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Technology and beyond..

Hi! Namaste,

This is Dr. Viral Parekh from Kolkata, India. It is a pleasant experience to bring out this fifth newsletter of Calcutta Academy Of Radiology.

Lot of things are happening in 2020 - most of them are negative. But, one positive thing has happened in the field of Radiology is that of FDA approval for one more company to allow use of 7 Tesla MRI for research as well as clinical applications. First clinical use of MRI was granted by FDA to one company in October 2017. So, in near future, we expect 7 Tesla MRI to be commercially available in India also.

We expected 3 Tesla MRI to be a game changer but it has not made a huge difference over 1.5 Tesla. Of course, in some areas it is much better than 1.5 Tesla and provides better resolution but at the same time most of us had to deal with increased artifacts also. One thing it surely did was to allow diagnostic centres and hospitals to participate in show of onepmanship and claim that we have a 3 Tesla MRI !

But, this 7 tesla MRI will be a game changer. Not only it will provide very high resolution images with finer details, it will be of great help in functional MRI studies. There will be much clearer visualization of anatomical structures like ligaments, vessels and cartilages. So let us wait for 7T MRI to be commercially available in India and see yet another revolution.

In spite of so many advances in the field of Radiology, there are certain challenges which we are yet to overcome. The first major challenge is the lack of an exact, noninvasive, image-based, tissue characterization, and the other is microresolution, which will enable detection of very small submillimeter lesions and hence an earlier diagnosis of micrometastases.

Besides the challenges, there are certain opportunities also which the field of radiology is providing. The biggest opportunity is interventional radiology because it provides minimal invasiveness and lesser costs than standard surgical procedures. So every Radiologist who wants to make an impact on healthcare will have to learn interventional radiology in a much more organised way. I think we should have a DM or fellowship in Interventional Radiology in educational institutions all over India.

The prevailing image is that of a radiologist working in a dark small cubicle, with minimal contact with the patients. Most of the times Radiologists have not seen the patient whose MRI, X-ray or CT scan they are reporting. In our country, Radiologist do the sonography themselves and that is the only interaction with patients. In western world, sonography is done by sonographer and the report is given by a radiologist in the same way as we report other modalities. But, interventional radiology changes the whole perception of a Radiologist as Radiologist here not only diagnoses the problem but provides the treatment for the same. Let all the young Radiologists take an active interest in interventional Radiology.

This newsletter would not have been possible without the academic contribution from Dr. Bhavin Jankharia, Dr. Sikandar Sk, Dr. Ankur Shah and Dr. Amar Udare. We sincerely thank all of them for their unconditional support in bringing out this newsletter.



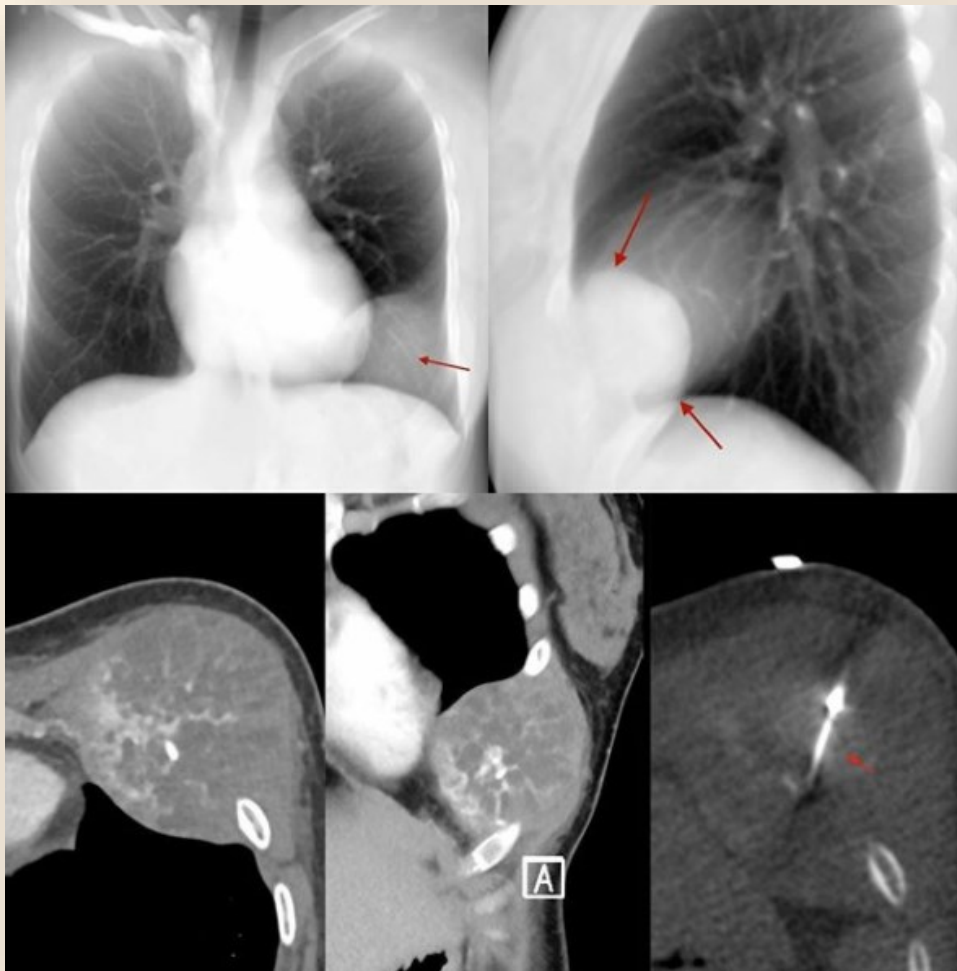
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Dr. Bhavin Jankharia needs no introduction to the Radiology fraternity. As you all know he is a renowned Radiologist and academician and has contributed immensely in propagating Radiology education. Presently, he is a Consultant Radiologist at Picture This by Jankharia. He is also a Trustee of Radiology Education Foundation. He has consented to share some of his work with us, which will help all the Residents as well as practicing Radiologists. Here is some information about him in brief.

