	Altered sensorium		08 (15.38)
Signs n (%)	Pulse	Bradycardia	02 (03.84)
		Tachycardia	30 (57.69)
		Normal	20 (38.46)
		Total	52 (100)
	Blood Pressure	Hypotension	02 (03.84)
		Hypertension	04 (07.69)
		Normal	46 (88.46)
		Total	52 (100)
	RR	Tachypnoea	02 (03.84)
		Bradypnoea	00 (00.00)
		Normal	50 (96.15)
		Total	52 (100)
	Pallor		10 (19.23)
	Dehydration		05 (09.61)
	Conjunctival suffusion		35 (67.30)
	Petechiae		04 (07.69)
	Hepatomegaly		16 (30.76)
	Splenomegaly		07 (13.76)

Table III: Laboratory Findings In Patients Of Leptospirosis

Hematology	Hb (gm%)	Abnormal (<11)	24(46.15%)
	TLC (mm^3)	Abnormal (>11000)	50(96.15%)
	Platelet (*10^3/microL)	Abnormal (<1.5lakh)	36(69.23%)
Renal function tests	Urea (mg%)	Abnormal (>40)	30(57.69%)
	Creatinine (mg%)	Abnormal (>1.3)	23(44.23%)
Liver function tests	Total bilirubin (mg%)	Abnormal (>1.1)	41(78.84%)
	SGOT(U/I)	Abnormal (>40)	28(53.54%)
	SGPT(IU/L)	Abnormal (>40)	29(55.76%)
	ALP(IU/L)	Abnormal (>200)	02(03.80%)
	Prothrombin time	Abnormal	16(30.76%)
Serum Electrolytes	Sodium (mEq/L)	Hyponatremia	08(21.15%)
	Potassium(mEq/L)	Hypokalemia	20(38.46%)
		Hyperkalemia	01(01.9%)
Others	LDH (IU/L)	High	23(44.23%)
	CPK(IU/L)	High	20(38.46%)
Urine analysis	Proteins	Positive (1+ to 2+)	08(15.38%)
	RBCs	Positive (>3RBCs/HPF)	02(03.84%)
Lepto serology	Lepto IgM	Positive	52(100%)

Table IV: Complications And Outcome In Patients With Confirmed Leptospirosis

Complications	Yes	38(73.07%)
Various complications	AKI	23(44.23%)
	Hepatitis	16(30.76%)
	Multiple Organ failure	17(32.69%)
Hemodialysis	Yes	09(17.30%)
Mechanical ventilator	Yes	02(03.80%)
Outcome	Death	02(03.8%)
	Recovery	50(96.15%)
Duration of hospital stay	< 7 days	12(23.07%)
	>7 days	40(76.92%)

Being a tertiary care teaching hospital the cases described here represent severe end of the spectrum of leptospirosis. The disease is more common among young people, as confirmed in the present study (n=32, 60%, 21 to 40 years of age) and also other studies done in the past[7,8,15,16]. The preponderance of cases between 21 and 40 years of age shows that leptospirosis is common in the working population who are most likely to be exposed to this organism. This was comparable to a study by Singh et al[16] & found that commonest age group affected was 21 to 40 years., Muthusethupathi et al[14] reported patients between 30 to 40 years.

Three fourth (40, 76.92%) patients were males. This again could be due to males engaged with more active outdoor activities acquiring infection. Male preponderence was reported by Muthusethupathi et al[14] in 88% of patients , by Singh et al in 86.2%[16].

Farming is classically an occupation at increased risk. Mansour- Ghanaei et al[7] found it in 60%. We observed disease preponderance in farmers in 34.61 %, followed by labourers (25%).

In our study maximum (67.30 %) patients were from rural area and we atribute it to exposure of this population to environmental factors as well as open shoe or barefoot walking.

Equal number of patients i.e. 17(32.69%) had fever for 1-5 days and 6-10 days, while 18(34.61%) had fever for > 10 days. Muthusethupathi et al reported fever for 3-8 days in most cases[14].

In the present study main clinical presentations were fever 52 (100%), jaundice 35 (67.30%), myalgia 43 (82.69%), headache 16 (30.76%), arthralgia 44 (84.61%), GI symptoms 16 (30.76%), chills/rigors 44 (84.61%) calf pains 43 (82.69%), anorexia 30 (57.69%), oliguria 14 (26.92%), altered sensorium 8 (15.38), Tachycardia 30 (57.69%), hypotension 2 (3.84%), hypertension 4 (7.69%), tachypnoea 2 (3.84%), pallor 10 (19.23%), hepatomegaly 16 (30.76%), splenomegaly 7 (17.30%). These are the most common findings reported in leptospirosis[2,6,7,12].

Muthusethupathi et al[14] reported fever (100%), myalgia (82%), jaundice (85%), Oliguria (72%), bleeding (25%) and altered sensorium (49%), Chaudhary et al[17] reported fever 377 (96.5%), vomiting/nausea 193 (49.4%), headache 197 (50.5%), myalgia 206 (52.8%), haemorrhage 117 (29.8%), dyspnoea 135 (34.4%), behavioural changes 117 (29.8%), rash 94 (24%), conjunctivitis 4 (10%), arthralgia 107 (27.5%), nuchal rigidity 45 (11.5%) and sore throat 68 (17.2%).

Conjunctival suffusion due to hemorrhage was seen in most of our patients (67.3%). It has been noted as being pathognomic for Leptospirosis[18]. Conjunctival suffusion has been reported by Muthusethupathi et al in 58%[14], Singh et al in 50%[16]. Although nonspecific constitutional symptoms reported in our study are comparable to previous studies, incidence of organ involvement is different. Singh et al[16] noted Splenomegaly in 23.2% as compared to hepatomegaly 6.9%. In this regard our study differs as splenomegaly was found in 7 (17.30%) while hepatomegaly in 16 (30.76%). This may be due to different infecting serovars, environment and host factors.

Bleeding in leptospirosis may be the result of a defect in the primary or secondary hemostasis. In a recent study, Chierakul et al[19] measured plasma concentrations of fibrinogen, Ddimer, thrombin antithrombin III complexes and prothrombin fragment 1.2 and evaluated the DIC score &was found to be significantly elevated. Patients with leptospirosis had significantly longer PT, a PTT and lower platelet counts[19]. Pulmonary hemorrhage is reported in 40-86% of patients with leptospirosis[20] Hemorrhagic manifestations has been reported by various investigators in the past. In Chiekaru et al[19] study, hemorrhage (petechias, hemoptysis and hematemesis) were present in 36% of the patients. The syndrome of diffuse alveolar hemorrhage, which is potentially lethal, consists of hemoptysis, bilateral airspace opacification on chest radiograph and a decreased hematocrit secondary to bleeding from pulmonary microvasculature into the alveolar space[20]. In our study prothrombin time was found to be abnormal in 16(30.76%) and petechie and microscopic hematuria was present in 12 (23.09%). Urinalysis is frequently abnormal in leptospirosis, with hematuria occurring during the early phase of the illness Hematuria was reported in 58-70% of patients with leptospirosis[7,12]. In the present study, microscopic hematuria was found in only 2 (3.84%) of patients. Hemoglobin less than 11 gm/dl was observed in our study in 24 (46.15%) patients. Leucocytosis in our study was observed in 50 (96.2%). Thrombocytopenia is frequently seen in leptospirosis

cases. Adrian Covic et al reported thrombocytopenia in 81%[18]. In our study thrombocytopenia was reported in 36 (69.23%). In present study rise in serum creatinine after correcting dehydration was seen in 23 (44.23%), hyperbilirubinemia 41 (78.84%), SGOT rise in 28 (53.54%), SGPT rise in 29 (55.76%), alk phosphatase rise in 2 (3.80%), abnormal PT in 16 (30.76%), hyponatremia 8 (21.15%), hypokalemia 20 (38.46%), high LDH 23 (44.23%), high CPK in 20 (38.46%). Laboratory parameters in our study suggests hepatocellular inflammation, hypokalemic acute kidney injury and probably skeletal muscle inflammation. Abnormal chest radiographs were documented in 11% to 67% of leptospirosis cases in previous studies[21]. In our study only two patients had abnormal XRC suggestive of ARDS. This we attribute again to different serovas in our patient population. In our study 73.07% (n=38) patients had complications. Maximum number of patients had multiple organ failure 17 (32.69%) followed by hepatitis 16 (30.76). Liver involvement was reported by Muthusethupathi et al[14] in 84% of patients with predominant conjugated hyperbilurubinemia, Clerke A M et al[22] 71.05% patients. Acute tubular necrosis (ATN) and interstitial nephritis are the two common renal lesions associated with leptospirosis[23]. In present study acute kidney injury was observed in 23(44.23%). Various investigators reported acute kidney injury in 40 to 72% patients. Clerke A M et al[22] have shown Kidney involvement in 63.15%, Muthusethupathi, MA, et al[14]. reported in 72% & 40 % by Vimala A., Kasi[24] from Kerala. Renal failure was non-oliguric in 24% of the cases. Our study differs from other studies Muthusethupathy et al reported dialysis in 40.35%[14]. Two patients with leptospirosis required mechanical ventilation due to ARDS. In a study by Muthusethupathi, MA, et al., 2% patients required ventillation[14]. Pulmonary catastrophes were documented to occur quite early during leptospiraemia. It is observed that once the patient starts developing severe pulmonary complications with pulmonary oedema, pulmonary hemorrhage and respiratory distress, the possibilities of acute respiratory failure and death were very high despite institution of vigorous intensive measures like forced ventilation[5]. Mortality in leptospirosis has ranged from 1% to 25%[25]. In our study 2 patients died of ARDS .

Conclusion

The wide spectrum of nonspecific constitutional signs and symptoms associated with acute leptospiral infections necessitates a high degree of clinical suspicion for timely diagnosis. Leptospirosis affects mainly males like farmers & labourers from rural area between 21- 40 yrs of age & who are exposed to environmental factors and animal contacts. Usual clinical features of leptospirosis are fever, jaundice, myalgia, arthralgia, headache, conjunctival suffusion, oliguria, bleeding, hepatomegaly anemia, leucocytosis. Hyperbilirubinemia with increased transaminases, hypokalemia, hyponatremia, abnormal prothrombin time, raised LDH & CPK were significant laboratory findings. Hepatitis, AKI and multiple organ failure were the commonest complications. Complicated leptospirosis may require hemodialysis and mechanical ventilation for case management. Present study which elaborates on clinical, laboratory findings and complications, need for dialysis & mechanical ventilation may be helpful to health care physicians working in limited laboratory resource setting for identifying and treating patients of leptospirosis to improve outcome.

Limitations

Sample size is small. Being tertiary care referral hospital, milder forms are not getting admitted. Similarly leptospirosis cases may not even reach tertiary care center for treatment as they can succumb to death without getting diagnosed. Hence sample do not include all types of patients of leptospirosis. As Lepto IgM ELISA test was used for diagnosing leptospira, conclusions do not apply for various serotypes .

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ORIGINAL ARTICLE

Study Of Electrocardiographic And 2D Echo Findings In Patients Of Intracerebral Hemorrhage

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ABSTRACT

Background: Intracerebral hemorrhage is caused by bleeding directly into or around the brain; it produces neurologic symptoms by different mechanisms. Many studies have shown that cerebrovascular accidents are associated with ECG changes and cardiac wall motion abnormalities on 2D ECHO. Studies showing ECG and 2D ECHO findings in patients of intracerebral hemorrhage are scarce. Hence this study was undertaken to determine ECG and 2D Echocardiographic changes in patients of intracerebral hemorrhage and to know whether such changes have any prognostic significance.

Aims and Objective: To study incidence and different types of ECG and 2D ECHO findings in patients of intracerebral hemorrhage and assessment of their impact on outcome of these patients.

Methods: 100 patients with spontaneous non traumatic intracerebral hemorrhage were selected from SGH, Pune for the study. All patients. were subjected to clinical examination, basic blood investigations, ECG and 2D ECHO examination. In hospital follow up was done to know their prognosis under two categories. viz. Live and dead.

Results: Abnormal ECG and 2D ECHO findings were common. Mortality was higher in these patients with ECG and ECHO. Significant ECG changes associated with increased mortality were tachycardia and ST depression. Significant 2D ECHO findings associated with increased mortality were presence of LVH, Left ventricular dysfunction and global hypokinesia.

Conclusions: ECG and 2D ECHO abnormalities are common in patients of intracerebral hemorrhage and these have prognostic significance in predicting mortality in patients of intracerebral hemorrhage. Thus, every patient of intracerebral hemorrhage should undergo ECG and 2D ECHO examination for evaluation of cardiac dysfunction occurring in these patients.

Keywords : Intracerebral Hemorrhage, Electrocardiographic Findings, 2D Echo, Cardiac dysfunction, Prognostic Significance

Introduction

Cerebrovascular diseases (CVA) include some of the most common and devastating conditions: ischemic stroke, hemorrhagic stroke and cerebrovascular anomalies such as intracranial aneurysms and arteriovenous malformations (AVMs). Most cerebrovascular diseases are manifested by the abrupt onset of a focal neurologic deficit, as if the patient was "struck by the hand of God".

Intracranial hemorrhage is caused by bleeding directly into or around the brain; it produces neurologic symptoms by producing a mass effect on brain structures, from the toxic effects of extravasated blood itself, or by increasing intracranial tension.

Many studies have shown CVA associated with ECG changes and wall motion abnormalities of 2D ECHO. The changes of ECG in CVA were reported in many studies (Bayers et al[1] 1947; Barch et al[2] 1954; Dimant J et al[3]1977 and Omkar P et al[4] 2014) Changes occurring in ECG following stroke were changes in T-wave, U-wave, ST-segment, QT-interval and various arrhythmias, these ECG changes may resemble those of myocardial ischemia or sometimes myocardial infarction. Earlier it was thought that CVA is preceded by changes in cardiac tissue, but Barch et al[3] (1954) disproved this view and found ECG changes in young patients with CVA in whom others causes like IHD for ECG changes could not be accounted. Along with ECG changes many studies have shown wall motion abnormalities on 2D ECHO following stroke, especially with subarachnoid hemorrhage (Narayan S K et al[5] 2012; Nileshkumar et al[6], 2013).

Studies showing ECG and 2D ECHO findings in patients of intracerebral hemorrhage are scarce. Hence this study was undertaken to determine ECG and 2D Echocardiographic changes in patients of Intracerebral

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hemorrhage and to know whether such changes have any prognostic significance.

Aims and Objectives

1. To study the incidence of myocardial dysfunction, defined as electrocardiographic abnormalities and 2D echo changes in patients with intracerebral hemorrhage.
2. To study different types of Electrocardio graphic and 2D ECHO changes observed in patients of intracerebral hemorrhage.
3. Study the correlation between cardiac dysfunction and outcome in patients of intracerebral hemorrhage.

Material and Methods

100 patients with spontaneous non traumatic intracerebral hemorrhage were selected from Government hospital for the study.

Inclusion criteria

All proved cases of non traumatic intracerebral bleed confirmed by CT scanning on admission were eligible for this study

Exclusion criteria

1. Patients with past history of Ischemic heart disease
2. Patients with Congenital heart disease
3. Patients with past history of Valvular heart disease
4. Patients with history suggestive of Cardiomyopathy
5. Patients with Electrolyte imbalance
6. Patients who do not consent to participate in the study and patients who were unable to understand the issues of the study.

In patients with a depressed level of consciousness, informed consent was asked from a relative. After admission a detailed history regarding the temporal profile of the stroke including history of risk factors like hypertension, diabetes mellitus, smoking, history of IHD and rheumatic heart disease were obtained. Detailed neurological examination including cardiovascular examination was carried out in all the cases. The diagnosis of CVA was made on the basis of following criteria: Temporal profile of clinical syndrome, Clinical examination and CT scan of brain. A 12 lead ECG and 2D echocardiography was done within. All patients were subjected to investigations like:- Complete blood count Blood sugar level Renal function test- Serum electrolytes, Lipid profile. In hospital follow-up was done to know their life status.

Results were analyzed with reference to age, sex and risk factors and clinical examination.

Statistical Analysis

The statistical analysis of the data was performed using statistical package for social sciences (SPSS) software version 15.0. Results were reported as frequency and percentages as well as mean for some data. Chi-square test was used for categorical data.

Results

Table I : Showing Various Study parameters

Parameter	Findings
Mean age in years	60.2 years
Male to Female ratio	1.08/1
Most common risk factor	Hypertension
Most common presenting symptom	Hemiparesis/plegia
Most common location of bleed	Gangliocapsular region
Percentage of abnormal ECGs	78%
Percentage of abnormal 2D ECHO	77%
Percentage mortality	43%
Most common ECG abnormality	LVH 36%
Most common 2D ECHO abnormality	Left ventricular dysfunction 48%

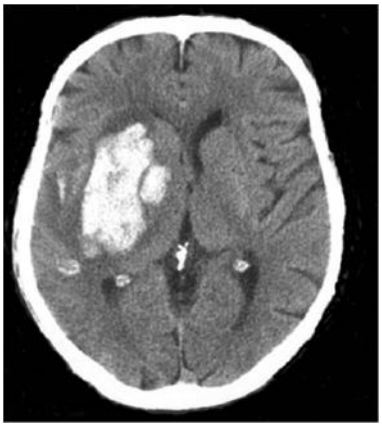

Fig - 1 CT brain showing Putamen region hemorrhage

Table II : Mortality in intracerebral bleed patients and its co-relation with ECG changes

TYPE OF 2D ECHO Changes		Outcome		Total	P value	Chi Square test	Significant
		Alive	Death				
Normal	Present	17	6	23	>0.05	0.062	No
	Absent	40	37	77			
Left Ventricular Dysfunction	Present	22	26	48	<0.05	0.03	Yes
	Absent	35	17	52			
LVH	Present	14	24	38	<0.05	0.001	Yes
	Absent	43	19	62			
Global Hypokinesia	Present	0	4	4	<0.05	0.019	Yes
	Absent	57	39	96			
Mild AR	Present	4	3	7	>0.05	0.994	No
	Absent	53	40	93			
Mild PAH	Present	6	1	7	>0.05	0.112	No
	Absent	51	42	93			

Table II shows that mortality was higher in patients of intracerebral bleed having ECG changes than those with normal ECGs. But only statistically significant ECG changes (i.e. P value <0.05) were tachycardia and ST depression.

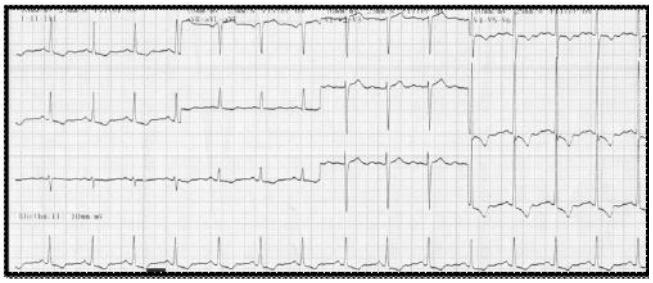

Fig - 2 ECG showing LVH with ST depression in a patient of intracerebral hemorrhage

Table III : Mortality in Intracerebral bleed patients and its co-relation with 2D echocardiography findings

TYPE OF ECG CHANGE		Outcome		Total	P value	Chi Square test	Significant
		Alive	Death				
Normal	Present	16	6	22	>0.05	0.092	No
	Absent	41	37	78			
Bradycardia	Present	1	2	3	>0.05	0.401	No
	Absent	56	41	97			
Tachycardia	Present	13	20	33	<0.05	0.013	Yes
	Absent	44	23	67			
LVH	Present	16	20	36	>0.05	0.057	No
	Absent	41	23	64			
QTc Prolongation	Present	17	13	30	>0.05	0.965	No
	Absent	40	30	70			
T Inversion	Present	12	16	28	>0.05	0.075	No
	Absent	45	27	72			
ST Depression	Present	14	21	35	<0.05	0.012	Yes
	Absent	43	22	65			
U Waves	Present	1	1	2	>0.05	0.840	No
	Absent	56	42	98			

Table III shows that mortality was higher in patients of intracerebral bleed having 2D ECHO abnormalities than those with normal 2D ECHO studies.

But only statistically significant 2D ECHO abnormalities were Left Ventricular dysfunction, Left Ventricular hypertrophy and presence of Global Hypokinesia (i.e. P value <0.05)

Discussion

Age Distribution:

In our study among the 100 patients age of patients ranged from 32-90 years and the mean age of patients was 60.2 years. Intracerebral bleed was more common in the 5th and 6th decade, accounting for 60% of total cases. This is comparable to Baidya et al study[4] where percentage of patients above 40 years of age was 96% same as our study. Similar findings were observed in study by Narayan et al[5] where 86.7% of patients were of age more than 40 years.

Risk Factors

Hypertension was present in majority of the cases i.e, 57%, which is comparable with that found in the studies of Baidya et al[4] and Nileshkumar et al[6] i.e. hypertension was present in 62% and 84% respectively. Next common risk factor was smoking (34%) in our study. It was reported to be present in 20% of cases in Baidya et al study and 28% of cases in Nileshkumar et al[6] study. Dyslipidemia was present in 28% of our study patients whereas it was present in 20% of patients in Nileshkumar et al[6] study. Diabetes mellitus was present in 16% patients in our study. Baidya et al[4] reported presence of Diabetes mellitus in 17% of their patients and Nileshkumar et al[6] reported it in 10% of their patients.

Symptoms

In the present study, hemiparesis/plegia was present in 80% of the cases, which is comparable to the study of Baidya et al[4] who reported an incidence of 78%. Nileshkumar et al[6] reported presented presence of hemiparesis/plegia in 58% of their patients. Vomiting was the next common presenting symptom. It was seen in 42% of cases as in our study. It was present in 29% of patients in Baidya et al[4] study & 46% of patients in Nileshkumar et al[6] study. Headache was present in 30% of our patients, which is comparable to Baidya et al[4] and Nileshkumar et al[6] who reported frequency of headache in 23% and 44% of cases respectively. Altered sensorium was present in 25% of the total patients in our study, whereas Baidya et al and Nileshkumar M et al, reported presence of altered sensorium in 53% and 60% of patients respectively. Giddiness was present in 38% patients in our study compared to 20% of patients as reported by Nileshkumar et al[6].

Location of intracerebral haemorrhage

Most common site of hemorrhage in our patients was Gangliocapsular region 58% which is comparable to findings in study of A K Joy Singh et al[7] and Ghelmez et al[8] who reported 65% & 32.5% cases of Gangliocapsular bleed respectively. Lobar hemorrhage was present in 21% of our patients compared to 17% and 25% in A K Joy Singh et al[7] & Ghelmez et al[8] studies respectively. Less common sites of hemorrhage were Thalamus (12%) followed by Cerebellum (6%) and Brain stem (3%) in our study. Similar findings were reported by A K Joy Singh et al[7]. Thalamic bleed was present in 13% of cases followed by brain stem hemorrhage in 3% and Cerebellar bleed in 2% of patients.

ECG findings

Findings suggestive of Left Ventricular Hypertrophy (LVH) was seen in 36% of our patients. This finding was not reported by Tomar et al[9] and Purushothaman[10] et al. It was the most common abnormal ECG finding seen in our study. ST depression on ECG was seen in 35% our patients whereas it was seen in 56.26% and 23.81% of patients in Tomar et al and Purushothaman et al study respectively. Tachycardia was seen in 33% of our patients and 50% of patients included in Tomar et al[9] study & 21.43% of patients included in Purushothaman et al[10] study. QTc prolongation was present in 30% of our patients and 50% of Tomar et al[9] and 19.05% of Purushothaman et al[10] study patients. T wave inversion was seen in 28% of our patients. T wave inversion was reported in 28.13% and 33.33% patients by Tomar et al[9] and Purushothman et al[10] respectively.

Mortality was higher in patients of intracerebral bleed having ECG changes than those with Normal ECGs. But only statistically significant ECG changes (i.e. P value <0.05) were Tachycardia and ST depression.

2D ECHO findings

Left ventricular dysfunction was the most common (48%) abnormal finding in our patients which is comparable to 56.26% cases of Left ventricular dysfunction reported in study by Tomar et al[9]Amin et al[11] studied 2D ECHO findings in stroke patients including 41 patients of intracerebral hemorrhage. LV dysfunction was present in 2% of patients. Amin et al study showed presence of Left ventricular hypertrophy in 24% of patients which is comparable with 38% cases in our study. Aortic regurgitation was seen in 6% patients of our study whereas it was seen in 15% patients in Amin et al study.

Mortality was higher in patients of intracerebral bleed having 2D ECHO abnormalities than those with Normal 2D ECHO studies. But only statistically significant 2D ECHO abnormalities were Left Ventricular dysfunction, Left Ventricular hypertrophy and presence of Global Hypokinesia (i.e. P value <0.05).

Conclusion

ECG and 2D ECHO abnormalities are common in patients of intracerebral hemorrhage and these have prognostic significance in predicting mortality in patients of intracerebral hemorrhage. Thus, every patient of intracerebral hemorrhage should undergo ECG and 2D ECHO examination for evaluation of cardiac dysfunction occurring in these patients.

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ORIGINAL ARTICLE

Comparison Of Dexmedetomidine (1μg/Kg) And Fentanyl (1μg/Kg) As An Adjuvant To 0.25% Bupivacaine In Supraclavicular Brachial Plexus Block

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ABSTRACT

Introduction: Relief of intra and post-operative pain has gained importance in recent years. Nerve blocks form the corner stone in this arena. Brachial plexus block is a commonly used technique for majority of upper limb surgeries.

Aim: To evaluate the effect of Dexmedetomidine and Fentanyl as an adjuvants to low dose bupivacaine 0.25% in terms of onset, duration and quality of sensory and motor blocks when used for supraclavicular brachial plexus block.

Material and methods: After the approval of ethics committee, 80 ASA grade I and II patients of either sex, between 18-60 years of age undergoing orthopedic and plastic surgeries under supraclavicular block were studied after randomly assigning them into two groups of 40 each.

Group D: Bupivacaine 0.25% (34ml) + Dexmedetomidine 1microgm/kg.

Group F: Bupivacaine 0.25% (34ml) + Fentanyl 1microgm/kg.

After baseline investigations and pre-operative routine assessment, the consenting patients were premedicated with inj. Midazolam 0.03mg/kg and inj. Glycopyrrolate 5microgm/kg IV 10 minutes prior to surgery after putting ECG, SpO2 and NIBP monitors and securing 18 G IV line in the non-operative upper limb. Block was given using paraesthesia technique and onset, duration and quality of both sensory and motor blocks in either group were studied. Use of rescue analgesia in both groups in post- operative period was compared up to 24 hours.

Results: Onset of both sensory and motor block was faster; 2.95± 0.0693 minutes in group D versus 4.275±0.9333 minutes in group F; and 5.45± 0.861 minutes in group D versus 6.025± 0.861 minutes in group F respectively; total duration of block was prolonged- 608.25± 38.84 minutes in group D versus 383± 27.66minutes in group F.

Conclusion: Dexmedetomidine is superior to Fentanyl as an adjuvant to low dose bupivacaine for supraclavicular brachial plexus block.

Keywords- Dexmedetomidine, Fentanyl, Pain relief, Nerve blocks, Supraclavicular block.

Introduction

Supraclavicular approach of brachial plexus block is a very popular mode of anesthesia for below mid arm surgeries due to it's effectiveness in terms of cost and performance, margin of safety along with good postoperative analgesia. This approach gives the most effective nerve block and blockade occurs at the distal trunk-proximal division of brachial plexus where it is most compact resulting in homogenous spread of anaesthetic throughout the plexus with a fast onset and complete block. However, limiting factors are onset of action and duration of analgesia. Increasing volume (dose) of local anesthetics may prolong duration of analgesia but at the risk of systemic toxicity. To minimize these drawbacks there has always been a search for an ideal adjuvant. Till now many adjuvants have been tried with varying degrees of success .[1,2,3]

Dexmedetomidine is a highly selective alpha-2 adrenergic agonist, has been found to be effective as an adjuvant in various regional anesthesia technique. Its use in peripheral nerve blocks has recently been described. However, the report of its use in supraclavicular block is limited.

Addition of Dexmedetomidine and Fentanyl as an adjuvant to bupivacaine in supraclavicular block have show to increase duration and quality of block in various studies but to best of our knowledge, the present study is first in which Dexmedetomidine was compared with Fentanyl with lesser concentration (0.25%) of bupivacaine in terms of onset time of the sensory and motor block, the time to achieve complete sensory and motor block, the duration of analgesia and duration of

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sensory and motor block, along with any side effects or complications.

Materials And Methods

After ethical committee approval and written informed consent, a double-blind randomized prospective clinical study was carried out on 80 ASA Grade I and II patients of either sex, aged 18–60 years, undergoing various orthopedic and plastic surgeries of 30-120 minutes duration involving elbow, forearm and hand under supraclavicular brachial plexus block. The study was conducted after randomly assigning patient into two groups of 40 each as follows,

Group D: Bupivacaine 0.25% (34cc) + Dexmedetomidine 1 µg/kg

Group F: Bupivacaine 0.25% (34 cc) + Fentanyl 1 µg/kg

Patient with uncontrolled DM, local infection at injection site, coagulation abnormalities, preexisting peripheral neuropathy, liver and kidney diseases, IHD, valvular heart disease, allergic to local anesthetic, pregnant women were excluded from study.

On arrival of patient into the operating room intravenous access was obtained in the unaffected limb with 18 G IV cannula. Standard monitors like ECG monitoring, pulse oximeter, non invasive blood pressure were connected, baseline readings were recorded. Under aspectic precaution, supraclavicular brachial plexus block was performed using parasthesia technique. After parasthesia in the forearm or hand was elicited and after negative aspiration for blood, appropriate drug solution was injected.

Sensory block was evaluated at each min by Hollmen score-

score 1 = normal sensation of pinprick,

score 2 = pin prick felt as sharp pointed but weaker compared with same area in the other upper limb,

score 3 = pin prick recognized as touch with blunt object,

score 4 = no perception of pin prick.

Onset time of sensory block: The time between completion of the local anaesthetic administration till the sensory block started appearing i.e, Hollmen score >1.

Time for complete sensory block: The time between completion of the local anaesthetic administration till complete sensory block was achieved i.e, Hollmen score =4.

Duration of sensory block: Time between onset of sensory block till the time when the Hollmen score reached <4 postoperatively.

Motor block was evaluated at each minute by modified Bromage scale for upper extremities on a 3-point scale.

Grade 0: Normal motor function with full flexion and extension of elbow, wrist and fingers

Grade 1: Decreased motor strength with ability to move the fingers only

Grade 2: Complete motor block with inability to move the fingers.

Onset time of motor block: Time between completion of the local anaesthetic administration till grade 1 on modified Bromage scale

Time for complete motor block: Time between completion of the local anaesthetic administration till grade 2 on modified Bromage scale

Duration of motor block: Time between onset of motor block to recovery of complete motor function of hand and fingers

The block was considered to have failed if complete sensory and motor block was not achieved after 30 minutes of drug injection and failed block was converted to general anaesthesia. Such patients were excluded from study.

Quality of block was assessed by the following numeric scale

Grade 4 (excellent) - no complaints from the patient.

Grade 3 (good) - minor complaints with no need for supplemental analgesia.

Grade 2 (moderate) - complaint that required supplemental analgesia.

Grade 1 (unsuccessful) - patient given general anaesthesia.

Duration of analgesia was assessed using standard VAS (Visual analogue scale); time between onset of complete block to time of first request for analgesia i.e. VAS $\geqslant$ 4.

Patients were monitored for HR, BP and SPO2 every 5 minutes for first 15 minutes and thereafter every 15 minutes after the block intraoperatively and every 30 minutes for first 2 hours and thereafter every 1 hour postoperatively.

Rescue analgesics were given in the form of inj. diclofenac (1.5mg/kg) intramuscularly when VAS score is ⩾ 4 on patients' request.

Intra-operative complications, if any, were recorded, with their respective management.

Statistical Analysis:

Unpaired t-test was applied for demographic data, haemodynamic parameters, onset and duration of sensory and motor blockade and duration of analgesia. Fisher exact test was applied for assessment of quality of block. A P-value of < 0.05 was considered statistically significant and a value <0.001 was highly significant.

Results

The groups were comparable with respect to age, gender, weight and duration of surgery (Table I).

Onset of sensory block and time for complete sensory block was faster in Group D than in Group F and was statistically highly significant (Table II) (p<0.001).

Onset of motor block was faster in Group D than in Group F and was statistically significant (Table II) (p=0.004).Time for complete motor block was faster in Group D than in Group F but was not statistically significant (Table II) (p=0.593).

There was significant prolongation of duration of sensory block, motor block and duration of analgesia in Group D compared to Group F (Table II) (p<0.001).

Quality of block was better in Group D as compared to Group F and difference was statistically highly significant. (Table III) (p<0.001).

TABLE I: Patient and surgical characteristics

	Group D	Group F	P-value
Age (years) (Mean±SD)	36.68±7.59	35.65±7.21	0.538
Weight(kg)	57.33±7.30	57.63 ±7.47	0.856
Gender(M/F)	19/21	21/19	0.823
Duration of surgery(min)	90.95±10.82	88.1 ±9.77	0.220

TABLE II: Characteristics of sensory and motor block

	Group D	Group F	P-value
Onset of sensory block(min)	2.95±0.693	4.275±0.933	<0.001
Time for complete sensory block (min)	11.025±1.70	12.65±1.74	<0.001
Onset of motor block (min)	5.450±0.875	6.025±0.861	0.004
Time for complete motor block (min)	16.075±1.384	16.250±1.528	0.593
Duration of sensory block (min)	529.5±43.41	355.2±28.90	<0.001
Duration of motor block (min)	608.25±38.84	383.2±27.66	<0.001
Duration of analgesia(min)	574.13±40.43	371.7±27.92	<0.001

TABLE III: Quality of block

		Group		Total	P-value
		Group D	Group F		
QOB(grade)	III	14(35%)	30(75%)	44	<0.001
	IV	26(65%)	10(25%)	36	
Total		40(100%)	40(100%)	80	

Baseline haemodynamic parameters were comparable in both the groups. Systolic blood pressure was found to be significantly lower than baseline from 10 minutes to 90th minutes intraoperatively and from 60th minutes to 600th

minutes postoperatively in Group D as compared with Group F (Figure 1) (P<0.05). Diastolic blood pressure was found to be significantly lower at 10, 15, 45, 60, 90th minutes intraoperatively and at 30th minutes postoperatively in Group D as compared with Group F (figure 2) (P<0.05). Pulse rate was found to be significantly lower at 10, 15, 30, 45, 60, 90, 120th intraoperatively and 30th minutes to 600th minutes postoperatively also in Group D as compared with Group F (figure 3) (*P*<0.05).

Group D had significantly better VAS score compared to Group F (P<0.001) (Figure 4) and the requirement of inj diclofenac in the first 24h was significantly lower in Group D compared to Group F

No side effects and complications were seen during the first 24 hrs in the post-operative period in both the groups.

FIGURE 1: Comparison of mean systolic blood pressure

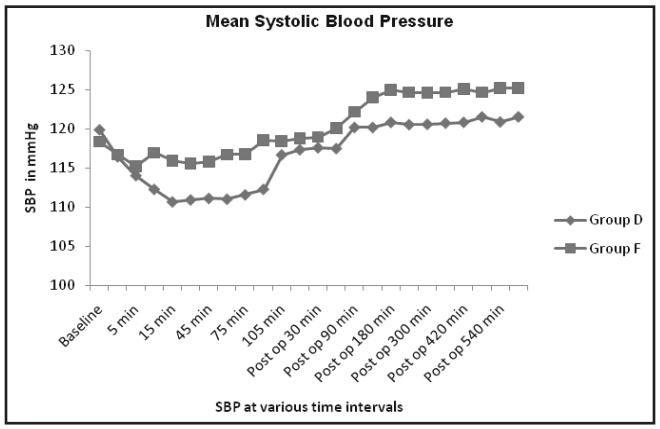


FIGURE 2: Comparison of diastolic blood pressure

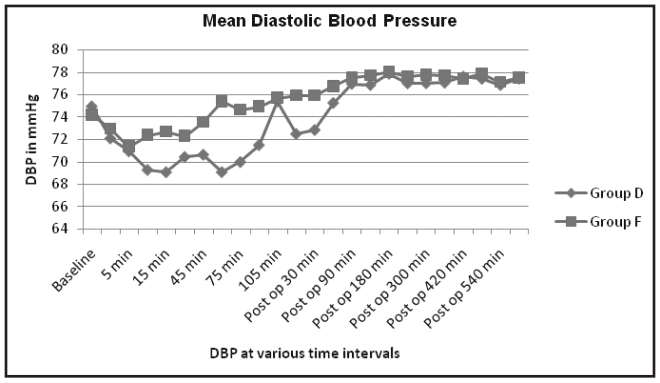


FIGURE 3: Comparison of mean pulse rate

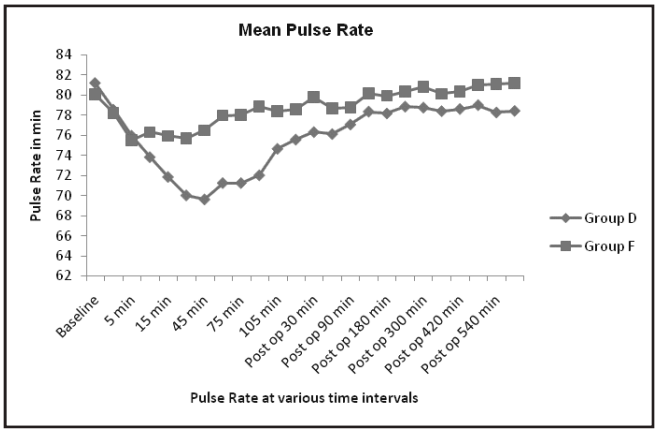
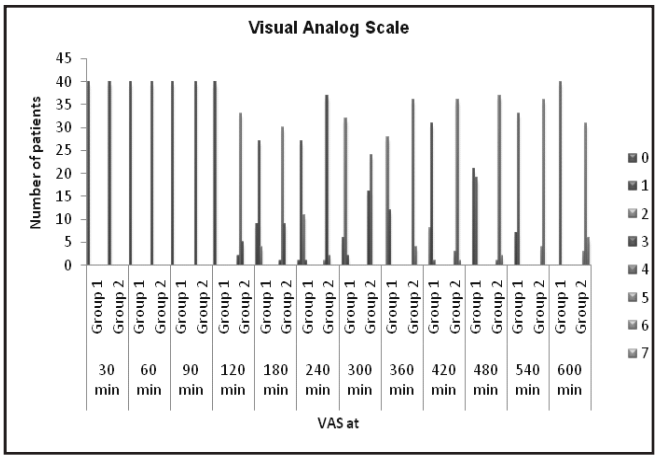


FIGURE 4: Comparison of visual analog scale score



Discussion

Majority of upper limb surgeries are safely performed under regional anesthesia. Compactness of plexuses and the resulting homogenous spread of local anesthetic, along with quicker onset with complete good quality block are very important features of brachial plexus block. Its popularity due to cost effectiveness and ease of approach have encouraged various observers to study it with various local anesthetic agents in combination with different adjuvants to prolong the block duration according to the length of surgery and effective postoperative analgesia.