- He has written 5 books, 35 chapters, 57 articles (PubMed listed)
- Presented 32 posters
- More than 1500 invited lectures over 27 years
- Editor-in-Chief, Indian Journal of Radiology & Imaging (2007-2012)
- Latest Book (2019): Computed Tomography of Interstitial Lung Diseases
- Hon. Visiting Consultant – Radiology – Tata Medical Centre, Kolkata

Case I

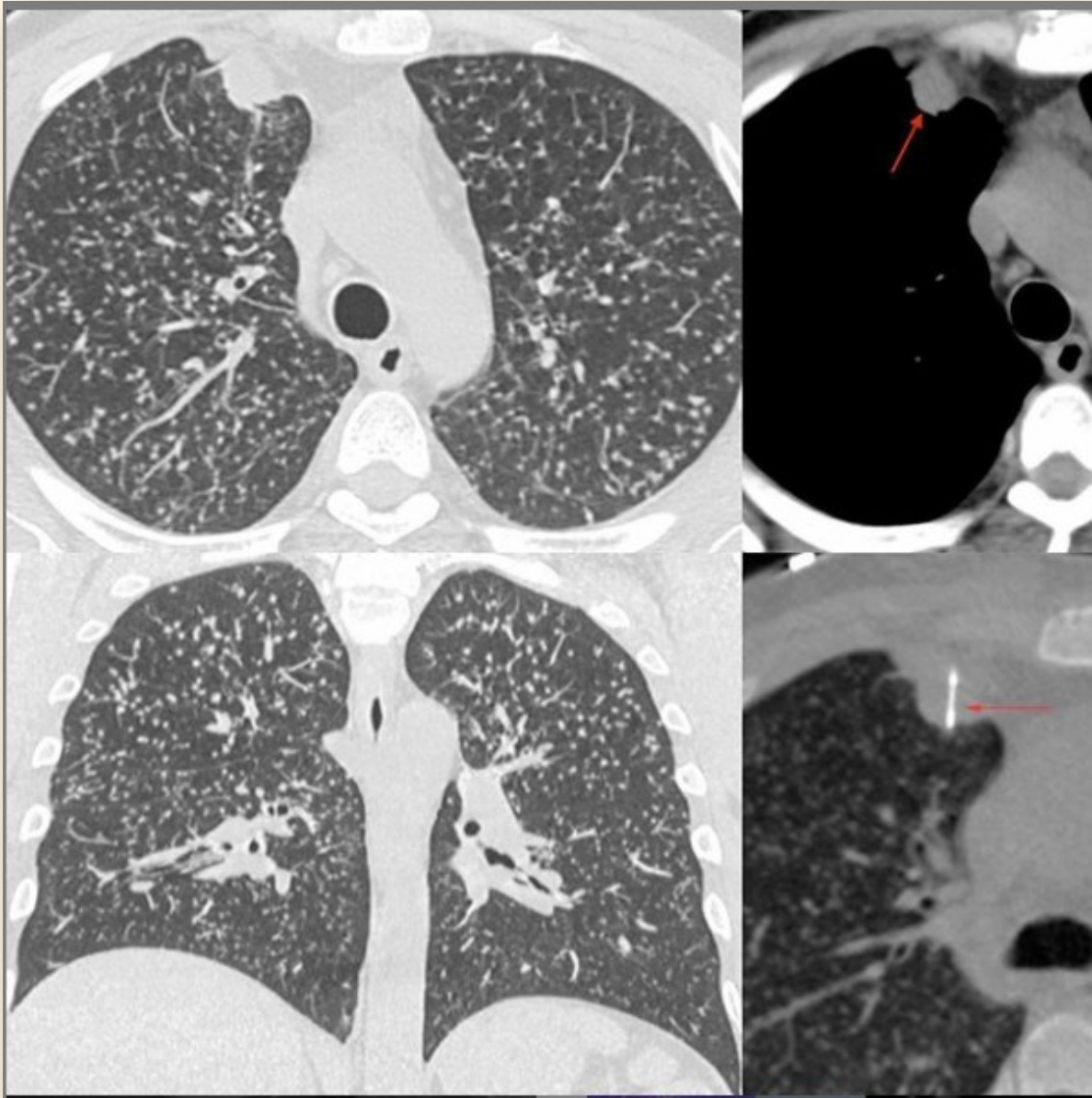


This 20-years old woman presented with a slowly growing mass over the left mid chest wall. The simulated radiographs (using the Mean function on the CT scan) show an extra pleural mass with involvement of the left 6th rib. The CT scan images in the axial and coronal planes show an enhancing mass with an osteoid matrix.

The biopsy was obviously simple performed along the plane of expected surgery.

It was a high grade osteosarcoma.