This study compares Dexmedetomidine and Fentanyl 1 µg/kg each, added to 0.25% bupivacaine using supraclavicular approach. Dexmedetomidine produce block with faster onset; sensory block, 2.95 ± 0.0693 min in Group D versus 4.275 ± 0.933 minutes showed early

onset and prolonged duration 529.5 ± 43.41 minutes in Group D versus 355.2 ± 28.9 minutes in Group F. Motor block was also of faster onset, 5.45 ± 0.57 minutes in Group D compared to 6.025 ± 0.861 minutes in Group F, and prolonged duration of 608.25 ± 38.84 minutes in Group D versus 383.2 ± 27.66 minutes in Group F. These results are comparable with those of Sarita SS et al[4], Harshavardan H S [5] keshav et al[6].

Early onset sesory block was obtained by Sarita SS using dexmedetomidine 1 µg/kg (1.77 ± 1.28 minutes) and clonidine 1 µg/kg (2.33 ± 1.21 minutes) added to 35ml of 0.25% bupivacaine. Keshav et al[6] reported 1.70 ± 1.28 and 2.33 ± 1.21 minutes. Harshavardhan H S[5] reported 2.59 ± 2.2 minutes sensory onset and 4.12 ± 1.6 minutes motor onset with dexmedetomidine versus 3.26 ± 1.4 minutes and 5.36 ± 3.2 minutes using clonidine respectively.

Use of dexamethasone and fentanyl 100 mcg 2 ml was added to 40 ml 1% lidocaine in axillary plexus by Siamak Y et al[7] showed onset of sensory and motor block at 1.73 ± 0.51 and 2 ± 0.53 with dexamethasone and 1.72 ± 0.52 and 2 ± 0.43 minutes respectively.

Complete sensory and motor block in our study was found to be earlier in Group D (11.025 ± 1.70 minutes and 16.075 ± 1.384 minutes) as compared to Group F (12.65 ± 1.74 minutes and 16.250 ± 1.528 minutes). Similarly Kenan K et al[8] obtained such findings as 7.75 ± 2.2 minutes and 14.25 ± 3.92 minutes in dexmedetomidine group vs 10.75 ± 2.55 and 15.75 ± 4.06 minutes in control Group respectively.

Total duration of sensory and motor block in our study was longer in Group D (529 ± 43.41 minutes and 608.25 ± 38.84 minutes) compared to Group F (355.2 ± 28.9 minutes and 383.2 ± 27.66 minutes). Gandhi R et al[9] added 30 mcg dexmedetomidine in 30 ml of 0.25% bupivacaine. Sensory and motor block duration was 732.4 ± 48.9 minutes and 660.2 ± 60.4 minutes respectively in Group D versus 146.5 ± 36.4 minutes and 100.7 ± 48.3 minutes respectively in control Group.

Total duration of analgesia as reported by Gandhi R et al[9] was 732.4 ± 95.1 minutes in Group D vs 194.8 ± 60.4 minutes in control Group; as reported by Sarita SS et al[4] it was 456.21 ± 9.7 minutes in dexmed Group vs 2.89.67 ± 62.5 minutes in clonidine Group and that Keshav et al[8] it was 732.4 ± 95.1 in dexmed Group vs 289.67 ± 60.01 minutes.

Our study showed comparable values of 574 ± 40.43 minutes in Group D vs 371.7 ± 27.92 minutes in Group F.

As regards the quality of block, Sarita SS et al[4] reported grade 4 quality in 80% patients, compared to 40% in clonidine Group, whereas in our study grade 4 block was found in 65% patients in Group D and 25% in Group F.

Esmaoglu et al[10] reported bradycardia in 7 patients out of 30 in dexmed Group; no such side effects were observed in our study.

In our study, chosen concentration of 0.25% bupivacaine is undoubtly highly beneficial for high risk patients. The volume of 35 ml ensures complete spread of local anesthesia in the brachial plexus; 1µg/kg dose of adjuvants dexmed and Fentanyl has also proved effective without postoperative bradycardia and comfortable and arousable patients throughout.

Conclusion

Dexmedetomidine is superior to Fentanyl when used as an adjuvant to low dose Bupivacaine (0.25%) in supraclavicular block in terms of onset of sensory and motor block, time for complete sensory block, duration of sensory block and motor block, duration of analgesia and quality of block. And also Dexmedetomidine provides better hemodynamic stability than Fentanyl.

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ORIGINAL ARTICLE

Bloodgood's Method Of Indirect Inguinal Hernia Repair

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ABSTRACT

Aim: To study the efficacy of Bloodgood's method for indirect inguinal hernia repair in terms of post-operative pain and recurrence of hernia.

Materials And Methods : Patients attending the Outdoor Patient Department at the Sassoon General Hospital, Pune with inguinoscrotal swellings and having indirect inguinal hernia were included in this study. There were total 25 patients of varying age-group with indirect inguinal hernia and good abdominal muscle tone.

Results : Post operative pain experienced by the patients on commencing routine work on 1 week follow up was absent. No patient had seroma formation. There were no early recurrences.

Conclusion : Bloodgood's method of inguinal hernia repair is perfectly anatomical. It can be performed even in an average surgical set up without any special expertise. The post operative pain is less as compared to other commonly used methods.

Keywords : Inguinal Hernia, Bloodgood's Method, Rectus Sheath, Anatomical Repair

Introduction

Hernia is defined as abnormal protrusion of viscous or part of the viscous through a normal or abnormal opening[1]. The Inguinal Hernia despite its frequency in medicine, contributes for challenging problems for the Surgeons. The manifestations of Hernia are readily seen and felt. Therefore, probably it is one of the first disease to be recognized by the patient himself. Recurrent hernias account for 15-20% of hernia repairs which testifies to the fact that the ideal surgical solutions to this problem has not been developed.

Operation for Inguinal Hernia has been a very interesting proposition.

Materials and Methods

Patients presenting to the surgical outdoor patient department (OPD) with inguinoscrotal swellings and having indirect inguinal hernia were included in this study. There were total 25 patients of varying age-group and good abdominal muscle tone selected for purpose of this study.

Children, adults with chronic cough, chronic obstructive pulmonary disease (COPD), direct inguinal hernia, benign enlargement of the prostate (BEP), femoral or incisional hernia and recurrent inguinal hernias were excluded from the study.

All essential investigations like complete hemogram, X-Ray chest, ECG and Ultrasound were done on admission. All 25 cases underwent hernia repair by Bloodgood's Method[2] (detailed below) by same operating surgeon. The cases was evaluated on the basis of time required for surgery, intra -operative and post-operative complications and recurrence. Follow up of the operated patients was done weekly for first month, monthly for next three months and two monthly for next one year.

Operative Procedure

After all essential investigations and fitness for anaesthesia, patient was posted for surgery. Patient was kept Nil By Mouth (NBM) 6 hours pre-operatively. Written informed consent was taken and routine pre-operative preparation was done. Under all aseptic precautions under regional anaesthesia cleaning, painting and draping was done. Antibiotics were given at induction.

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Oblique incision of 5-6 cm in length was taken, 1-1.5 cm above and parallel to medial 2/3 of inguinal ligament **(Fig 1)**. It was deepened to incise subcutaneous, Camper's and Scarpa's fascia. Superficial pudendal and superficial epigastric vessels were ligated. External oblique aponeurosis (EOA) was incised in the line of skin incision **(Fig 2)**. Incision was extended on either sides, medially to incise the margins of the superficial inguinal ring. The upper leaf of EOA was reflected above and it was held with hemostat. Using peanut dissection, upper leaf was raised adequately to visualize conjoined tendon and lateral rectus sheath. The lower leaf was reflected downwards to visualize and expose the margins of incurved part of Inguinal ligament. IlioInguinal and Iliohypogastric nerves were safeguarded. Cord was isolated. Cremaster muscle with its fascia was opened longitudinally. Cord structures were dissected. Sac lying anterolateral to the cord was identified as pearly white in color.

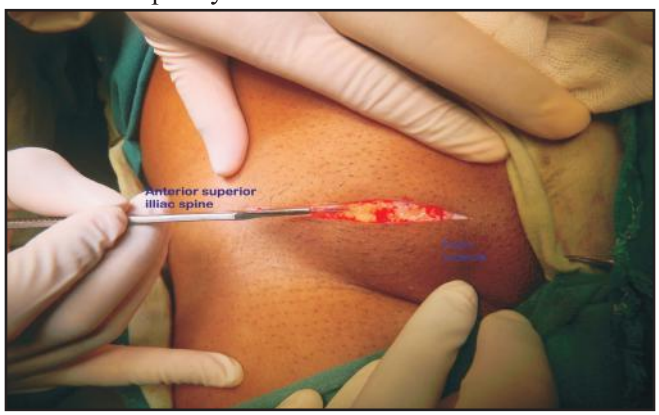

Figure 1: Incision 1.5 cm above medical 2/3 of inguinal ligament

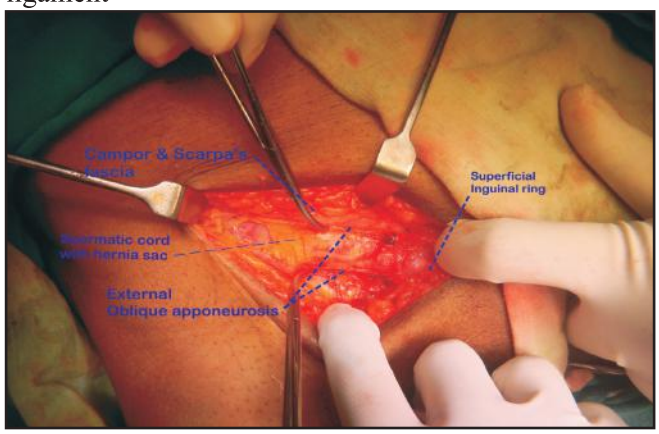

Figure 2: External oblique aponeurosis (EOA) was incised in the line of skin incision

Dissection usually starts from fundus and extends towards neck which is identified by extra peritoneal pad of fat. The neck is narrow and lies lateral to inferior epigastric artery. Dissection beyond the deep ring is usually done. Sac was opened at fundus. Sac was twisted so that contents should not come out and it was transfixed with silk (2-0) and distal portion of sac was excised.

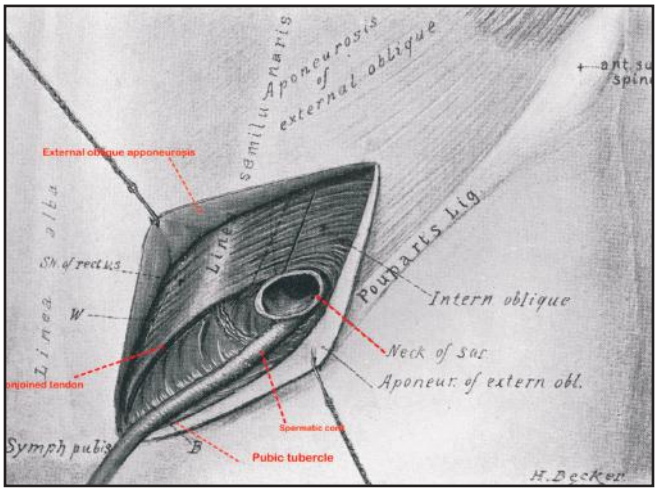

Figure 3: Diagram illustrates anatomy of Inguinal canal

After dealing with the sac, the conjoined tendon **(Fig 3)** was pulled downwards with two Babcock's forceps to expose rectus sheath. A flap of rectus sheath was mobilized by incising it **(Fig 4)** starting from pubic tubercle up to external inguinal ring this maneuver exposes the rectus abdominus muscle beneath. Thus a semilunar flap of rectus sheath was elevated **(Fig 5)** and it was reflected distally to suture to margins of incurved part of Inguinal ligament with intermittent simple sutures[2] with mersilk (2-0) up to the deep ring **(Fig 6)**. Haemostatis was confirmed. Incision was closed in layers. EOA was sutured with ethilon (2-0) with continuous interlocking; subcutaneous tissue with vicryl (2-0) with simple intermittent and skin was sutured with ethilon (2-0) with mattress sutures. Cleaning and dressing was done, scrotal support was applied. Patient tolerated the procedure well. Intraoperative blood loss was 15-20 cc.

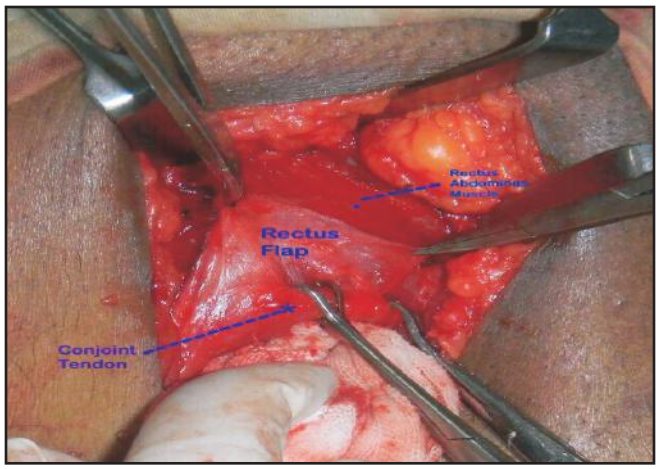

Figure 4: Rectus flap raised from lateral rectus sheath

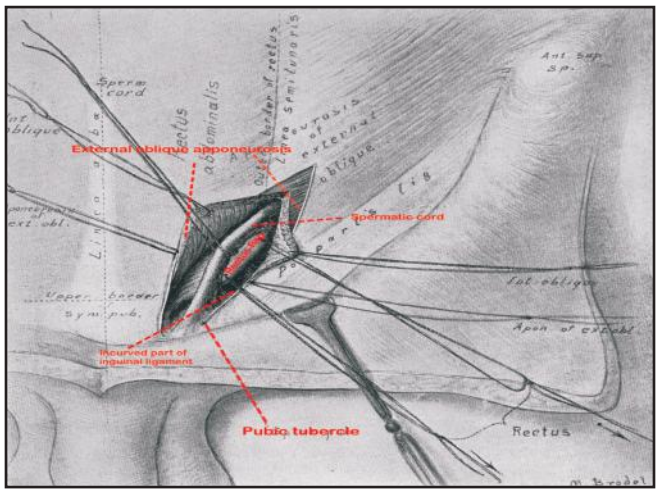

Figure 5: Diagram showing mobilization of rectus flap to suture to incurved part of Inguinal ligament

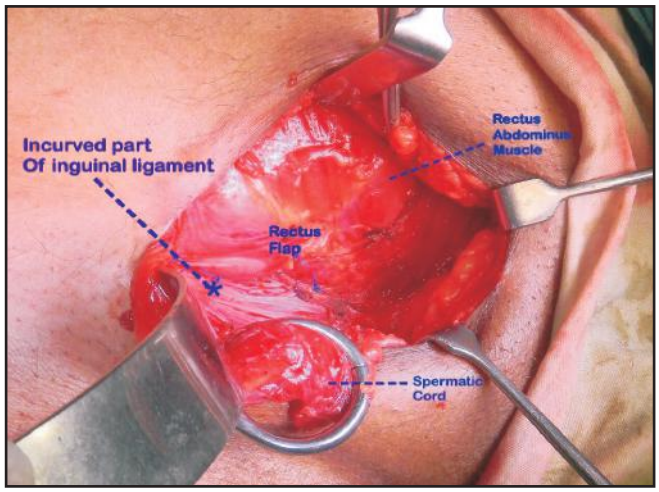

Figure 6: Image showing final presentation after suturing rectus flap

Post Operative Follow Up

Patients were started on oral feeds from 6 hours postoperatively. Patients were ambulated very next day of operation. They experienced least pain on ambulation.

There was no evidence of swelling or discharge at the operative site. Cleaning and dressing was done on post-operative day 2. Patients were discharged on post-operative day 3.

Patients were advised to follow up on OPD basis - weekly for first month, monthly for next three months and two monthly up to one year.

Sutures were removed on his first follow up and findings were noted. Those were as follows.

- Post operative pain experienced by the patient on commencing routine work was absent
- No patient reported with recurrence or seroma formation
- Patients were able to do their normal work within a week of operation

Discussion

Currently, operations for adult inguinal hernia account for 15% of the operations in general surgery. Inguinal hernia repair is the most common procedure performed by a general surgeon. Although, many recent major technical advances have occurred in surgery, the current management of an inguinal hernia remains diverse as it was in the times of Halsted and Bassini (1888AD). Developments and improvements in the managements of an inguinal hernia have decreased recurrence rates and post-operative morbidity. In this study, We present our observations about the Bloodgood's method for inguinal hernia repair done on patients at a tertiary care hospital in Pune.

In Bloodgood's method[2], a sheath is sutured to ligaments while maintaining the tissue respect. It is perfectly anatomical and physiological repair. It's tension free. No special instruments are required. It requires less operative time. Patient's hospital stay is reduced. It does not require mesh so it is also less expensive method. Natural anatomy of the canal is also maintained. Chances of post operative pain is less. No special skills or expertise is required. The recurrence rate is least as compared to the other methods. Thus, it is the best

method of repair in cases where mesh is contraindicated or where the conjoined tendon is obliterated.

In most of the other methods (as listed in the table), the conjoined tendon is sutured to inguinal ligament under tension. So, it is not an anatomical or physiological repair. It also hampers natural shutter like mechanism of conjoined tendon. Also, they are associated with more operative time, post- operative infections and prolonged post- operative pain in cases of use of mesh etc. Moreover, high recurrence rates are observed worldwide.

Table depicting salient features - Advantages and disadvantages of Bloodgood's method of hernia repair as compared to other commonly used methods of hernia repair

	Method of hernia repair	Technique of repair	Special requirements	Special comments	Problems faced	Recurrence rate
1	Bassinni's method[1,3]	Conjoined tendon sutured to incurved part of Inguinal ligament		Biological method. Creates undue tension over inguinal ligament	chances of ligamental tear	High recurrence rate
2	Halsted method[4,5]	Four layered repair			Cord shifted superficial to external aponeurosis. Brings deep and superficial rings closer	High recurre-nce rate
3	Shouldice's method[6]	Double breasting method of posterior wall repair	Surgical expertise and special training required			1%
4	Lichtenstain's tension free repair[7,8]	Synthetic mesh used	Synthetic mesh	expensive	Post operative infections	1.2%
5	Laparoscopic repair[6]		special setup with experienced surgeon and staff	expensive	More operative time	3.5%
6	Bloodgood's method[2]	Sheath is sutured to ligaments	No special instruments are required			Recurren ce rate is least

Conclusion

Bloodgood's method of inguinal hernia repair is perfectly anatomical. It utilizes locally available tissues eliminating the cost and associated inherent infections. Since, no special instruments are required, it can be performed even in an average surgical set up without any special training or expertise. It requires less operative time and hence, post operative pain is also less. Patient's hospital stay is reduced. The recurrence rate is least as compared to the other methods. Thus, it is the best method of repair in cases where mesh is contraindicated or where the conjoined tendon is obliterated.

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CASE REPORT

Familial Presentation of Fibrodysplasia Ossificans Progressiva

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ABSTRACT

We describe a case of Fibrodysplasia Ossificans Progressiva (FOP) in a family afflicting the father and his two daughters. Fibrodysplasia Ossificans Progressiva is an autosomal dominant disorder manifested in the form of congenital malformation of the great toes with progressive ossification in the skeletal muscle and soft tissues. It is a rare disorder with the usual manifestation being sporadic and isolated. Few cases have been reported in literature with an organization based in Pennsylvania named IFOPA working towards research in all the aspects of the disease. Though a lot of scientific evidence about the disease is known, successful long term treatment still remains elusive. We report a familial development of this disorder which is very rare and will add to the research pool.

Keywords: Fibrodysplasia Ossificans Progressiva, Autosomal Dominant, Hereditary, Familial Presentation , Great Toe

Introduction

Fibrodysplasia Ossificans Progressiva (FOP) is a rare autosomal dominant disorder characterized by bilateral congenital malformation of the great toes and disabling progressive heterotopic ossification of skeletal muscle and soft connective tissue in specific anatomic patterns[1]. It tends to affect patients during the first decade of life with the development of inflammatory fibroproliferative masses in skeletal muscles and aponeuroses, usually in the axial region. It is progressive and ultimately forms mature heterotopic bone through an endochondral process[2]. The molecular defect causing the disorder is a heterozygous recurrent mutation, c.617 Guanine>Adenine, causing an R206H substitution in the *ACVR1/ALK2* gene of chromosome 2q 23-24 region that encodes for a Type I receptor for bone morphogenetic proteins (BMPs)[3]. FOP occurs sporadically with a worldwide prevalence of approximately one in two million individuals. There is no ethnic, racial, gender or geographic predisposition. Fewer than ten multigenerational families have been identified worldwide. When observed, genetic transmission is autosomal dominant and can be inherited from mother or father. Penetrance is complete[4].

In the current report, we describe findings of FOP in a father with concomitant involvement in his two daughters.

Case report

A fifteen-year-old female presented to our hospital with multiple progressive swellings over the back since eleven months. Since two months, she had started developing right hip deformity with difficulty in walking. The patient had deformities of the toes in the form of bilateral hallux valgus and short toes since birth with normal developmental history (Fig1a). On examination, multiple hard nodules were noted in the entire paraspinal region with loss of lumbar lordosis and flattening of the spine. A solitary nodule was noted over the left supraclavicular region (Fig1b) and the left axillary region. On examination of the hips, a fixed flexion deformity of left hip and knee of 40 degrees was noted. The range of motion of right hip and knee was normal. The patient was investigated with serum calcium, serum phosphorus, serum alkaline phosphatase, serum CPK Total and CPK- MM fraction. All investigations were within normal limits. Radiographs revealed generalized paraspinal calcification (Fig 1c). CT chest and abdomen revealed multiple soft tissue calcifications, lumbar canal stenosis and hepatosplenomegaly. Bone scan using Tc 99m-MDP revealed extensive extra-osseous tracer uptake suggesting extra-osseous ossification. Hence, diagnosis of FOP was made.

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On enquiring about her family, her father had started developing gradually progressive stiffness of back since 11 years with significant restriction of his daily routine activity. On examination, he had a stooped posture (Fig 2 a) with generalized paraspinal calcification extending over the entire spinal area. He had bilateral fixed flexion deformity of hips of 60 degrees with bilateral fixed knee flexion deformity of 40 degrees and bilateral fixed elbow flexion deformity of 50 degrees. There was restriction of internal rotation of both his shoulders with the other movements relatively spared. He had deformity of toes similar to his daughter (Fig 2 b). Radiographs revealed calcification of left hip adductor muscles (Fig 2 c).

The patient's sister a 11-year-old female also had similar deformities of the toes (Fig 3 a) with clinodactyly of both her hands (Fig 3 b) with mild mental retardation. She was unable to walk and used to ambulate by crawling. On examination, she had equinovarus deformity of bilateral ankle and foot along with spasticity of both her knees and hips. In upper limbs, there was fixed pronation deformity of her right forearm in 45 degrees with further pronation of 20 degrees possible. She had isolated calcification over dorsal aspect of her right wrist. Paraspinal region was spared of any calcification. Rest of the examination was normal .

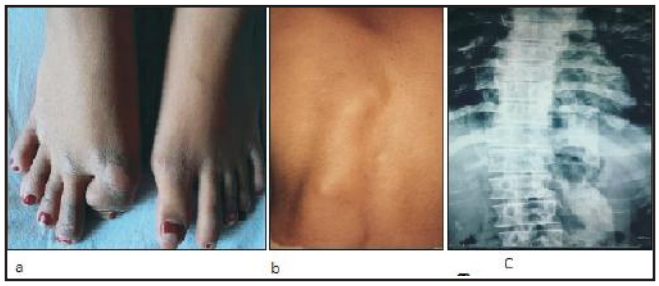

Figure 1

a) Microdactyly of both the greater toes in the patient

b) Clinical photograph of the back showing multiple paraspinal bony hard nodules

c) X-ray of the thoracolumbar spine (AP view) showing evidence of paraspinal calcification

The Father and his fifteen-year-old daughter were investigated and were planned for hip and knee arthrodesis in functional position. During their stay in the hospital for over two months, no new progression and deterioration was observed. However, after explaining the progressive nature of the disease and poor prognosis to the family, they refused any surgical procedure. They were discharged on oral steroids and followed up every monthly on OPD basis.

Figure 2

a) Fixed posture of the father with flexion of the spinal column and hips

b) Microdactyly of both the greater toes in the father

c) X-ray PBH (AP view) showing evidence of ossification over left adductor muscles causing extra-articular ankylosis

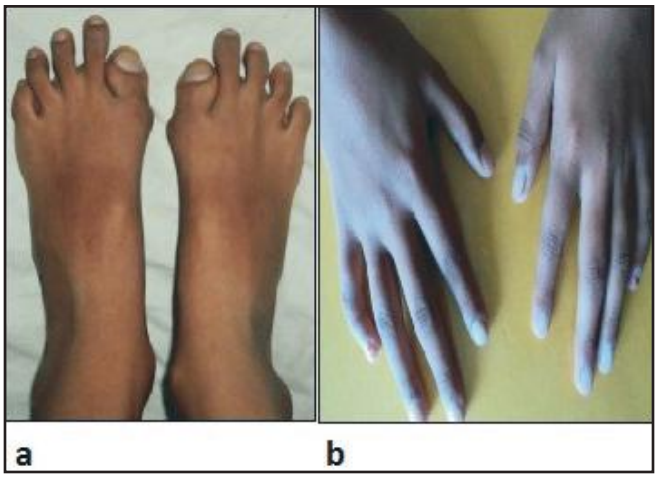

Figure 3

a) Microdactyly in the right greater toe of the patient's sister

b) Presence of clinodactyly in the patient's sister

Discussion

Fibrodysplasia ossificans progressiva (FOP) is a rare genetic disorder, first described by Guy Patin in 1648, characterized by congenital malformations of the great toes and progressive heterotopic ossification in characteristic anatomic patterns. Usual age of onset of symptoms and presentation is within first decade[5]. In the first decade of life, children with FOP develop painful inflammatory soft tissue swellings (flare-ups) that progressively transform soft connective tissues into

heterotopic bone with resultant permanent immobility. Minor trauma such as intramuscular immunizations, mandibular blocks for dental work, muscle fatigue, blunt muscle traumas, falls or influenza like illnesses can trigger painful new flare-ups leading to progressive heterotopic ossification[6].

Surgical attempts lead to episodes of explosive new bone growth. FOP is commonly misdiagnosed, because clinicians often fail to associate the rapidly developing soft tissue swellings with the malformed great toes. FOP is commonly misdiagnosed as progressive juvenile fibromatosis, lymphedema or soft tissue sarcomas[6].

Fibrodysplasia ossificans Progressiva arises spontaneously and occasionally may be inherited in an autosomal dominant manner with variable expression and complete penetrance[4]. Most cases occur due to new gene mutations. Both sporadic and familial cases have been reported with 90% of cases having new mutations and 10% familial cases with autosomal dominant mode of transmission[7].

There hasn't been any documentation of a familial manifestation of this disease in the Asian region in literature. Patients with Fibrodysplasia Ossificans Progressiva have bilateral involvement of muscle, tendons and ligaments and a predominantly endochondral pattern of ossification[5]. The disease is gradually progressive with periods of remission and exacerbation. International Fibrodysplasia Ossificans Progressiva Association (IFOPA) based in the state of Florida, U.S. has done pioneering work in the research of this debilitating condition.

Clinical management is symptomatic and there is no effective treatment. The ultimate treatment of FOP will likely be based on integrated knowledge of the cellular and molecular pathophysiology of the condition. The patient should avoid soft tissue injuries, contact sports, overstretching of soft tissues and muscle fatigue. The surgeon should avoid biopsies, surgical removal of heterotopic bone, intramuscular injections, and all non-emergent surgical procedures as well as passive range of motion. The physician should avoid all intramuscular immunizations and traumatic IV's and arterial punctures[8].

Fibrodysplasia ossificans progressiva is a condition of considerably reduced lifespan, with the most common cause of death being cardiorespiratory failure from thoracic insufficiency syndrome[6].

This case report shows a familial presentation which is not the usual presentation in this disease. But due to lack of large scale series on this front, it cannot be conclusively suggested to do a familial screening for all isolated cases of Fibrodysplasia Ossificans Progressiva.

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CASE REPORT

Petrous Apex Cholesteatoma

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ABSTRACT

Petrous apex cholesteatoma is a rare primary cystic lesion of Petrous apex. Though cholesteatoma is not malignant, because of its expansile nature it may lead to serious complications. We herewith report case of a 52- year-old male who presented with right sided facial palsy, which turned out to be congenital Petrous apex cholesteatoma after investigations. Surgery is inevitable in Petrous apex cholesteatoma before it could involve most vital structure at Petrous apex i.e. carotid artery. This case was successfully managed surgically through transmastoid translabyrinthine approach with complete excision of cholesteatoma and exenteration of surgical cavity into external ear canal through wide meatoplasty. Transmastoid approach bypasses intracranial manipulations which are inevitable in other approaches. Exenteration of surgical cavity enables inspection of the cavity postoperatively, making it better than other approaches.

Key words - Petrous Apex, Cholesteatoma, Transmastoid Translabyrinthine Approach, Facial Palsy, Hearing Loss

Introduction

Petrous apex cholesteatoma is rare primary cystic lesion involving petrous apex. Cholesteatoma is an expansile lesion. It causes bone erosion as well as affects important structures in the proximity by mass effect leading to serious complications. Surgery remains the definitive treatment of petrous apex cholesteatoma. Because of location of petrous apex and proximity of vital structures, surgery of petrous apex cholesteatoma becomes a surgical challenge. We present a case of congenital petrous apex cholesteatoma which presented late with facial palsy and was managed by transmastoid translabyrinthine approach.

Case history

A 52-yr-old male came to outpatient department with insidious onset, gradually progressive right sided facial weakness (Fig 1 a) since six months. It was associated with right sided headache and right sided, insidious onset, gradually progressive hearing loss since last 4 months. There was no history of ear discharge from right ear. However, there was history of scanty, purulent, foul smelling, blood stained discharge from the left ear for which patient had undergone surgery in the childhood.

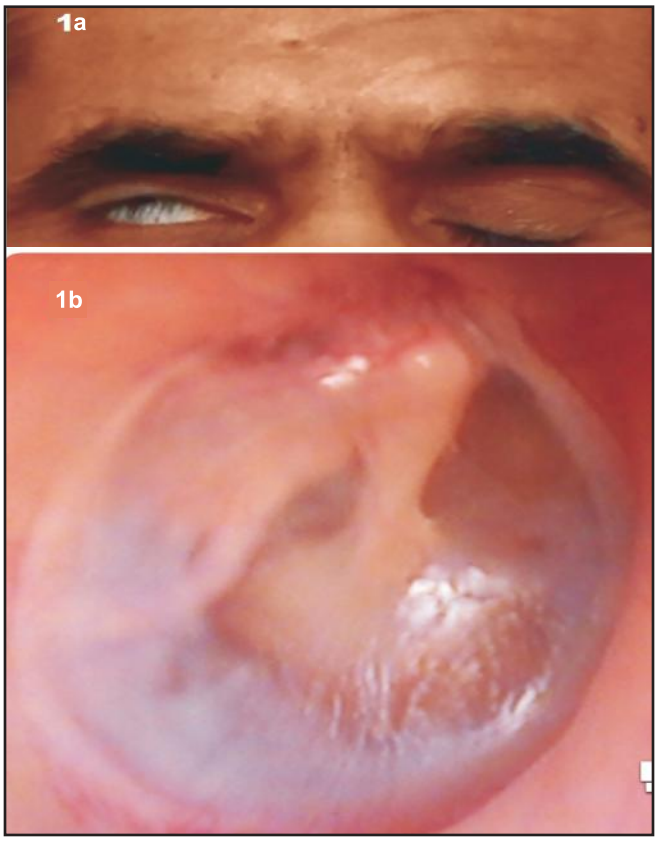

Figure 1a : Showing Bell's phenomenon and loss of forehead wrinkles on right side

Figure 1b : Showing Grate II pars tensa and pars flaccida retraction

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On examination, House-Brackmann grade V facial palsy was present on right side. On otoscopy, mastoidectomy cavity was present on the left side. Grade II pars tensa and pars flaccida retraction (Fig 1b) was present on the right side without any discharge or debris. Weber's test lateralized to left side with negative Rinne's on both sides with absolute bone conduction less than that of examiners' on both sides. Romberg's and Untenberger's test were positive on right side.

Pure tone audiometry showed profound sensorineural hearing loss on right side and moderately severe mixed hearing loss on left side. Acoustic (stapedial) reflex was absent on right side. HRCT temporal bone showed non enhancing soft tissue density in right Petrous temporal bone involving right internal auditory canal. There was bony destruction of right internal auditory meatus, labyrinthine portion of the facial canal, horizontal portion of right carotid canal, jugular canal and the sinodural plate. Multiplanar, multiecho MRI showed soft tissue density in right Petrous apex which was hyperintense on T2W and hypointense on T1W images. There was no post contrast enhancement of soft tissue (Fig 2). Mild restricted diffusion was noted on DW images. No obvious blooming was noted on GRE images.

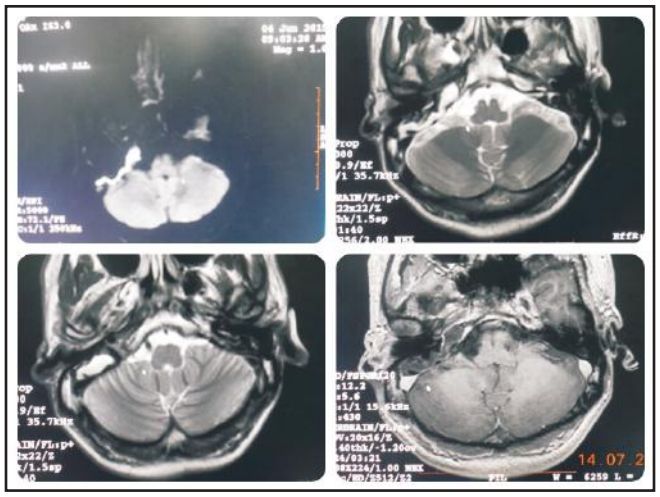

Figure 2: MRI showing mild restricted image on diffusion weighed image (1), hyperintense T2W images (2,3) and hypo to isointense T1W image(4)

Transmastoid translabyrinthine approach was chosen for cholesteatoma excision. Postaural incision was taken with temporocervical extension. Cortical mastoidectomy was done. Facial nerve was decompressed in its tympanic and mastoid segment.

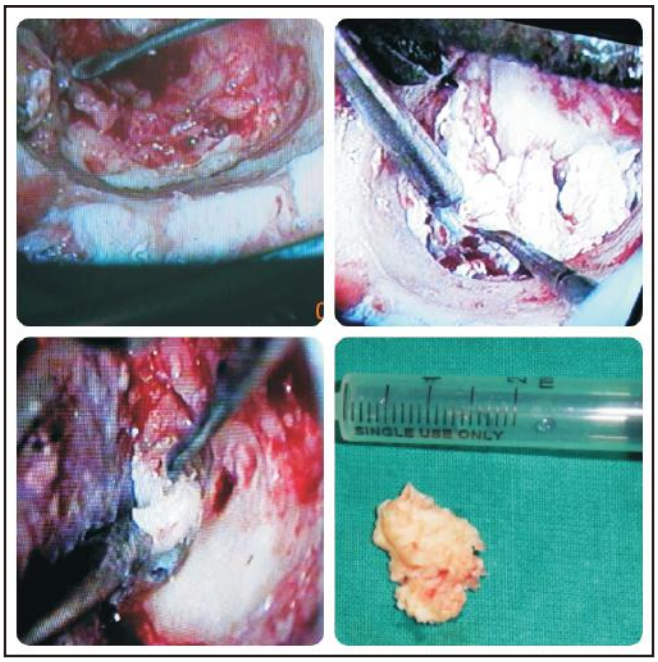

Figure 3 : Showing cholesteatoma below sinodural plate (1), cholesteatoma being removed from sinodural plate (2) and retrolabyrinthine region, cholesteatoma at Petrous apex (3), specimen of cholesteatoma (4)

Bony defect was present in the sinodural plate, medial to which cholesteatoma with shiny epithelium and pearly white flakes. Cholesteatoma was extending upto Petrous apex exposing dura of posterior cranial fossa and eroding the internal auditory meatus (Fig 3). Labyrinthectomy was done keeping dome shaped bone of labyrinth to support the exposed dura. All the cholesteatoma was excised. Eustachian tube was plugged with cartilage. Exposed dura was covered with temporalis fascia. Wide meatoplasty was done and wound closed in layers.