Case II

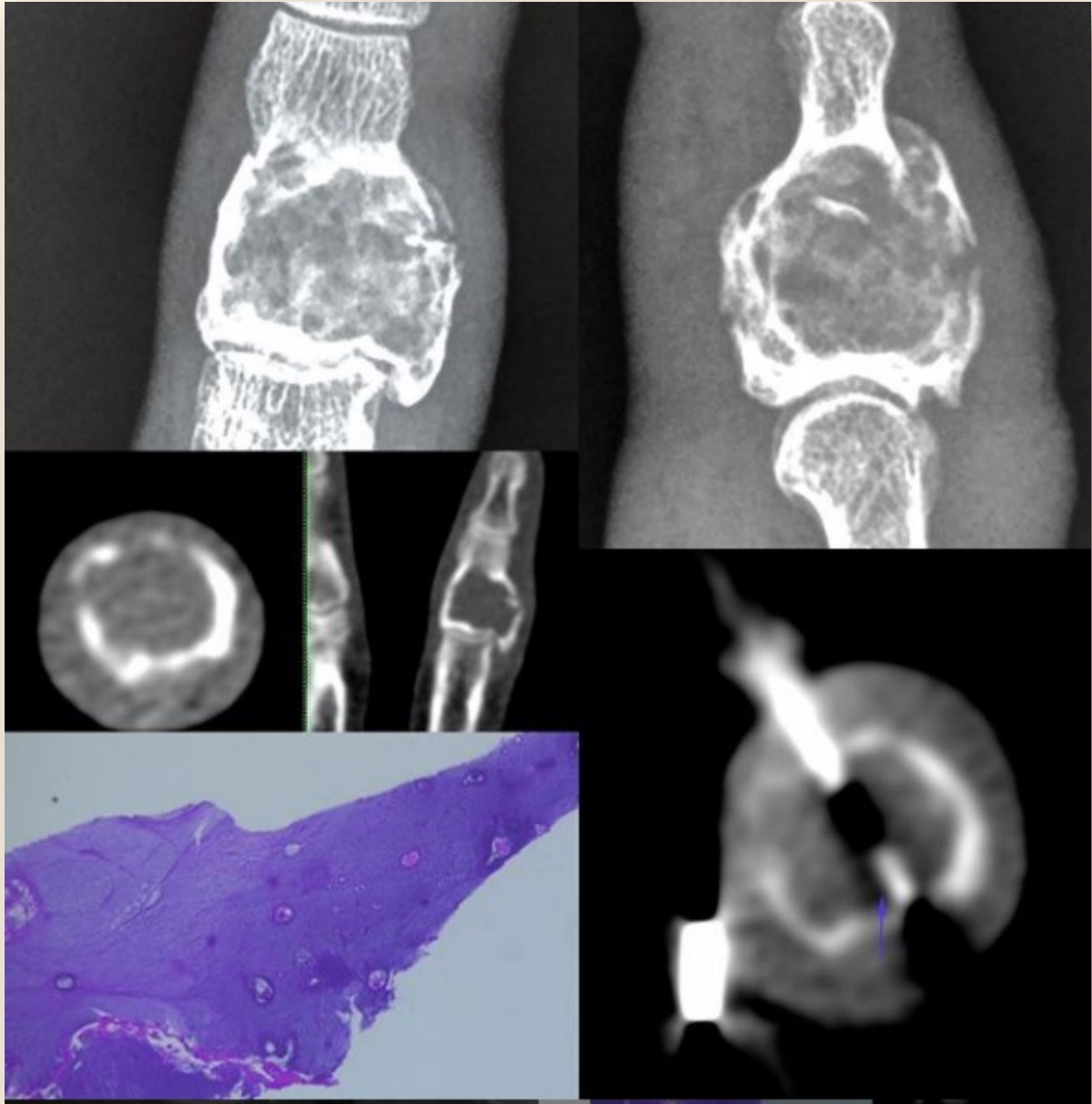


This 43-years old man came with fever and dyspnea. CT scan showed multiple nodules of the same size throughout the lung parenchyma, looking like miliary nodules with one larger lesion in the anterior segment of the right upper lobe. I don't remember, but sputum or bronchoscopy / lavage was likely negative.

The question was - is this miliary tuberculosis or is this carcinoma with miliary metastases. The nodules are not all of the same size, though they are evenly distributed. The one large focal lesion in the RUL really complicates the matter.

I biopsied the lung nodule with a 20G coaxial biopsy gun. It turned out to be rifampicin resistant tuberculosis.

Case III



This is a 65-years old lady who had a swelling over the middle phalanx of her finger for many years. It started paining a month prior following an injury. The radiographs and CT scan show a clear fracture through a lesion that is characteristic of an enchondroma, even though a chondroid matrix is not seen on the CT scan. The patient and surgeon insisted on a biopsy to prove that this is a benign chondroid lesion.

Like the renal tumor earlier, sometimes, it is best not to argue, so we went ahead and did the biopsy using an 18G coaxial biopsy gun and proved that it indeed was a benign enchondroma. And everyone was happy and relieved.



Dr. Amar Udare

MD, DNB

Fellow in Cross-Sectional
Imaging,

McMaster University,

Hamilton, Canada.

Dr. Amar Udare is a young and dynamic Radiologist. He is now doing his fellowship in Cross sectional imaging at Hamilton, Canada, He has developed a website - radiogyan.com - A free radiology website for radiology residents and professionals. He runs a Telegram group also, where thousands of Radiologists and Residents are members. Thanks a lot for helping the fraternity and spreading the knowledge. We are proud of you. Here is one of his cases.

Atypical Femoral Fracture



What is an atypical femoral fracture ?

- Also known as Bisphosphonate-related proximal femoral fractures.
- Type of insufficiency fracture.
- Usually in patients on long term bisphosphonates (>3-5 years).
- Can be bilateral in up to 60% of cases, always screen the opposite femur.
- Changes first occur on the lateral femoral cortex.
- Subtrochanteric , transverse orientation, lack of comminution cortical beak; occur with low velocity trauma.
- Associated with poor healing.

What are the diagnostic criteria for an atypical femoral fracture (AFF)?

According to the American Society for Bone and Mineral Research Taskforce, 4 of the 5 major criteria are necessary for the diagnosis of AFF.

Major and Minor criteria for Atypical Femoral Fractures (AFF)

Major Criteria (4 out of 5 necessary)	Minor Criteria (not necessary for diagnosis)
Minimal trauma	Increased cortical thickness of the femoral diaphysis
Fracture originating at the lateral cortex and being substantially transverse	Bilaterality
Complete fractures extending through both cortices	Delayed fracture healing.
Localized periosteal or endosteal cortical thickening	A prodrome of thigh or groin pain.
Minimal comminution at most	

What is the management for atypical femoral fractures?**Conservative management:**

It is reasonable to discontinue bisphosphonates, adequate calcium and vitamin D intake should be ensured, and teriparatide should be considered for those who appear not to heal with conservative therapy [1]. Results are poor and patient may eventually need surgical management.

Surgical management:

Femoral subtrochanteric and shaft fractures are usually treated with intramedullary (IM) nailing or plating

From the pages of history



Dr. WERNER FORSSMANN – father of angiocardiology and the typical man before his time

It was very painful. I felt that I had planted an apple orchard and other men who had gathered the harvest stood at the wall, laughing at me.” Dr. Werner Forssmann said these words toward the end of his life on his unexpected scientific exile after having laid the foundations of modern cardiology.

The most dramatic early angiocardigram was by Werner Forssmann who in 1929 inserted a well-oiled ureteral catheter into his antecubital vein of his own arm and maneuvered it into the right atrium.

For his first attempt he took help of a colleague.

However, “..... after a week ,I undertook another experimentI administered local anaesthesia and since venepuncture with a thick needle in one’s own body is difficult ,I performed a venesection on my left elbow vein and passed a catheter without resistance its entire length of 65 cm..... . I examined the position of the catheter by means of a mirror which was held by a nurse in front of a fluoroscopic screen”

Forssmann catheterised his own heart nine times until he had no more available patent superficial veins.

He closed his first article with “ Finally I would like to point out that the method which I have employed opens numerous perspectives on new possibilities on the study of metabolism and of cardiac activity, which I am now pursuing.”

He also introduced contrast material through his ‘heart-probe’ for visualisation of cardiac chambers. After obtaining satisfactory cardiogram in dogs he again experimented on his favourite subject –himself.

He injected 20 ml Of 25% sodium iodide in his own right atrium and later wrote.

“... shortly after injection there was slight sensation of dizziness which disappeared quickly again. Only after one and one-half days when the iodine salt was excreted was there slight stuffiness of nose and unpleasant sensation of taste. Under any circumstances the experiment gave proof that this was a safe diagnostic method”

He asked Prof Ferdinand Sauerbruch of Berlin , who was the world’s leading thoracic Surgeon , to see whether any use could be made of this new technique of cardiac catheterisation, either therapeutic or diagnostic purposes .Prof Sauerbruch’s reaction was that “ he ran a clinic for patients, not a circus”.

Forssmann was barred from any further important hospital appointments and had difficulty in obtaining suitable work.

Twenty years later he was discovered working as a general practitioner in a small town in the Rhine valley. Fortunately, his originality and personal heroism achieved international recognition when he was awarded with the Nobel prize in Medicine in 1956 (with Andre Courmand and Dickinson Richards) for their pioneering work in introducing diagnostic cardiac catheterisation.

From 1950 onwards he practised as urologist and since 1958 he has been chief of the surgical division of the Evangelical Hospital at Dusseldorf. In 1954 he was awarded the Leibniz medal of German Academy of sciences, in the same year he was guest of honour at the national institute of Cordoba, Argentina.

He died in Schopfheim, Germany of heart failure on 1 June 1979.

**Dr. Sikandar****DMRD,DNB,MNAMS,EDiR,FICR****Consultant PET-CT & Radiology****Asst. Prof. Dept Of Radiology.****Shadan Medical College, Hyderabad.****Asst. Adjunct Prof. Dept of BME, IIT, Hyderabad.**

Case Presentation

30 years old female came with history of repeated headaches since last seven months. The headache gradually increasing since last four months. For this CT PNS was done and diagnosed as Bilateral ethmoid sinusitis and involving the bilateral nasal cavities. For this surgery was done and patient was not completely relieved.

Gradually similar complaints were there. In addition, patient started developing bilateral nasal obstruction with bloody discharge on and off since last one months. There was history of Anosmia on right side gradually involving the left side also.

INTRODUCTION

Esthesioneuroblastoma is also known as olfactory neuroblastoma and this is a very rare malignant neoplasm of the Sino nasal tract originating from the olfactory neuroepithelium with characteristic neuroblastic differentiation. The commonest location is Superior nasal cavity. It was first described in 1924 by Berger and Luc. Esthesioneuroblastoma is a locally aggressive neoplasm and can metastasize by both hematogenous and lymphatic routes.

The exact aetiology of Esthesioneuroblastoma is still unknown.

Esthesioneuroblastoma comprises of 2% to 6% of nasal cavity and paranasal sinus cancers and 0.3% of upper aerodigestive tract malignancies. The incidence of Esthesioneuroblastoma is increasing significantly due to various causes. Esthesioneuroblastoma can occur at any age, but more prevalent in young adults. The average mean age at presentation is 40 to 70 years. Men and women are affected equally.

Esthesioneuroblastoma arises from sensory neuroepithelial olfactory cells. These cells are usually present in the upper part of the nasal cavity, including the upper part of the septum, superior nasal concha, the roof of the nose, and the cribriform plate of the ethmoid sinus.

Genetic profile:

Esthesioneuroblastoma demonstrates various numerous chromosomal aberrations and deletions with no consistent pattern. This is commonly unilateral, polypoidal in shape, soft, reddish grey with intact mucosa. The macroscopic surface appears greyish-tan to pinkish-red and hypervascularized. The size of this tumour is ranging from 1 cm to large masses with local extension into nasal cavity and intracranial region. Usual presentation by imaging is expansion of the paranasal sinuses, orbit, and cranial vault and infiltration into adjacent structures.

Histopathology

Low-grade Esthesioneuroblastoma showing submucosal, sharply demarcated nests, lobules, or sheets of cells which are separated by richly vascular or hyalinized fibrous stroma. Pseudo rosettes (Homer-Wright rosettes) are the hallmark with neoplastic cells with delicate fibrillar neural matrix. Higher-grade tumours show tumor necrosis, pleomorphism, increased mitoses, decreased to absent neuropil, and a less overt lobular growth pattern. The tumor cells can be arranged in gland-like rings or tight annular formations with a true lumen (Flexner-Winter Steiner rosettes). The Homer Wright rosettes are nearly pathognomonic in the nasal cavity when containing true neuropil.

Immunohistochemical study:

The common immunohistochemical profile of this tumour showing staining of enolase, synaptophysin, chromogranin A, CD56 (NCAM) and beta-tubulin, as well as variable S100 protein reactivity.

Clinical Presentation

Esthesioneuroblastoma commonly mimics benign inflammatory or infectious disease in early stages. Nasal obstruction and epistaxis are early symptoms and depend on the location and extent of the tumor. Anosmia is important clinical finding. Other symptoms are due to involvement of the paranasal sinuses (facial swelling, medial canthus mass), the orbit (orbital pain, proptosis, epiphora, visual field defects), or anterior cranial fossa (headache), and manifestations of inappropriate antidiuretic hormone secretion. Physical examination, flexible fiberoptic endoscopic findings and contrast-enhanced CT scan and MR imaging are important for evaluation.

Clinical examination:

Any patient with suspicion for a Sino nasal tumor requires a complete neurologic, ophthalmologic, and head and neck examination.

Computed tomography (CT) scan:

Contrast CT of Esthesioneuroblastoma will show the extent of the sinus disease and bony erosions.

Magnetic resonance imaging:

Esthesioneuroblastoma is typically hypointense on T1-weighted MRI and will enhance with gadolinium. T2-weighted images show an isointense or hyperintense mass. MRI provides will differentiate between tumor and secretions for the orbital, intracranial or brain parenchymal involvement.

Nuclear medicine scan:

Majority of this are MIBG-avid, which can be used to differentiate them from anterior cranial fossa meningiomas.

Histopathology:

The biopsy is preferred after imaging studies based on the vascularity of the mass. Intraoperative biopsy can also be taken in doubtful cases.

Management:

The management of Esthesioneuroblastoma is surgery, radiation, and chemotherapy based on the status of the presentation, extent, and local involvement, or it can be combination of these modalities. Small tumours with no metastasis, surgical resection is preferred option. In advanced cases open or endoscopic-assisted craniofacial resection with postoperative radiation therapy. Chemoradiation is for unresectable locally advanced Esthesioneuroblastoma.

Differential Diagnosis

Malignant neoplasms:

Extramedullary plasmacytoma

Extrasosseous Ewing sarcoma/Primitive neuroectodermal tumor (PNET)

Mesenchymal chondrosarcoma

Natural killer/T-cell lymphoma

Rhabdomyosarcoma

Sino nasal malignant melanoma

Sino nasal neuroendocrine carcinoma

Sino nasal undifferentiated carcinoma

Small cell osteosarcoma

Small cell undifferentiated (neuroendocrine) carcinoma

Synovial sarcoma

Undifferentiated (lymphoepithelioma like) carcinoma

Staging

Hyams et al. developed grading system for Esthesioneuroblastoma. This system comprises of four grades, Most differentiated (grade I) to least differentiated (grade IV), based on tumor architecture, mitotic activity, nuclear pleomorphism, fibrillary matrix and rosettes, necrosis, gland proliferation, and calcifications. The Kadish staging system is widely accepted. It includes the following groups:

Group A tumours: are limited to the nasal cavity

Group B tumours: extend only to the paranasal sinus

Group C tumours: extend beyond the nasal cavity and sinuses

A modified Kadish system includes group D tumours, which have distant metastasis or cervical lymphadenopathy. Dulgierov also proposed a TNM (tumor/nodes/metastasis) staging system with nodal status.