Follow up was done after 15 days, 1 month and 3 months after discharge in order to examine and clean the surgical cavity. On subsequent follow up visits, patient had complete relief from headache. The surgical cavity was healthy without any evidence of infection or CSF leak. Aim of this surgery was invariably life-saving and thus facial reanimation surgery was considered as a second stage procedure taking into account the lengthiness of surgery and safety of patient. Dynamic facial reanimation surgery with facial-hypoglossal transposition will be done after 3 months in an attempt to restore facial function.

Discussion

Petrous apex is part of Petrous temporal bone lying anterior to internal auditory meatus and otic capsule; wedged between greater wing of sphenoid, clivus and basiocciput[1,2]. Most vital structure traversing through petrous apex is the internal carotid artery. Gasserian ganglion, abducens nerve coursing through Dorello's canal[1], facial nerve traversing through fallopian canal are other important structures which lie in proximity of Petrous apex. Peculiarity of lesions involving petrous apex is that they remain asymptomatic for long period, become symptomatic when they involve adjacent important structures and may even present with serious life threatening complications. Imaging studies are primary method to diagnose petrous apex lesion. Surgical access to petrous apex is very difficult demanding special surgical skills.

Cholesteatoma is rare primary cystic lesion involving petrous apex. It accounts for 4-9% of primary lesions affecting Petrous apex[2]. Cholesteatoma is sac of squamous epithelium with fibrous subepithelium and keratin debris and without abnormal mitoses. Petrous apex cholesteatoma can be congenital or acquired.

Congenital cholesteatoma is supposed to be arising from epidermal cell rests, either from Seesel's pocket[3] from cranial end of primitive foregut or from inward migration of external canal epithelium[1]. Acquired cholesteatoma occurs due to inward extension of retraction pocket due to persistent negative middle ear pressure. Majority of them remain asymptomatic till they enlarge enough to cause mass effect on adjacent structures. Hearing loss is most common symptom associated with Petrous apex cholesteatoma which can be conductive or sensorineural[1]. Conductive hearing loss is because of Eustachian tube compression and sensorineural hearing loss is because of inner ear or auditory nerve involvement. Retro-orbital or temporoparietal headache may be present which is because of irritation or compression of Gasserian ganglion. Facial palsy is uncommon and may occur due to compression of facial nerve. Carotid compression may present as syncopal attacks. Anterior extension into cavernous sinus is rare and if occurs then it leads to opthalmoplegia. Ear may be absolutely normal on otoscopy[1] or may show retracted tympanic membrane. In this case patient presented with gradually progressive facial palsy, which was because of mass effect as well as destructive effect of cholesteatoma at labyrinthine segment of facial nerve. Patient also had watering, redness of right eye and retro-orbital headache which point towards irritation of Gasserian ganglion. Progressively developed profound sensorineural hearing loss and positive Rhomberg and Untenberger's test on right side were suggestive of vestibulocochlear nerve involvement.

HRCT temporal bone of this patient showed expansile lesion at Petrous apex with bony destruction of right internal auditory meatus, labyrinthine portion of facial nerve, horizontal portion of right carotid canal, jugular canal and sinodural plate arose suspicion of either neoplasm or cholesteatoma. Non enhancement of the lesion after contrast injection reduced possibility of neoplasm. MRI gave better soft tissue differentiation.

Lesion in this patient was hypointense on T1W, hyperintense on T2W and mild restricted diffusion was noted on diffusion weighed images, which confirmed presence of cholesteatoma.

Surgery is the definitive treatment for cholesteatoma. Goals of surgery are complete removal of squamous epithelium, restoration of hearing and preservation of normal anatomy[4]. Choice of approach of surgery depends upon extent of lesion, hearing status, cranial nerve involvement, carotid artery involvement, presence of CSF otorrhoea, bacterial contamination and experience of the surgeon[4]. In this case cholesteatoma was not communicating with middle ear or mastoid cavity and thus was sterile. There was no CSF otorrhoea. Patient had profound sensorineural hearing loss as well as right vestibular deficit. Patient already had long standing facial palsy. As the cholesteatoma was extending beyond labyrinth, transmastoid translabyrinthine approach was chosen so as to get access to cholesteatoma at apex. Cholesteatoma cavity was exteriorized into external auditory canal so as to facilitate periodic inspection and cleaning. Openings of semicircular canals were plugged with connective tissue and gelfoam. Cavity obliteration was avoided as recurrence is difficult to detect with cavity obliteration. Exposed dura of posterior cranial fossa was covered with fascia to minimize post operative CSF leak. No attempt was made to restore hearing as patient had profound sensorineural hearing loss on right side and patient had

better hearing on left side. Intra and post operative period was uneventful. There was no evidence of CSF leak in immediate postoperative period.

Conclusion

Transmastoid translabyrinthine approach in such cases of extradural cholesteatoma is the most suitable approach as it avoids opening dura as in middle fossa approach which may lead to meningitis and dissemination of cholesteatoma inside dura. Deep seated Petrous apex cholesteatoma has tendency to recur and recurrence is worst than primary lesion. This approach also provides exenterated cavity facilitating postoperative inspection and cleaning, making it ideal approach for Petrous apex cholesteatoma.

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CASE REPORT

Iatrogenic Diaphragmatic And Splenic Injury During Closed Tube Thoracostomy

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ABSTRACT

Closed tube thoracostomy is an emergency procedure with possible preventable iatrogenic complications. A 20-year-old female was referred to our institute, a tertiary care centre, in view of acute abdomen after insertion of ICD (Inter Costal Drain) through left side of chest, intervened in secondary health care centre in view of tubercular pleural effusion. Acute abdomen in this case made us suspicious of abdominal organ injury which on exploratory laparotomy revealed iatrogenic diaphragmatic and splenic injuries. Patient was treated with proper placement of ICD in left pleural cavity, closure of diaphragmatic rent and splenorrhaphy. Post-operative course went uneventfully. Knowledge of anatomy of triangle of safety and possible pathological changes in it during pulmonary tuberculosis would have prevented the complications. Hence we emphasize on presenting the case report to create awareness.

Keywords : ICD (Inter Costal Drain), Triangle of Safety, Iatrogenic Trauma, Diaphragmatic Perforation, Splenic Laceration

Introduction

Closed tube thoracostomy with ICD (Inter Costal Drain) is emergency, life saving, bed-side surgical procedure. Though procedure involves risk, possible complications can be prevented keeping insertion site restricted to 'triangle of safety'. Cumulative rates of early (<24 hours post-placement) and late (>24 hours post-placement) tube thoracostomy complications are 3% and 8-10% respectively[1]. The anatomic structures injured during ICD insertion are lung (primary and secondary injuries), vessels (intercostal and intra-thoracic), diaphragm, spleen, stomach, liver, bowel, heart etc. Pulmonary tuberculosis leads to pathological changes like pulmonary parenchymal changes, mediastinal shift, crowding of ribs and tenting up of the respective hemidiaphragm. Lack of knowledge of these conditions and hence absence of due precautions while ICD insertion causes complications, which can be prevented otherwise.

Case Report

A 20-year-old female, suspected case of pulmonary tuberculosis, having breathlessness underwent intervention in secondary health care centre in the form of Intercostal drain (ICD) insertion. Post intervention, 50 ml of hemorrhagic fluid (suggestive of hemothorax) was drained with no column movement along with respiration but breathlessness increased, instead of decreasing and patient developed symptoms with which she was referred to our centre.

On examination, she had hypotension, tachycardia, pallor. There was no cyanosis and lymphadenopathy.

On examination of the respiratory system, there was absent air entry over left infra mammary, infra axillary, infra scapular regions with no foreign sounds. ICD was in situ through left 7th intercostal space with no column movement. There was mild abdominal distention, tenderness and guarding over the left side of abdomen. The Cullen's and Kehr's sign were negative. Cardiovascular system and Central nervous system examinations were within normal limits.

X-ray abdomen (erect) with chest showed crowding of left lower ribs, tip of ICD entering the peritoneal cavity through 7th ICS (Fig 1), minimal free air under right dome of diaphragm, left hemi-thorax lower zone opacity. Decision was taken to do emergency exploratory laparotomy and SOS left thoracotomy.

On exploratory laparotomy, there was non-expanding intra-peritoneal hematoma of about 1 litre. After evacuation of hematoma, ICD tube was found entering

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intra-peritoneally (Fig 2). It had perforated the left hemi-diaphragm and caused grade I laceration of left lobe of liver with no active bleeding along with two grade I splenic lacerations. Definitive surgical management was done by placement of ICD into pleural cavity through 5th ICS through the same chest wall wound, closure of the rent in the diaphragm with polypropylene using simple interrupted sutures, suturing of splenic lacerations over gelfoam i.e. splenorrhaphy, confirmation of hemostasis, intra-peritoneal drain placement and closure of abdomen.

Post-operative chest X-ray showed a well placed ICD in the left pleural cavity with comparative expansion of the left lung. Throughout the post-operative period, patient had dyspnoea on severe exertion probably due to underlying left lung pathology. Post operative period was otherwise uneventful. ICD was removed on post-operative day 7 when ICD output was minimal. Post ICD removal chest X-ray was showing comparative expansion of the left lung. Patient's work up for tuberculosis i.e. sputum for AFB, ADA of pleural fluid was not confirmatory for the disease.

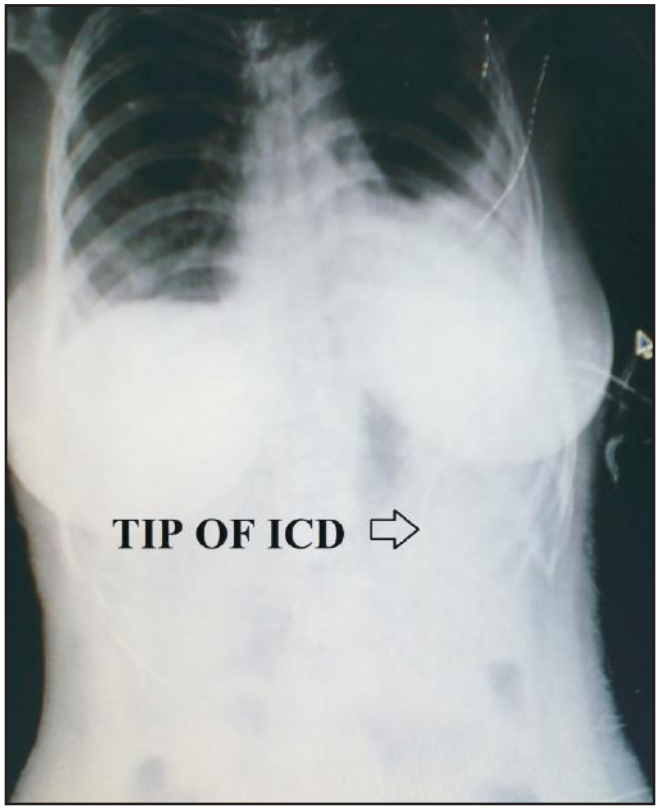

Fig 1- Chest X -Ray on presentation showing left sided pleural effusion and tip of ICD in the abdomen

So patient was not put on AKT. Patient was followed up every monthly for next 6 months after discharge. Chest X-rays on follow up showed gradual expansion of the left lung but with persistent fibrotic changes in lower lobe of left lung.

Discussion

Tube thoracostomy with ICD (Intra Costal Drain) is emergency, bed side, lifesaving surgical intervention. Common indications of insertion of Intercostal Drainage Tube are-hemothorax, pneumothorax, hemopneumothorax, empyema, massive or symptomatic pleural effusion and blunt or penetrative, iatrogenic chest trauma.

ICD tube can be safely introduced in the pleural cavity through 'triangle of safety'[1]. The triangle is bounded medially by lateral boarder of Pectoralis major, laterally by lateral boarder of latissimus dorsi, inferiorly by 5th intercostal space and apex is on the line of base of axilla. Introduction of ICD through this space prevents injury to breast tissue, chest muscles, abdominal viscera and long thoracic nerve. ICD can be put safely through anterior aspect of mid axillary line[2].

Precautions while putting ICD are - confirmation of indication of ICD insertion, informed consent, aseptic precautions, adequate local anaesthesia, proper patient positioning, ICD placement with proper technique and drainage by means of an underwater seal.

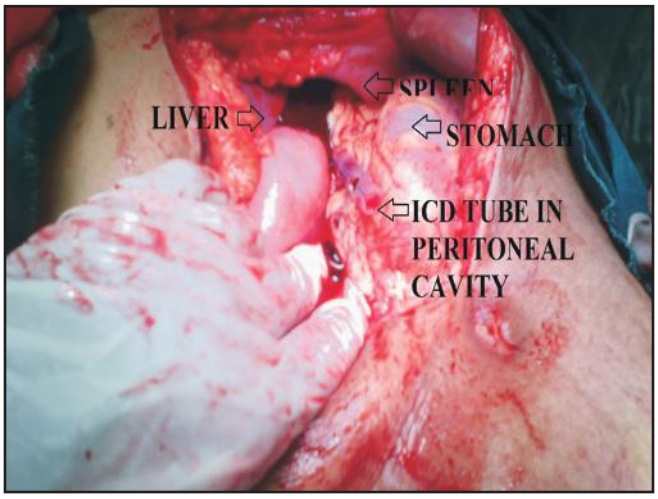

Fig 2- Intra-operative photograph showing ICD into the peritoneal cavity

Common complications during ICD insertion are mal-positioning (intra-fissural in 21% and intra-parenchymal in 9%[3], subcutaneous tube placement in 1-1.8%[4], intra-abdominal placement in <1%, mediastinal organ (heart, esophagus, vessels, nerves) injury and very rarely abdominal organ (spleen, liver, stomach, bowel) injury.

In this case, there was disturbed normal anatomy of triangle of safety in form of crowding of ribs and tenting i.e. pulling up of the left hemidiaphragm due to chronic lung and pleural pathology. Additionally ICD was put through 7th left intercostal space.

This iatrogenic surgical complication could have been prevented by knowledge of pathology induced anatomical variation in this patient followed by tube thoracostomy through triangle of safety with due precautions.

Conclusion

Tube thoracostomy is not without risk. But it is important to limit tissue dissection to triangle of safety to minimise the complications. This case report highlights that tube thoracostomy must be inserted through triangle of safety. With proper understanding of the pathology induced anatomical disturbances and due modifications in insertion technique, complications of tube thoracostomy can be avoided. Unforeseen complications should be timely recognized and managed appropriately.

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CASE REPORT

Case of recurrent headache

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ABSTRACT

Tolosa Hunt Syndrome is a rare disorder, causing painful ophthalmoplegia with wide differential diagnosis. Characteristic MRI findings and dramatic rapid response to steroid therapy, hint towards the diagnosis. We hereby present a case of young female, who presented with recurrent episodes of headache with 6th nerve palsy

Keywords : Headache, Tolosa Hunt.

Introduction

Tolosa Hunt Syndrome (THS) is a rare disorder, causing painful ophthalmoplegia with wide differential diagnosis. Tolosa first described the condition in 1954, in a patient with unilateral recurrent painful Ophthalmoplegia involving cranial nerves III, IV, VI and V1. This painful ophthalmoplegia is characteristically steroid responsive. In 1988 THS criteria were provided by the International Headache Society (IHS), and further revised in 2004

Case Report

A 35 years old female came to Sassoon general hospitals, Pune with complaints of left sided headache since 20 days and double vision since last 8 days. She gave history of similar episodes of headache in past, which were self-limited and recovered on their own.

The headache was confined to the left side, dull boring type and not associated with watering of eyes or nose or tingling sensations on the face. There was no preceding history of fever, trauma and seizures. She described it as pain behind the eyes. It was associated with double and blurry vision more on left sided gaze (Fig 1).

On examination there was left sided abducent nerve palsy. Right eye was normal. In left eye, visual acuity was 6/36 with Rapid Afferent Pupillary Defect present on swinging flash light test suggesting optic nerve damage. Rest of the neurological and systemic examination was within normal limits. Laboratory tests were done to rule out common causes including complete blood count, thyroid function tests, renal function tests, liver function tests, serum Calcium, CSF routine and microscopic analysis, CSF culture sensitivity, ESR, CRP, ACE levels, ANA levels, BSL fasting and postprandial and HIV ELISA were within normal limits. However ESR and total leukocyte count was raised (Table 1).