This system is related with survival and recurrence.

Prognosis

The prognosis of Esthesioneuroblastoma is based of the stage and grade-dependent. The 5-year survival of stage A tumours is 75% to 90% whereas stage C has a 45% survival. High-grade tumours have a 25% 5-year survival whereas low-grade tumours have an 80% survival.

Poor prognosis of Esthesioneuroblastoma are

Metastases

High stage

High-grade tumor

Above 50 or below 20 or years of age at presentation

Intracranial spread

High proliferation

Females

Polyploidy/aneuploidy

Complications

Recurrence of Esthesioneuroblastoma is common and appears within 2 years of the initial presentation (about 30%). Metastasis develops in 35% of cases. The cervical lymph nodes are the most common site of spread. Distant metastasis occurs in approximately 10% of cases. Early diagnosis of Esthesioneuroblastoma is important due to aggressive nature. Management of Esthesioneuroblastoma is team work consists of an otolaryngologist, a neurosurgeon, a radiation oncologist, a pathologist, a radiologist, and an oncologist.

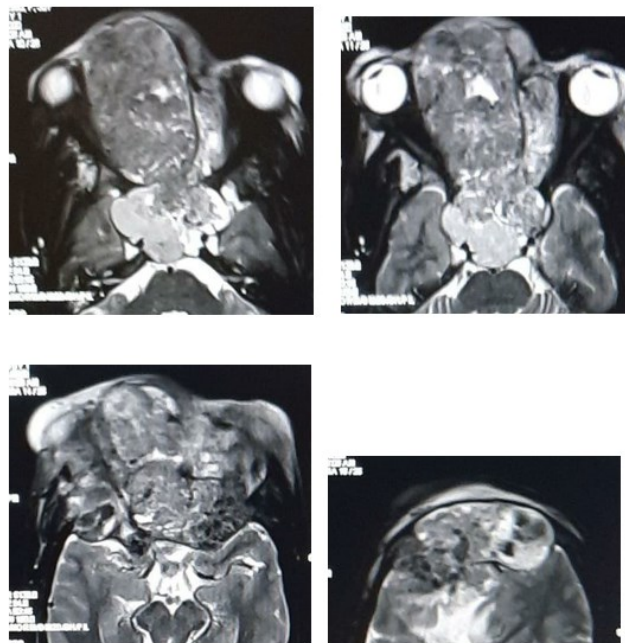
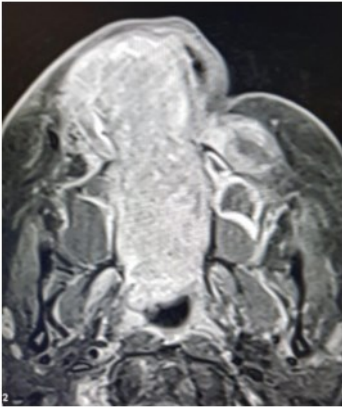
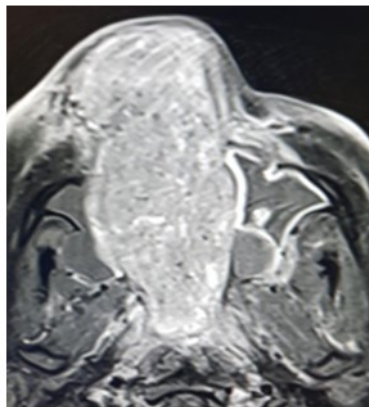


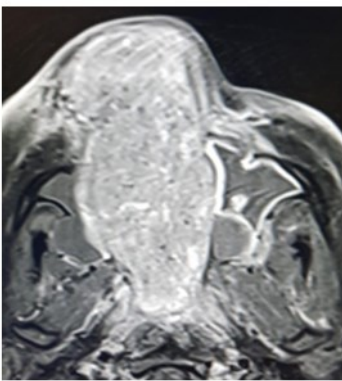
Figure A,B,C and D: MR Axial sections T2 W sequence showing large infiltrative hyperintense lesion involving the bilateral ethmoid sinuses, bilateral nasal cavities and infiltrating the sphenoid sinus and bilateral orbits and bilateral internal carotid artery and cavernous sinuses



A



B



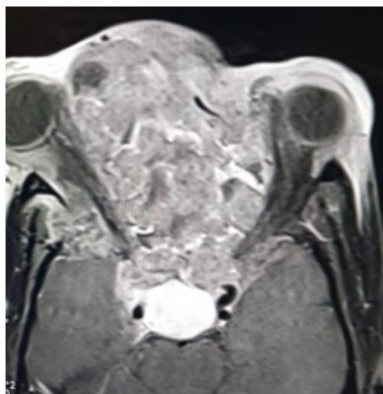
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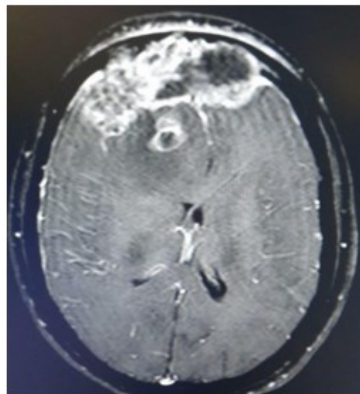
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Figure A, B, C and D:

MR Axial sections post contrast images showing large infiltrative enhancing lesion involving the bilateral ethmoid sinuses, bilateral nasal cavities, sphenoid sinus and bilateral orbits and bilateral internal carotid artery and cavernous sinuses



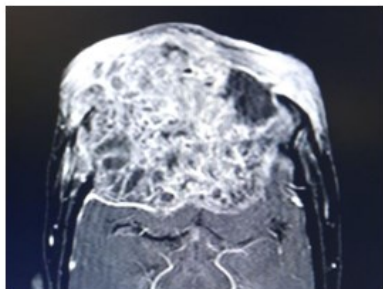
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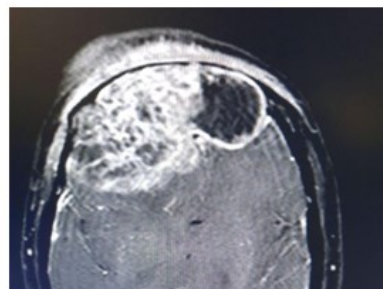
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Figures E, F, G and H:

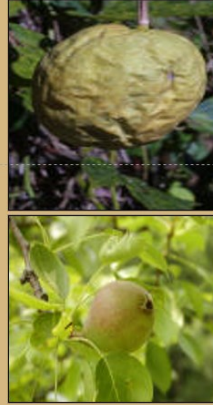
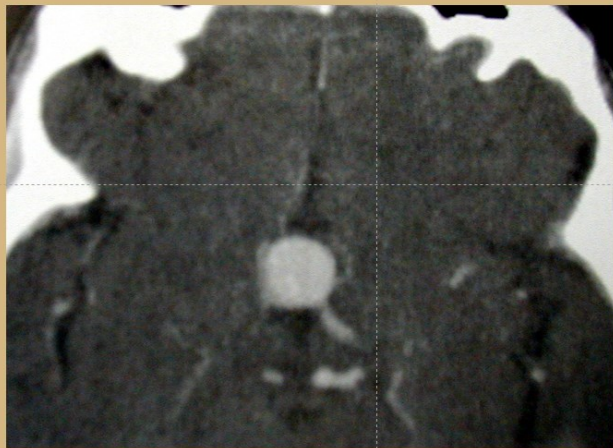
MRI post contrast images showing large infiltrative heterogeneously enhancing lesion with intracranial bilateral frontal lobe infiltration, scalp infiltration, dura and bilateral frontal sinuses.



G



H

FOOD SIGNS IN RADIOLOGY - Dr. Viral Parekh, DMRD, DNB.**BERRY ANEURYSM****BERRY ANEURYSM****BERRY ANEURYSM****BERRY ANEURYSM**

- Saccular intracranial aneurysm that resemble a berry.
- Congenital and occur where arteries bifurcate.
- Associated with AD polycystic renal disease and Coarctation of aorta.
- 80% arise in Circle of Willis and 20% in posterior fossa.



We are thankful to all the contributors for sharing their experiences and literature with us and in the process helping the Radiological fraternity.

**We are on
YouTube and
Facebook**

MRI of Shoulder - Labral Tear—Bankart Lesions



Dr. Ankur J. Shah
Consultant Radiologist
Sadbhav Imaging Centre,
Ahmedabad, Gujarat

Joint Editor – IJRI
Secretary, Musculoskeletal Society of India.

MRI of Shoulder joint

Labral tear - Bankart lesions

The shoulder joint is a very mobile and unstable joint. It is the most frequently dislocated joint in the body. 95% of shoulder dislocations are anterior where humeral head is dislocated anteriorly and medially below the coracoid process.

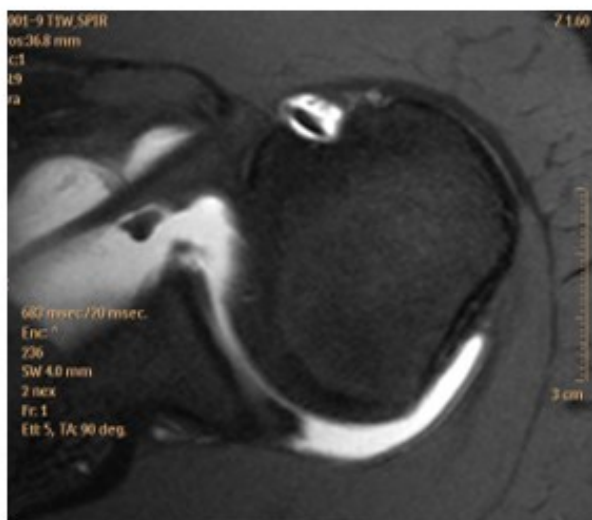
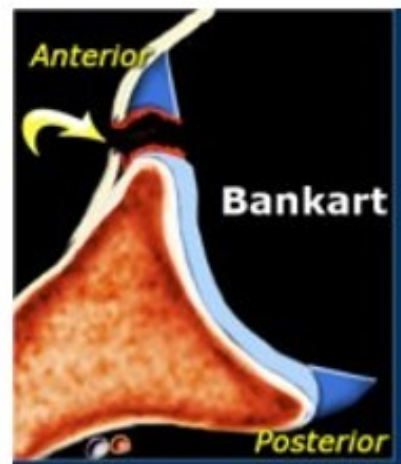
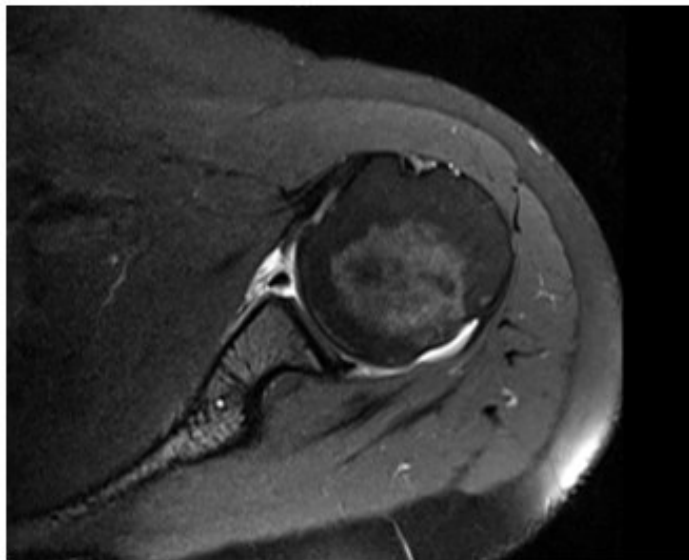
This dislocation patterns result in injury to the antero-inferior rim of glenoid from 3 to 6 o'clock position. Such injury to the glenoid-labral complex is termed as Bankart lesions. They represent most common complication of anterior shoulder dislocation.

Posterior shoulder dislocations are uncommon and usually occur after electric shock or seizures.

Many patients with Bankart lesions have chronic recurrent shoulder dislocation and there may not be sufficient joint fluid to delineate the exact extent of the labral tear. MR arthrography can be helpful in such cases when the diagnosis is not certain on routine MRI study, particularly when there is high clinical suspicion with negative MRI.