Table I : Investigations

Parameter	Value	Parameter	Value
Hemoglobin	10.2 g/dL	CRP	POSITIVE
Platelets	266000	Serum Ca	8 mg/dL
WBCs	11200	T3	1.79 pg/ml
Creatinine	1.1 mg/dL	T4	1.30 ng/ml
Urea	37 mg/dL	TSH	1.00 mIU/L
Bilirubin	0.7 mg/dL	HIV ELISA	Negative
Sodium	142 mEq/L	BGL(F)	90 mg/dL
Potassium	3.6 mEq/L	BGL(PP)	140 mg/dL
ESR	22 mm	ANA level	Negative

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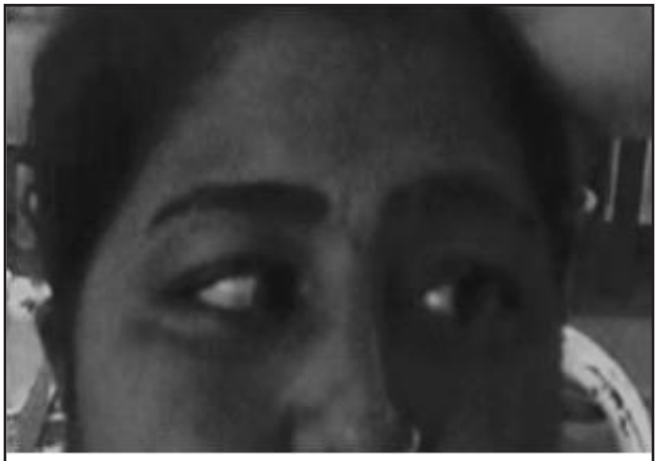

Fig 1 - Photograph Showing Left Lateral rectus palsy

Magnetic Resonance Imaging showed, on T1 Weighted imaging a heterogeneously enhancing soft tissue intensity lesion in left orbital apex and left cavernous sinus with adjacent pachymeningeal thickening and enhancement with mild compression of left optic nerve and left supraclinoid Internal Carotid artery on ruling out other common causes and based on findings of MRI, diagnosis of Tolosa Hunt syndrome was done and patient was started on I.V. methyl prednisolone 1 gram I.V. Symptoms improved within 24 hrs, I.V. steroids were continued for 3 days and then switched over to oral dose

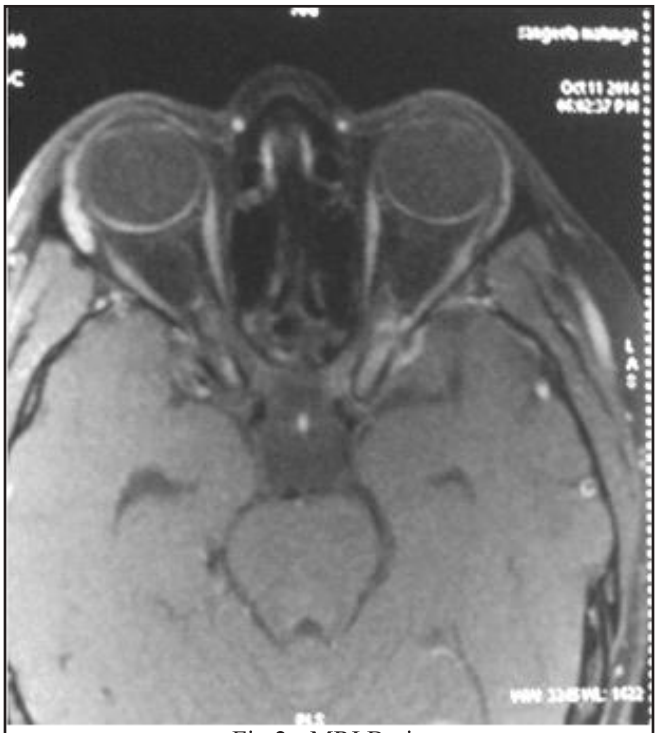

Fig 2 - MRI Brain

50 mg of prednisolone and then tapered off over next four weeks. On readmission she developed similar complaints, which relieved on restarting steroids and this time she was discharged on low dose oral steroids preventing any further episodes of headache. Thus we successfully treated Tolosa Hunt syndrome in a young patient presenting with headache.

Discussion

THS diagnostic criteria

- One or more episodes of unilateral orbital pain persisting for weeks if untreated
- Paresis of one or more of the third, fourth and/or sixth cranial nerves and/or demonstration of granulomas by MRI or biopsy
- Paresis coincides with the onset of pain or follows it within 2 weeks
- Pain and paresis resolve within 72 hours when treated adequately with corticosteroids
- Other causes have been excluded by appropriate investigations

Tolosa first described the condition in 1954, in a patient with unilateral recurrent painful Ophthalmoplegia involving cranial nerves III, IV, VI and V1.[1] The patient was imaged using carotid angiography, and segmental narrowing of the carotid siphon was seen.[2]Hunt et al. described 6 patients with similar clinical findings in 1961, and proposed a low-grade non-specific inflammation of the cavernous sinus and its walls as the cause of the syndrome.[3]

Pathologically, infiltration of lymphocytes and plasma cells as well as thickening of the dura mater was seen.[2] The condition was termed Tolosa-Hunt syndrome by Smith and Taxdal in 1966.[4] The latter authors stressed the importance of the dramatic rapid response to steroid therapy.

The clinical differential diagnosis of steroid responsive painful ophthalmoplegia includes metastases, carotid-cavernous fistulae, pituitary adenomas, vasculopathic cranial neuropathy, aspergillus invasion, Wegener's granulomatosis, sarcoidosis, lymphoma and ophthalmoplegic migraine.Administration of systemic steroids for 48 hours in a patient with Tolosa Hunt syndrome produces a dramatic response in painful

ophtahmoplegia that allows differentiation of this cause from other conditions of painful ophtahmoplegia.[5]

In 1988, THS criteria were provided by the International Headache Society (IHS), and further revised in 2004 (Table I).[6,7]

Neuro-imaging in particular MRI is an essential part of the workup of any patient presenting with features of THS, as these features are non-specific and have a wide differential diagnosis. MRI findings classically demonstrate a soft-tissue mass lesion involving the superior orbital fissure or cavernous sinus. Signal characteristics are typically hypointense to fat and isointense to muscle on short TR/TE sequences and isointense to fat on long TR/TE sequences.[8] Significant enhancement of the mass lesion is demonstratedon contrast enhancement sequences. Of particular value is the post-contrast fat-saturated thin-slice coronal images through the orbital apex and cavernous sinus. Tolosa Hunt syndrome essentially remains a diagnosis of exclusion.

Although spontaneous remissions may occur in Tolosa Hunt syndrome, corticosteroid treatment dramatically relieves the orbital- periorbital pain within 24-48 hours, and usually relieves the cranial nerve dysfunction within 2 weeks.[8] However, the response to steroid therapy can be nonspecific because some cases of Tolosa Hunt syndrome fail to respond, while some painful parasellar tumors may improve on steroid treatment.[9] The recommended treatment for Tolosa Hunt syndrome is usually prednisolone 1-1.5 mg/kg/day, although there is little information on the optimal dosage, duration of treatment, or alternative forms of therapy. After steroid therapy in patients with Tolosa Hunt syndrome, the disappearance of the abnormal soft tissue in follow-up MRI has been reported. Therefore Tolosa Hunt syndrome should be suspected in patients of intractable headache with ophthalmoplegia, as it has got specific treatment and patient can be relieved of their symptoms.

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CASE REPORT

A Curious Creeping Eruption

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ABSTRACT

Cutaneous larva migrans is a skin disease in humans, caused by the larvae of various nematode parasites of the hookworm family (Ancylostomatidae). Colloquially called **creeping eruption** due to its presentation, the disease is also somewhat ambiguously known as "**ground itch**". Herein we report a case of cutaneous larva migrans in a 24 year old girl having an itchy raised tortuous migrating lesion on left palm, who reported expulsion of the larva from the biopsy site leading to spontaneous resolution.

Keywords : Cutaneous larva migrans, Hookworm infestation, Albendazole

Introduction

Cutaneous larva migrans is a skin disease in humans, caused by the accidental penetration and migration of larvae of various nematode parasites of the hookworm family in the epidermis[1] Exposure of the skin to the infective filariform larvae of non human hookworms and strongyloides are amongst the common causes. The most common species causing this disease is Ancylostoma braziliense.[2] These parasites live in the intestines of dogs, cats and wild animals and should not be confused with other members of the hookworm family for which humans are the definite host like Ancylostoma duodenale and Necator Americans.

Case Presentation

A 24 year old girl came to our out patient department with complaints of migratory swelling over her left arm on and off since one and a half month. Over the past four days she noticed the appearance of a tortuous fluid filled lesion over the left palm associated with pain and itching.

Patient gave a history of gardening in damp soil two months prior to having these symptoms.

Patient had a history of past consultation for the swelling over the arm and treatment with tablet ivermectin for the same but with no relief.

Clinical examination revealed a pseudovesicular tract of approximately 4 cm length in a tortuous pattern on the thenar eminence of the left palm (Figure 1a). Closer look revealed a small black linear structure within the tract which was seen to be moving gradually within the tract. The differential diagnosis considered were larva currens, erythema migrans and annular erythemas.

Her absolute eosinophil count was 400 cells/microlitre at the time of presentation. All routine investigations were found to be within normal limits. Hence a skin biopsy from the progressively migrating end was performed which showed a cleft in the epidermis which was surrounded by necrotic keratinocytes. The cleft was attributed to the migration of the larvae within the epidermis (Figure 1b). The patient returned three days later after biopsy with spontaneous reduction in itching and migration of the lesion following extrusion of the black larvae from the biopsy site (Figure 2). Subsequent follow up of the patient revealed resolution of the tract over the next three weeks.

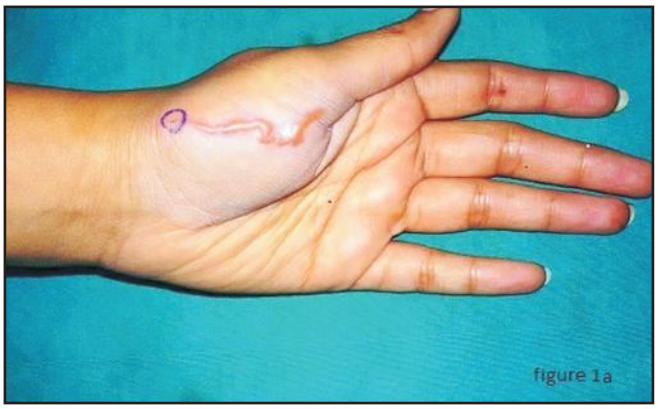

Figure.1a- Skin coloured tortuous tract approximately 4 cm in size on left palm

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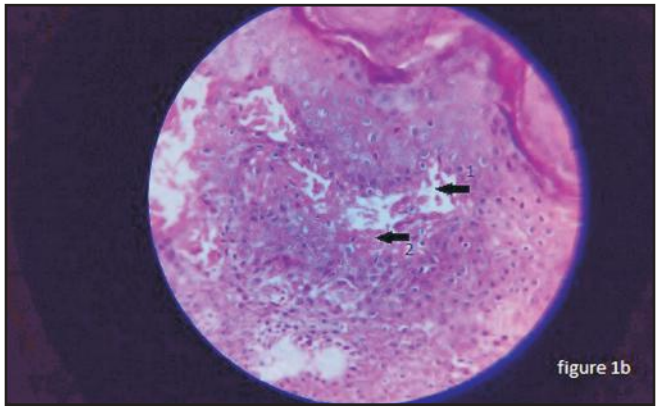

Figure.1b- Skin biopsy of the lesion showing the cleft within the epidermis (arrow 1) with adjoining necrotic keratinocytes (arrow 2) [H&E, 10X]

Her absolute eosinophil count was 400 cells/microlitre at the time of presentation. All routine investigations were found to be within normal limits. Hence a skin biopsy from the progressively migrating end was performed which showed a cleft in the epidermis which was surrounded by necrotic keratinocytes. The cleft was attributed to the migration of the larvae within the epidermis (Figure 1b). The patient returned three days later after biopsy with spontaneous reduction in itching and migration of the lesion following extrusion of the black larvae from the biopsy site (Figure 2). Subsequent follow up of the patient revealed resolution of the tract over the next three weeks.

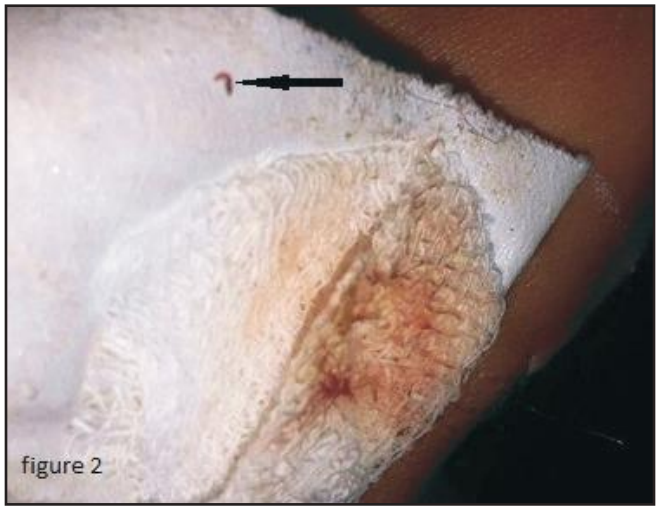

Figure.2- The extruded larva that the patient brought to us

Discussion

Cutaneous larva migrans is widely distributed but is most commonly found in tropical and subtropical areas, especially the Southeastern United states, Caribbean, Africa, India, and Southeast Asia.[3] It is an infection with a larval nematode that wanders in the epidermis. It is acquired from walking barefoot on the ground contaminated with animal faeces, but other sites can also be infected by contact with contaminated soil or sand.[1] The infective larvae are unable to penetrate below the stratum germinativum. As a consequence of their migration, a tunnel is formed with the corium as the floor and the stratum granulosum as the roof. Within a few hours after the penetration of skin, symptoms in the form of red itchy papules develop which later become vesicular.[2]

Wandering movements causing creeping eruptions usually start after four days but may last for weeks or months depending on the dormancy of the larvae. The commonest sites for the eruption are the hand, feet, abdomen and gluteal region.[2] The diagnosis of hookworm related cutaneous larva migrans is based on clinical findings.[3] The wandering of the larvae on the skin is represented as a tortuous skin coloured itchy tract. Larva of ankylostoma usually manifests on the foot and moves at a rate of 1-2cm per day. Usually one to three erythematous serpiginous and intensely pruritic lesions are present.[3] Serpiginous lesions of strongyloides stercoralis, known as larva currens, typically present as recurrent, transient and rapidly moving skin lesions. Larva of strongyloides moves at a rate of 5-10cm per hour and the lesions usually disappear within hours only to recur over subsequent weeks to years. Strongyloides causing larva currens typically occur on the buttocks, and in the perianal region.[3] Larva migrans can be accompanied by loeffler`s syndrome of pulmonary eosinophilia, particularly in severe infestations.[4]

In our case, due to history of the swelling migrating slowly at the rate of 1-2 cm per day, the probable aetiology could be attributed to the larvae of ancylostoma.

The treatment given for cutaneous larva migrans is either topical, with ten percent thiabendazole or oral with tablet ivermectin 200 microgram/kg and then repeated after one week which has gained favour over thiabendazole. Oral thiabendazole is more toxic and less effective than when applied topically. It can be given in the dose of 25 mg/kg thrice daily for three days and repeated after two and four weeks. Strongyloides are known to respond

better with itching usually subsiding within 24 hours and disappearance of rash in 10 days. Other drugs like tablet albendazole 400mg daily for 1-5 days is preferred as first line of treatment due to better side effect profile.[2]

The unusual aspect of our case was the site of involvement being the upper extremity and also the halting of the progression of the tortuous tract after skin biopsy and subsequent suture placement. This also led to the extrusion of the larva on its own without necessitating any further treatment. In the subsequent 3-4 weeks, the tract healed on its own.

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Acknowledgement

We thank the department of pathology, BJGMC Pune for their assistance and academic support.

CASE REPORT

Gastrointestinal Stromal Tumour Presenting As Acute Abdomen : A Case Report

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ABSTRACT

A 70-year-old female presented to the emergency ward with abdominal pain and distension. Erect X-ray abdomen was suggestive of intestinal obstruction. The patient was taken up for exploratory laparotomy after fluid resuscitation. Laparotomy revealed multiple spherical lesions scattered all over the small intestine, mesentery and omentum of varying sizes and one lesion in particular, causing perforation of the small bowel. Histopathology of the lesion was suggestive of Gastrointestinal Stromal Tumour (GIST). Gastrointestinal stromal tumour causing obstruction and thereby leading to perforation is a rare presentation. Hence, this case report.

Keywords : Gastrointestinal Stromal Tumour (GIST), Imatinib Mesylate, Intestinal Obstruction, Laparotomy

Introduction

Gastrointestinal Stromal Tumours (GISTs) are rare malignancies, representing 0.2% of all gastrointestinal tract (GI) tumours. Primary GIST can arise throughout the GI tract, but are most common in the stomach (40–70%), small bowel (20–40%) and colorectum (5–15%). GIST usually present in patients from 40 to 60 years of age. They are equally common in men and women and occur in all racial and ethnic groups. GISTs are asymptomatic or present with non-specific symptoms. GISTs can also cause obstructive symptoms according to its' site or it might be an unsuspected finding during surgery for perforated viscus. It is treated with Imatinib Mesylate, a tyrosine kinase inhibitor.

Case Report

70- year- old female came to the emergency ward with acute abdominal pain and distension of the abdomen. On examination, she was dehydrated and the abdomen was distended. There was diffuse tenderness and guarding all over the abdomen. Fluid resuscitation was done initially. X-ray abdomen done thereafter showed multiple air fluid levels in the abdomen suggestive of intestinal obstruction. Hence, the patient was taken up for exploratory laparotomy.

Abdomen was opened via midline vertical incision. Multiple spherical lesions of various sizes were found in the small intestine, mesentry and the omentum. One particular lesion was causing obstruction of the small intestine, which was also ulcerated on the antimesenteric border causing perforation. Resection anastomosis of the perforated bowel was done (Fig 1).

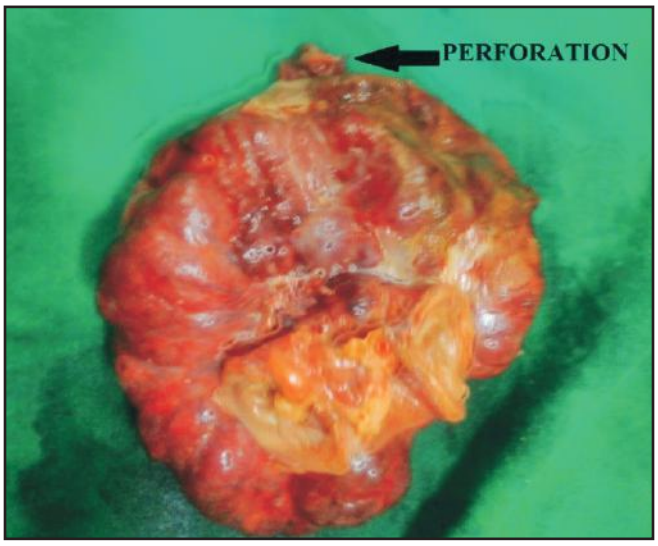

Fig 1: Resected specimen of the perforated bowel containing the tumor (GIST)

The larger lesions over the serosal surface of the bowel and the mesentery were excised (Fig 2). Thorough abdominal wash was given and abdomen closed in layers after insertion of abdominal tube drain.

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The histopathology report of the lesions was suggestive of gastrointestinal stromal tumour. On immunohistochemistry examination, CD117 was positive. After the post operative recovery, patient was started on Imatinib 400mg once daily (OD) as per the oncologist's advice. Presently, at a follow up of 7 months patient is doing well without any recurrence or distant metastasis.

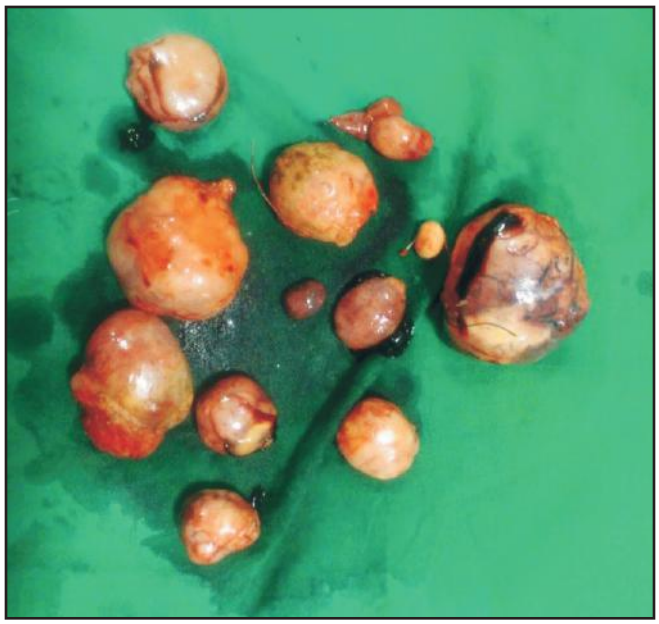

Fig 2: Multiple resected specimens of serosal and mesenteric GISTs

Discussion

Gastrointestinal Stromal Tumors (GISTs) account for 0.2% of gastrointestinal tumors[1,2]. However, they are the most common mesenchymal neoplasms of the gastrointestinal tract. They are submucosal lesions, which most frequently grow endophytically in parallel with the lumen of the affected structure. GISTs may also manifest as exophytic extraluminal excrescences. These tumors have been reported ranging in size from smaller than 1 cm to as large as 40 cm in diameter. Approximately 50-70% of GISTs originate in the stomach. The small intestine is the second most common location, with 20-30% of GISTs arising from the jejunoileum. Less frequent sites of occurrence include the colo-rectum (5-15%) and esophagus (< 5%). Primary pancreatic, omental or mesenteric GISTs have been reported, but are very rare [3].

GISTs are thought to arise from the interstitial cells of Cajal (ICC), which are components of the intestinal autonomic nervous system. Gain-of-function mutations of the KIT proto-oncogene is seen in the vast majority of GISTs[4]. GISTs are now identified by the near universal expression of the CD117 antigen (~95%), part of the KIT receptor. Imatinib Mesylate, a tyrosine kinase inhibitor is used for treatment of GIST.

Many GISTs are asymptomatic, discovered upon imaging or at laparotomy for other reasons. Patients with advanced disease may present with a mass lesion or vague abdominal pain. GISTs can be highly vascular, and bleeding is one of the more common presenting symptoms. These tumors are typically soft and friable, and can cause life-threatening hemorrhage by erosion into the intestinal lumen. Additionally, tumor rupture with intraperitoneal bleeding can occur, and this complication carries a high risk of dissemination by peritoneal seeding of the tumor. Obstruction of the GI tract is occasionally a presenting condition, and can lead to perforation. Between 15-50% of GISTs present with overtly metastatic disease, with the most common metastatic sites being liver and peritoneum. The pattern of metastatic spread is almost entirely intraabdominal, with less than 5% of patients demonstrating pulmonary metastases. GISTs almost never metastasize to regional lymph nodes; however they can invade adjacent organs, the common sites being intestine, liver or the urinary bladder. Diffuse peritoneal spread is not uncommon. The recognition that all GISTs have some malignant potential has now led to their classification as either low, intermediate or high-risk based upon tumor size and mitotic count as depicted in Table 1[5].

Table 1 - Showing Categorization of GISTs

Risk Category	Size	Mitotic Count
Very Low	<2 cm	<5 per 50 HPFs
Low	2–5 cm	<5 per 50 HPFs
Intermediate	<5 cm	6–10 per 50 HPFs
	5–10 cm	<5 per 50 HPFs
High	>5 cm	>5 per 50 HPFs
	>10 cm	Any mitotic rate
	Any size	>10 per 50 HPFs

*HPF means High Power Field

This particular patient came to the emergency ward with acute abdomen. On laparotomy, patient was found to have multiple GISTs, one of which was obstructing the lumen of the bowel and leading to its' perforation. Other lesions were found scattered over the small bowel and were associated with lesions over the mesentery and omentum which is a rare occurrence. The perforated lesion along with the bowel was resected and anastomosis was done. Histopathology report was suggestive of gastrointestinal stromal tumour (high risk). Patient was started on post-operative chemotherapy with Imatinib Mesylate which has prevented recurrence and also reduced the morbidity.

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CASE REPORT

LIPOID PROTEINOSIS - A Rare skin disorder

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ABSTRACT

Lipoid proteinosis is a very rare autosomal recessive disorder, three hundreds cases reported so far, characterized by deposition of hyaline material in the skin and the upper aero-digestive tract. We present a 14 years old male with multiple facial scars and hoarseness of voice diagnosed as a case lipoid proteinosis on the basis of clinical and histopathological features. Although there is no definitive treatment, the overall prognosis is good.

Keywords : Autosomal recessive disease, lipoid proteinosis, Urbach-Wiethe disease

Introduction

Lipoid proteinosis, also known as hyalinosis cutis et. mucosae (Urbach−Wiethe disease), is a rare autosomal recessive disease usually presenting with mucocutaneous lesions since birth. Till date, around 300 cases have been reported in literature. Hoarseness of voice occurs very early in life resulting in airway obstruction in some. Characteristic skin lesions include multiple brown atrophic scars over face and distal extremities, beaded papules over the margins of the eyelids and verrucous nodules over the friction bearing areas (elbows, knees).[1,2]

Case Presentation

A 14 year old male patient born of non-consanginous marrige presented with hoarseness of voice and history blisters over skin in early childhood with multiple atrophic scars over face, upper back , chest, nape of neck, bilateral elbows and knee, with multiple skin colored discrete waxy papules over both dorsum of hands. Parents gave history of weak cry in the child at birth. At two months of age, skin lesions began to appear. Initially blisters appeared which healed with scar over bilateral forearms followed by face, trunk, elbows and knees. At the time of presentation patient had multiple atrophic scars over the face, upper back, chest. Multiple discrete skin colored firm, waxy papules over bilateral dorsa of hands, periorbital area, elbows and knee with beaded papules on eyelids margin were observed (figure 1a and 1b). Patchy diffuse non-scarring alopecia of scalp was present. Because of dermal deposits; appearance of early onset leonine facies was visible clinically. Patient was unable to protrude his tongue due to thickened sublingual frenulum. Direct laryngoscopic examination showed boggy mucosa around base of tongue and posterior pharangeal wall, pale mucosa over epiglottis with cobblestone appearance. Bilateral vocal cord movement was normal. Histopathology of scar from right shoulder revealed hyaline deposits in the papillary dermis (figure 2b), perivascular and peri- appendegeal location (figure 2b) which were PAS positive and diastase resistant. Radiography of skull did not reveal any calcification. All laboratory reports were within normal limits. Diagnosis of lipoid proitenosis was made based on clinical and histopathological findings.

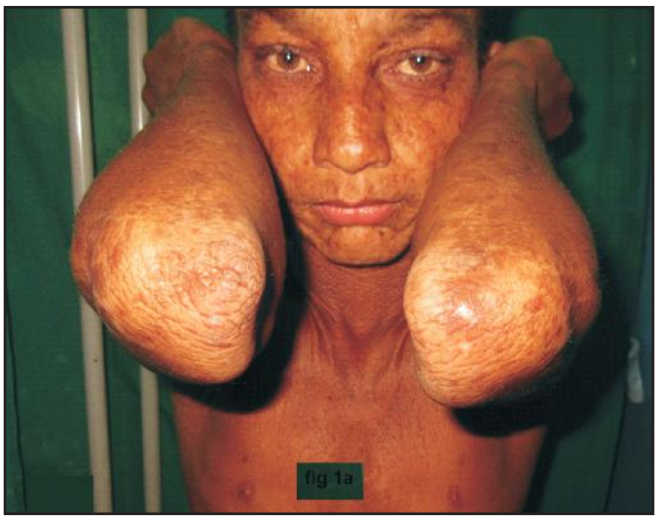

Figure 1a- Shows multiple atrophic scars over the face with beaded papules on eyelids margin. Multiple discrete skin colored firm, waxy papules over bilateral dorsa of hands, periorbital area, elbows and knee

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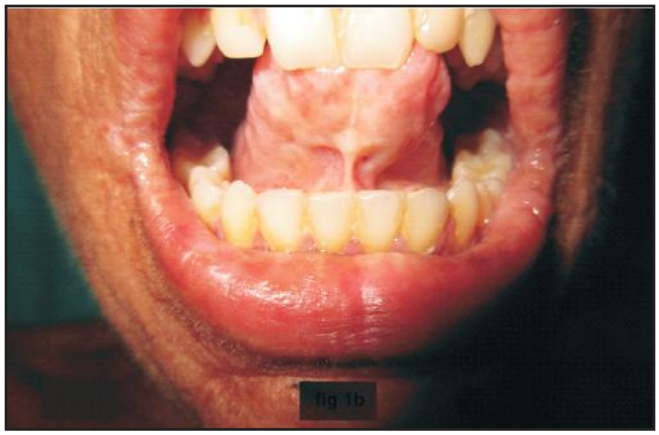

Figure 1b- Shows infiltrated tongue with difficulty in protrusion

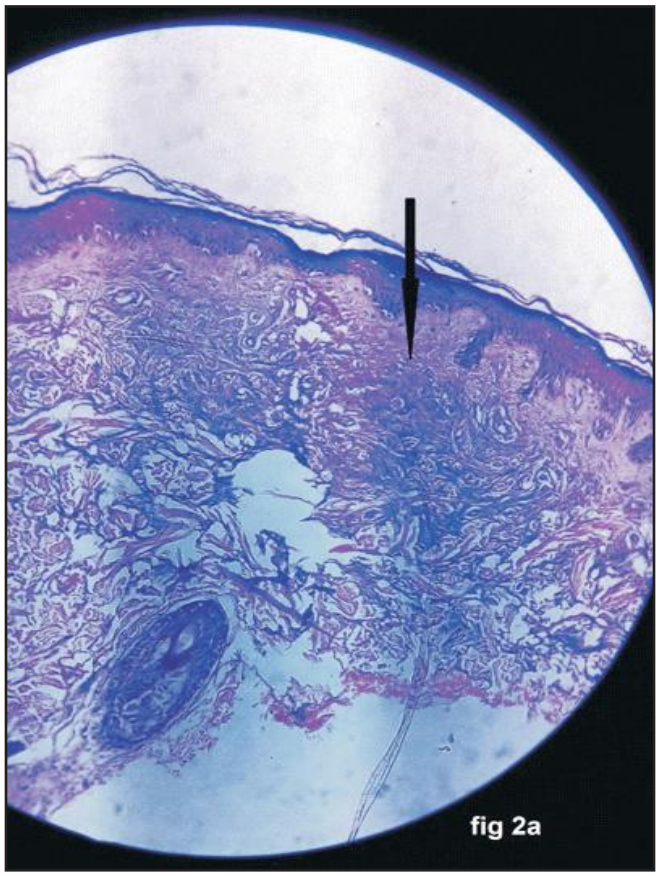

Figure 2a – Shows hyaline deposits in the papillary dermis, perivascular and peri- appendegeal location on H & E stain on scanners view

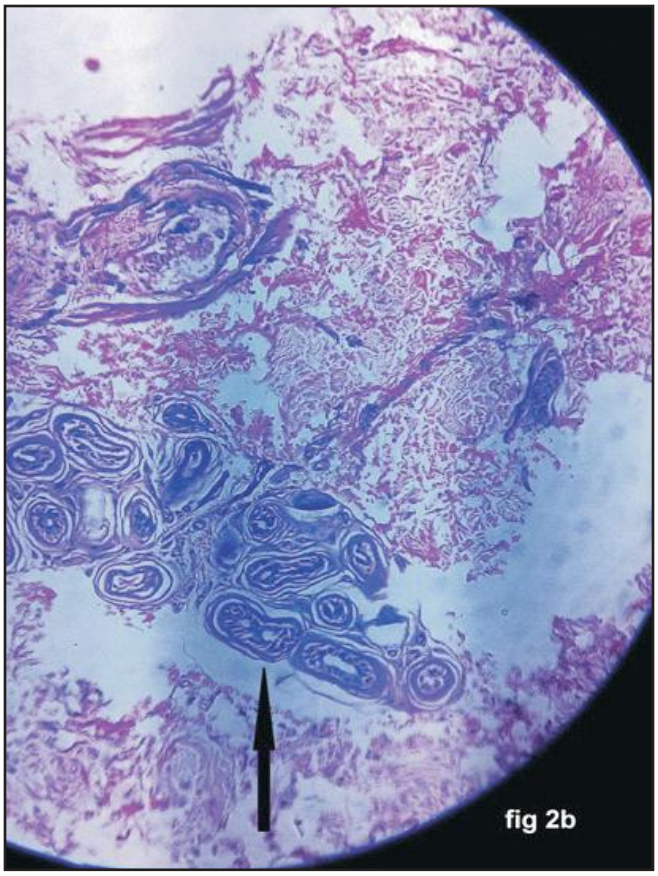

Figure 2b- showing peri-eccrine deposits of pink hyaline material on H & E stain at 10x magnification

Discussion

Lipoid proteinosis is a very rare, autosomal recessive disorder, characterized by infiltration of hyaline material into the skin, oral cavity, larynx and internal organs. The disorder is caused by mutation in the extracellular matrix protein 1 (ECM1) gene[3]. Mutation in EMC1 in lipoid proteinosis leads to loss of function of EMC1[2]. The presenting symptom may be hoarseness of voice during infancy as seen in our case. Skin lesions appear during childhood and consist of yellowish papules that may coalesce to form plaques on the face, forearms, neck, genitals and dorsum of the fingers and scalp. Similar lesions are also found on lips, under surface of tongue, uvula and larynx. Laryngeal involvement may lead to respiratory compromise necessitating a tracheostomy. Tongue is thickened and firm on palpation and cannot be protruded completely. Beaded papules along the margins of the eyelids (moniliform blepharosis) is the most characteristic clinical feature as observed in our

case[1,2]. Hypertrophied and hyperkeratotic nodules occur at friction sites such as elbows and knees. Associated anomalies may include epilepsy, recurrent parotitis, xerostomia, dental caries[2]. The diagnosis is essentially clinical. The combination of hoarseness from early childhood, thickening of the tongue and frenulum and cutaneous nodules suggest the diagnosis[1]. Various laboratory tests can be helpful in supporting the diagnosis. The skin tissue stains strongly with PAS as it contains hyaline[4]. Immunofluorescence labelling for type IV collagen confirm the basement membrane thickening. Staining for type I and III collagen is decreased in upper dermis; the deposites of hyaline material do not stain with anticollagen antibodies[1]. More than half of the patients have shown bilaterally symmetrical damage in the amygdaloid region on computed tomography scan studies. The disease is compatible with a normal life span. The disfiguring lesions and permanent hoarseness may seriously impair quality of life for that we had asked patient to follow up regularly in skin OPD to detect early onset of any untoward complication. We started the patient on 0.025% tretinoin gel for scar resolution. As such there is no definitive therapy at present, although dimethyl sulfoxide, oral retinoids, and dermabrasion have been shown to reduce skin lesions. Surgical management consists of microlaryngeal surgery of the vocal cords using CO2 laser to reduce their thickness and hence hoarseness[1,2].

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Acknowledgement

I am grateful to Dept of Skin & V.D., B.J.G.M.C. & S.G.H. Pune & Dept of Pathology, B.J.G.M.C. & S.G.H. Pune for their academic support.

CASE REPORT

Unilateral Lung Agenesis - A Rare Occurrence

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ABSTRACT

Agenesis of the lung is a very rare congenital anomaly. So far, it was thought to be difficult to diagnose radiologically. However, with the advent of cross sectional computerized tomography (CT) scan imaging, the exact diagnosis is being put forward with confidence. It represents the extreme end of the spectrum of lung agenesis-hypoplasia complex. The presentation can be varied ranging from asymptomatic to recurrent lung infections. It is usually diagnosed in childhood. We present a case of complete agenesis of the right lung in an adult along with discussion of it's pathophysiology, imaging appearances and further management.

Keywords : Pulmonary Agenesis, Computerized Tomography (CT) scan, Opaque Hemithorax

Introduction

Agenesis of lung results due to failure of development of primitive lung bud. It is an extremely rare condition with reported prevalence of 1 per million live births[1]. Most of the patients are asymptomatic and the anomaly is incidentally detected on routine chest radiograph. But it can also present as recurrent chest infections and the history of same can be elicited even in asymptomatic subjects. Bilateral pulmonary agenesis is incompatible with life, however patients with unilateral agenesis can lead a healthy life, the prognosis of which many a times depends on the associated congenital anomalies[2]. We present a rare case of unilateral pulmonary agenesis in an adult.

Case Presentation

A 31- year- old male patient, clerk by occupation, presented with mild fever and cough with expectoration of 15 days' duration. He had complaints of recurrent and protracted episodes of respiratory tract infection since childhood. There was no history of tuberculosis contact or blood tinged sputum. On examination, the patient demonstrated pallor and tachypnoea. The respiratory movement on right side was impaired with significantly reduced breath sounds. On percussion, there was dull note on the right especially the lateral regions. However, a hyperresonant note was elicited throughout the left side. Chest radiograph PA view (Fig 1) demonstrated radio- opaque right hemithorax with total volume loss of the right lung. There was tracheal shift to the right as well as compensatory hyperinflation of the left lung, which was also seen to cross the midline and herniate into the right hemithorax (Fig 2). The differential diagnoses considered were lung agenesis-hypoplasia complex, complete lung collapse and thickened pleura. The patient was evaluated further with CT thorax (plain + contrast) examination. CT scan revealed complete absence of the right mainstem bronchus (Fig 3) as well as right main pulmonary artery (Fig 4). Few patchy areas of consolidation were also noted in the overinflated left lung. The final diagnosis of complete agenesis of right lung was made.

After imaging the patient was advised oral antibiotics for lung infection and advised a follow up chest radiograph after a period of one month. On follow up imaging, the lung consolidation had resolved completely. The patient visited the OPD two months after initial imaging and was completely asymptomatic. Presently, he is not on any medication. The patient is counseled about his underlying lung pathology and is advised to seek medical opinion immediately for any respiratory infections in future, since aggressive medical management would avoid further complications.