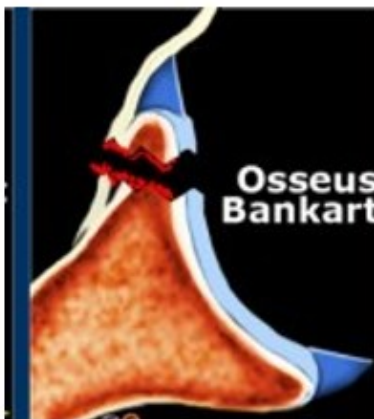
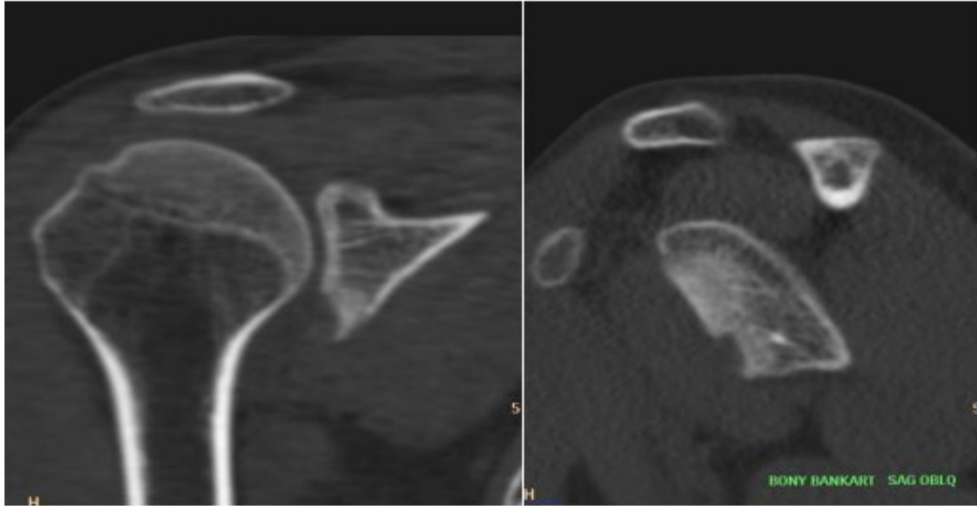
MRI of Shoulder - Labral Tear—Bankart Lesions

The injuries of antero-inferior glenoid labrum can be divided as Bankart lesions and its different variants such as

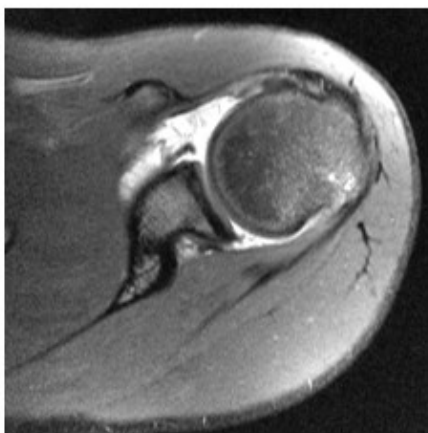


Classical Bankart lesion –
Detachment of antero-inferior glenoid labrum (from 3 to 6 o'clock position) with complete tear of anterior scapular periosteum.

MRI of Shoulder - Labral Tear—Bankart Lesions

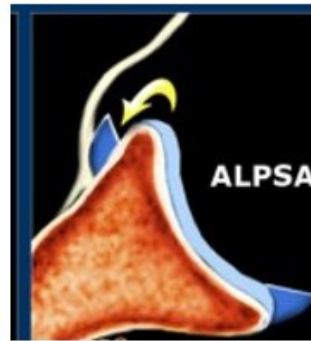


Bony Bankart lesion - When the Bankart lesion is associated with fracture of bony glenoid at its antero-inferior aspect, it is termed as Bony Bankart lesion.

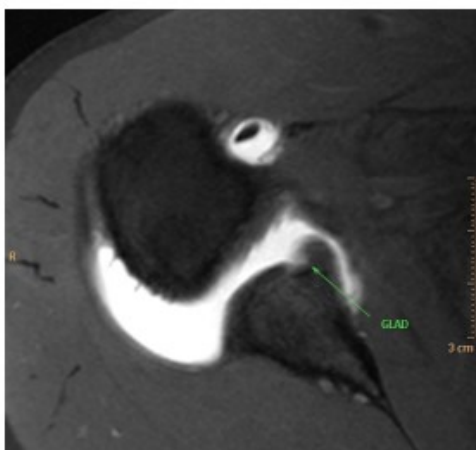
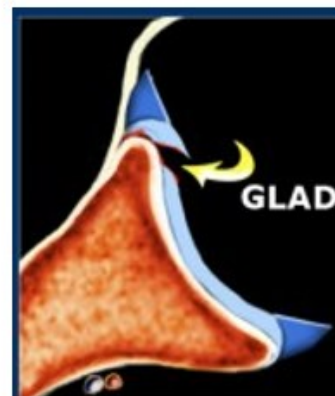
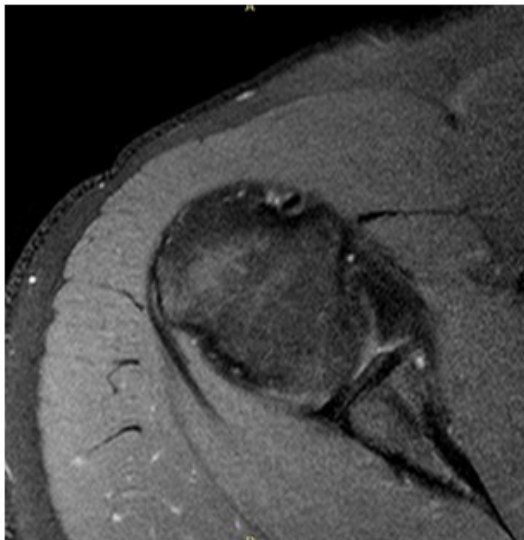


Perthes lesion – There is detachment of antero-inferior glenoid labrum with intact periosteum, which might be medially striped but not torn.