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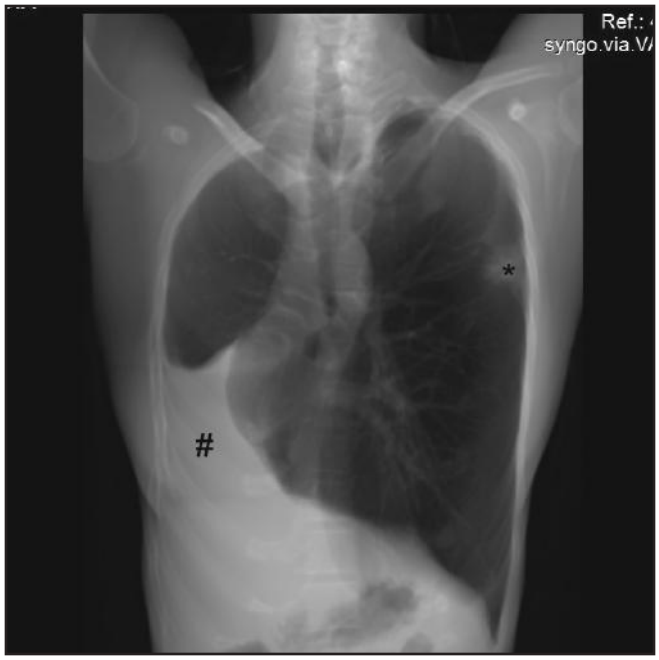

Figure 1: Chest radiograph showing radio opaque right hemithorax with herniation of left lung. Small consolidation is seen in left upper zone

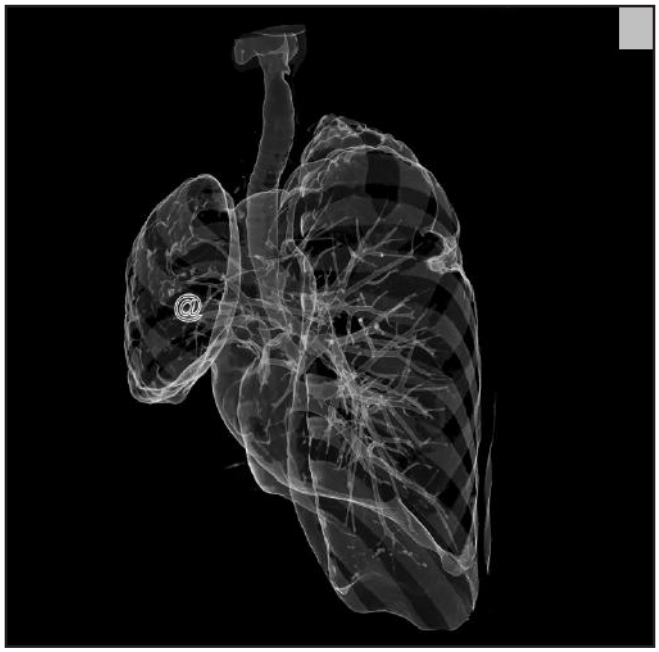

Figure 2: Three dimensional reformatted image of CT thorax demonstrating complete agenesis of right lung with herniation of left lung in right thorax

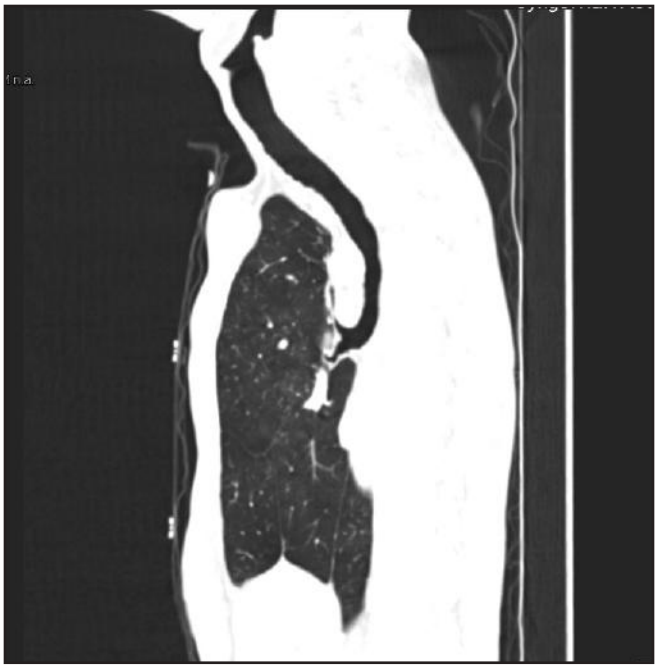

Figure 3: Sagittal reformatted CT thorax image viewed in lung window demonstrates the principle bronchus terminating into left mainstem bronchus with absence of right mainstem bronchus

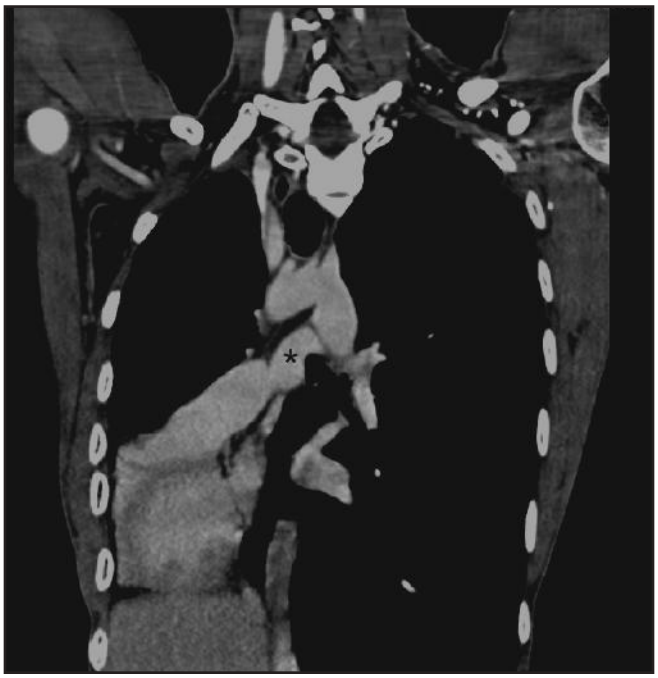

Figure 4: Coronal reformatted Post contrast CT thorax image viewed in mediastinal window demonstrates origin of only left pulmonary artery from main pulmonary artery with absence of right pulmonary artery

Discussion

The aplasia-hypoplasia developmental anomaly complex of lung is divided into three main types which was first described by Schneider and subsequently modified by Boyden.[3]

1. Type 1(Agenesis) – Complete absence of lung and bronchus and no vascular supply to the affected side
2. Type 2 (Aplasia) – Rudimentary bronchus with complete absence of pulmonary parenchyma
3. Type 3 (Hypoplasia) – Presence of variable amounts of bronchial tree, pulmonary parenchyma and supporting vasculature

Our patient was categorized as Type 1. The etiology of pulmonary underdevelopment is not known. However, it is thought to result from the negative effects that occur in the 4th week of fetal life. Causes like Vitamin A deficiency, Folic Acid deficiency or the use of Salicylates are postulated to be the causative agents[4].

Few cases of unilateral lung agenesis are diagnosed on chest radiography done for recurrent childhood respiratory infections. However, many cases are reported to be asymptomatic and reach adulthood without any complaint. There is no sex or side related predisposition. Nearly 50% of the cases of pulmonary agenesis have associated congenital defects, involving the cardiovascular (ventricular septal defect, atrial septal defect, tetralogy of Fallot), skeletal (hemivertebra, absent ribs), gastrointestinal (esophageal atresia, imperforate anus), genitourinary system (absent or polycystic kidneys) and others (hypoplastic trachea, ear deformities)[5]. CT scan imaging plays a pivotal role in diagnosis as it can depict the bronchial anatomy in detail as well as identify any adjacent associated anomalies. CT angiography when performed in same setting will demonstrate the absence of ipsilateral pulmonary artery as well as any other cardiovascular abnormalities. Asymptomatic cases hardly require any treatment. However, cases of recurrent respiratory infections should be treated aggressively. Antibiotics and postural drainage form the mainstay of treatment. However, patients with hypoplastic stump who fail to respond to medical methods will need surgery. Surgical correction is also indicated for associated congenital anomalies of other systems. The prognosis of any case of lung agenesis depends on the degree of malformations within the existing lung as well as the severity of the associated anomalies. In uncomplicated cases, the prognosis is excellent.[6] In these cases, role of imaging is to correctly label the degree of pulmonary maldevelopment, identify associated anomalies and to guide the physician in further management and follow-up.

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CASE REPORT

Severe rheumatic mitral stenosis in a patient with Patent Ductus Arteriosus with severe Pulmonary Hypertension with Bidirectional shunt

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ABSTRACT

Rheumatic Mitral stenosis in a patient with Patent ductus arteriosus is unusual. We are reporting a rare case of Rheumatic (acquired) valvular heart disease with severe Mitral stenosis with Patent Ductus Arteriosus (congenital) with severe pulmonary hypertension with bidirectional shunt. Such occurrence is unusual and has not been reported in past to the best of our knowledge.

Herein we describe a case of 15 yr old female who presented with history of progressive dyspnoea since last 2 years with past h/o rheumatic fever and recurrent respiratory infections in childhood. Evaluation of the patient revealed severe rheumatic mitral stenosis with Patent Ductus Arteriosus (PDA) with severe pulmonary hypertension with bidirectional shunt

Early diagnosis and treatment for Patent Ductus Arteriosus (PDA) and Rheumatic heart disease besides preventive measures(wherever feasible) along with cautious interpretation of mixed hemodynamics of such combined lesions is emphasized.

Keywords : Rheumatic Mitral Stenosis, Patent Ductus Arteriosus (PDA), Pulmonary Hypertension, Bidirectional Shunt

Introduction

Patent ductus arteriosus is the pathological persistence of normal fetal channel after birth that shunts blood from pulmonary artery to the aorta during fetal life[1]. Patent Ductus Arteriosus (PDA) is associated with conditions like prematurity, high altitude[2], infections like maternal rubella[3], other congenital heart disease(duct dependent lesions) or isolated anamoly in otherwise normal full term newborms. Patent Ductus Arteriosus (PDA) leads to left to right shunting of blood, increased pulmonary blood flow, changes in pulmonary vascular bed, increased pulmonary vascular resistance over time, ultimately leading to irreversible changes in pulmonary vasculature and Eisenmengerisation with shunt reversal[4].

Rheumatic heart disease is a sequalae to rheumatic fever which is a nonsuppurative immune mediated delayed complication of group a beta haemolytic streptococcal sore throat[5].Valves are affected most commonly, commonest being mitral valve. Commonest lesion in Rheumatic heart disease is mitral stenosis with/without mitral regurgitation[6]. Mitral stenosis leads to increased back pressure with pulmonary venous hypertension with secondary pulmonary arterial hypertension[7].

Case History

Present case report is a rare combination of Rheumatic severe mitral stenosis (Fig 1,2,3) with Patent ductus arteriosus with bidirectional shunt (Fig 4,) with severe pulmonary hypertension. Both conditions can lead to pulmonary hypertension and affect the hemodynamics of each other significantly. Such case has not been reported in the literature so far to the best of our knowledge.

15 year old female from lower socioeconomic status, resident of Pune district, full term home vaginal delivery with normal antenatal and perinatal events. Patient had history of recurrent lower respiratory tract infections in childhood treated by local doctors without evaluation for cause. History of multiple joint pains at the age of 8years, lasting for 1 month, treated by local doctors with symptomatic improvement. she took monthly injections for 6 months, then stopped. There was history of

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dyspnesa on exertion New York heart association (NYHA) CLASS II/IV since last 2 years, gradually progressed to NYHA III/IV since last 2 months for which patient referred to our hospital for further management.

On examination, she was thin built and poorly nourished apprehensive girl. Her Pulse rate 94/minuite regular, BP 96/70 mm Hg, respiratory rate 22/min, saturation 95% in upper limb and 92% lower limb (at rest). On auscultation loud first heart sound, loud palpable single second heart sound, opening snap was appreciated, grade II/VI Mid Diastolic Murmur heard at apex in left lateral position, grade III/VI pansystolic murmur heard in tricuspid area, apex located at 5th left Inter Costal Space in Mid Clavicular Line, bilateral basal crepts were present. Grade 1 clubbing both upper and lower limbs noted without cyanosis. Chest x ray revealed Cardio Thoracic ratio of 50% with pulmonary venous congestion and prominent main pulmonary artery. ECG suggestive of left atrial enlargement with right ventricular hypertrophy with right axis deviation. Echocardiography of patient suggested established thickened mitral leaflets, severe mitral stenosis with severe pulmonary hypertension (by TR jet method) with 7.5 mm non-restrictivePatent Ductus Arteriosus (PDA) with bidirectional shunt with severe tricuspid regurgitation and mild pericardial effusion. There was no stigma/evidence suggestive of congenital rubella in the patient.

Patient diagnosed as severe rheumatic mitral stenosis with Patent Ductus Arteriosus (PDA) with bidirectional shunt with severe pulmonary arterial hypertension.

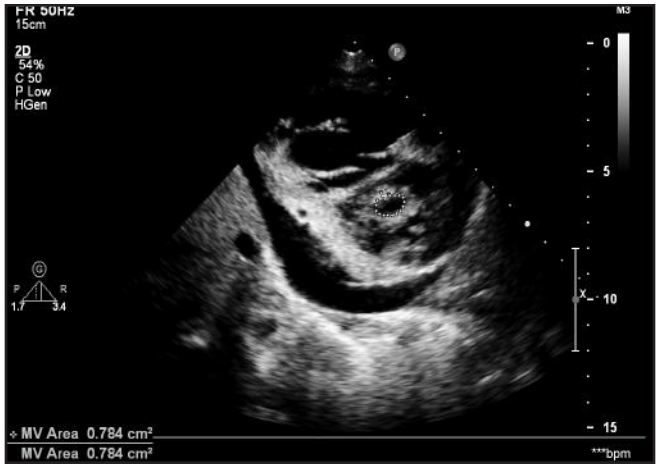

Figure 1: Mitral Valve area

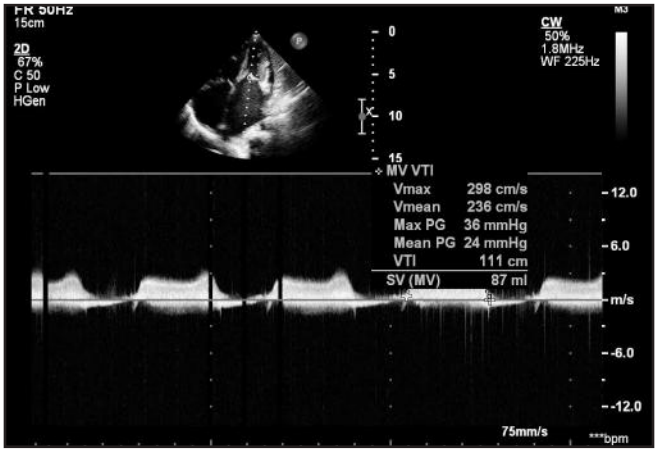

Figure 2: Mitral Valve Gradiant

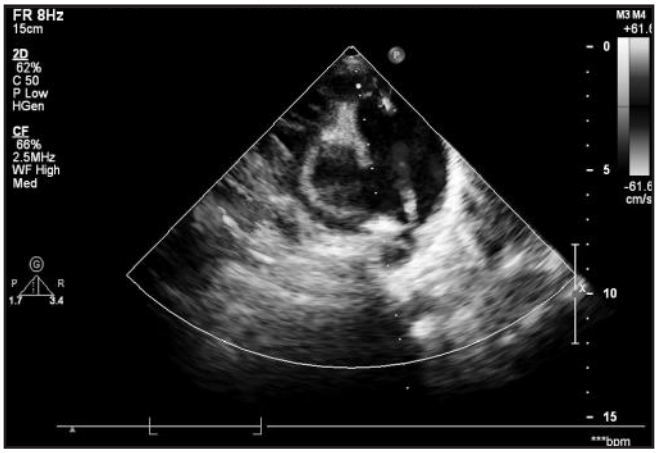

Figure 3: Patent Ductus Arteriosus

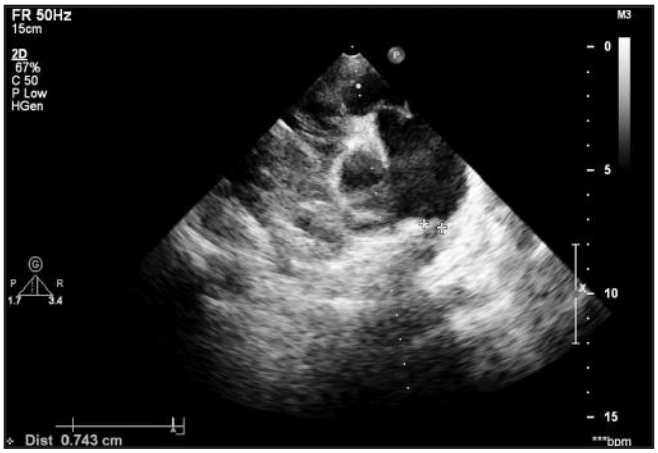

Figure 4: Patent Ductus Arteriosus with shunt

Patient was planned for diagnostic and therapeutic cardiac catheterization, including balloon mitral valvuloplasty, hemodynamic assessment and staged post BMV oximetry study. However attendants insisted for discharge as they were not willing for further

treatment except medicines despite all counselling and support. Patient went against medical advice. No follow up done so far.

Discussion

Patent ductus arteriosus as an isolated congenital anamoly in otherwise normal newborn is not uncommon. Early detection of duct is quite feasible in infancy and childhood during immunisation visits, evaluation of recurrent lower respiratory tract infection, school health check ups and so on. Both device closure and Patent Ductus Arteriosus (PDA) ligation are possible in patients, early closure can prevent development of significant changes in pulmonary vascular bed and can prevent Eisenmengerization.

Rheumatic heart disease is a sequalae to rheumatic fever which is a nonsuppurative immune mediated late complication of group a beta haemolytic streptococcal sore throat. Early detection of sore throat within 10 days of onset and initiation of appropriate antibiotic course can prevent Rheumatic fever. Penidura prophylaxis is quite effective in prevention of subsequent episodes of rheumatic fever and hence development of Rheumatic heart disease[8]. Even in patients developing RHD with valvular involvement like mitral stenosis are manageable with balloon mitral valvuloplasty, open mitral commissurotomy or prosthetic valve replacement, thus preventing pulmonary vascular changes and right ventricular dysfunction.

Shunt lesion can aggravate the symptoms of mitral stenosis by increasing pulmonary congestion while mitral stenosis can increase pulmonary arterial pressure secondary to pulmonary venous hypertension leading to early shunt reversal and apparent clinical evidence of Eisenmengerization.

Interestingly in this case, patient was having severe pulmonary arterial hypertension (TR jet method). It was important to assess the relative contribution of mitral stenosis (pulmonary venous hypertension) and of shunt lesion (increased pulmonary blood flow) towards pulmonary arterial hypertension. Patient was having bidirectional shunting as evident clinically and on echocardiography. In such cases prematurely labelling patiensts as Eisenmengerised shunt would be unwise. Cardiac catheterization is important (both diagnostic and therapeutic, preferably staged) to look for impact of mitral stenosis on pulmonary vascular bed and pulmonary arterial hypertension before and after balloon mitral valvuloplasty before deciding for operability of shunt lesion.

Summary

Although rare, combination of rheumatic mitral stenosis and congenital lesion like PDA is possible. Both lesions can affect the hemodynamics of each other significantly. It is possible to detect and treat both lesions at an early stage before significant consequences. It is possible to prevent PDA in some cases (rubella vaccination) and rheumatic heart disease by timely treatment of sore throat and penidura prophylaxis. It is important to understand the mixed hemodynamics of such combined lesions before reaching to conclusions and deciding plan of action.

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