MRI of Shoulder - Labral Tear—Bankart Lesions

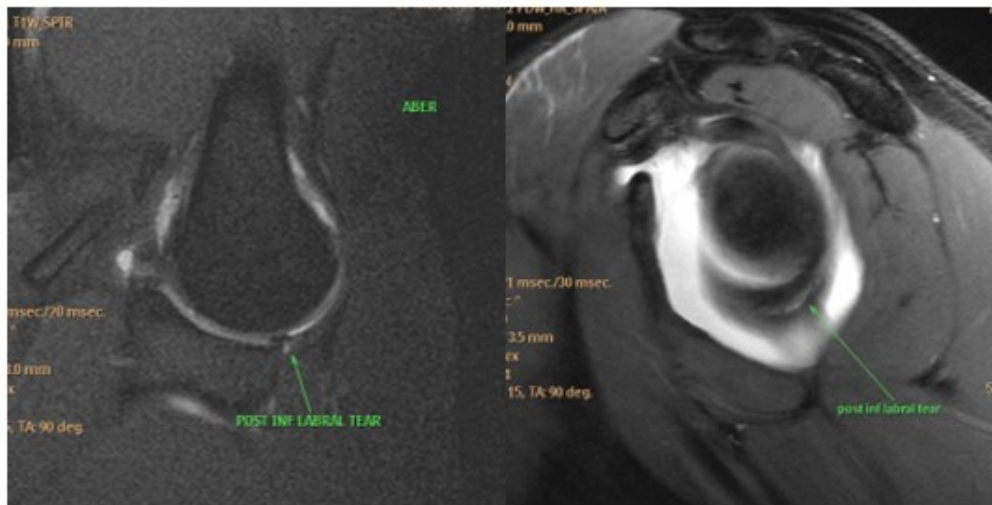


ALPSA (Anterior Labroligamentous Periosteal Sleeve Avulsion) lesion – The torn antero-inferior glenoid labrum is displaced medially with absence of labrum at glenoid rim. The scapular periosteum is intact.

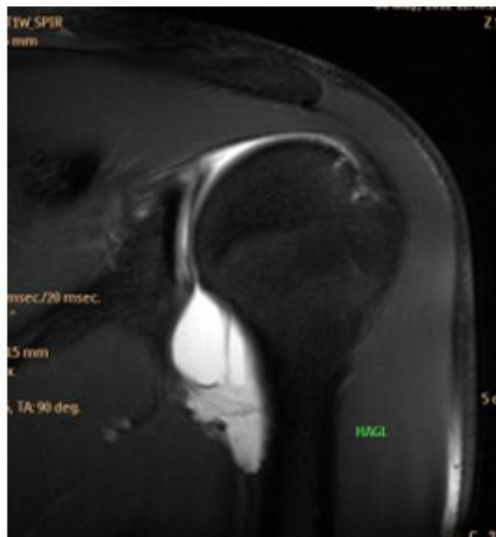


GLAD (Glenolabral Articular Disruption) – There is partial tear of antero-inferior glenoid labrum with a focal injury / defect in adjacent articular cartilage.

MRI of Shoulder - Labral Tear—Bankart Lesions

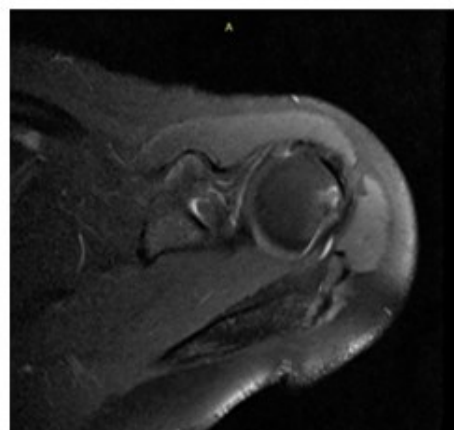


Reverse Bankart lesion – Detachment of postero-inferior labrum (from 6 to 9 o'clock position) with tear of posterior scapular periosteum. Seen in patients having history of posterior shoulder dislocation.



HAGL (Humeral Avulsion of inferior Glenohumeral Ligament) lesion – There is discontinuity of attachment of inferior Glenohumeral ligament on humerus with leakage of contrast on MR arthrography.

Hill-Sachs fracture - The Bankart labral tears are commonly associated with a cortical wedge



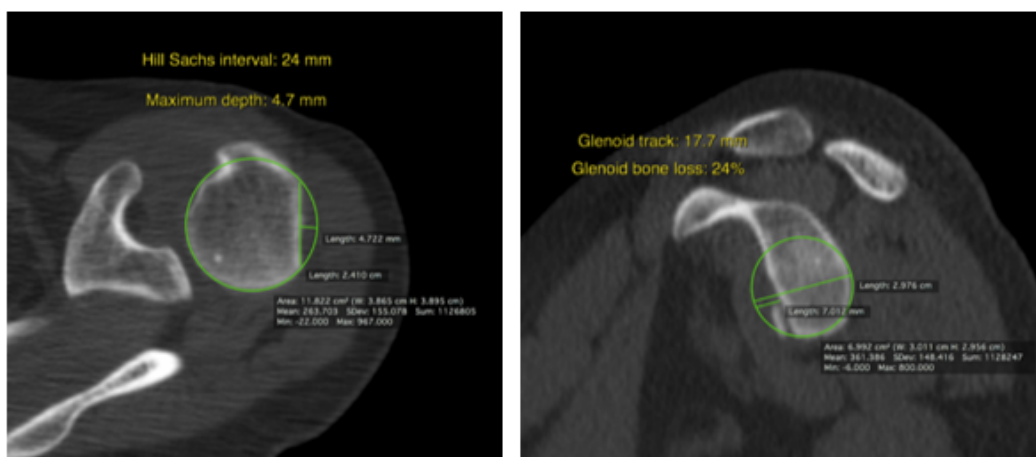
MRI of Shoulder - Labral Tear—Bankart Lesions

shaped bony defect or flattening at the postero-lateral aspect of superior part of head of humerus at the level of coracoid process known as Hill – Sachs fracture

For management of the Bankart lesion, the importance lies in detection of whether it is Bankart lesion or Bony Bankart lesion – as the treatment may differ. Differentiation of classical Bankart or Bankart variant is of very less surgical importance.

Another important information for management of patients with shoulder instability is calculation of glenoid bone loss and whether the lesion is 'On track' or Non-engaging or 'Off track' or engaging.

3D CT scan of shoulder joint can help in differentiating the two by calculation of Hill Sachs interval, Glenoid track and Glenoid bone loss.



The Hill Sachs interval is more than Glenoid track suggesting Off-track or engaging lesion



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**A Platform For Radiology
Education & Interaction**

Calcutta Academy of Radiology was formed on international day of Radiology in 2019, that is on 8th. November, 2019 to promote Radiology education, keeping in mind Residents as well practicing Radiologists.

Since then we are on WhatsApp and Telegram, where thousands of cases have been discussed by members from all over the world and in the process we are sharing our experiences and helping each other. These social media platforms have turned out to be great learning tools.

We had organized a half day CME also on GI Radiology in February, 2020. We have plans to organize more such CME programmes in future when world recovers from this ongoing pandemic.

We are on YouTube also where we regularly post teaching videos and in the process try to propagate Radiology as much as possible.



Next issue will be published in February 2021

We will be bringing out such Newsletters with a frequency of one issue every two months. So, next issue will be published in February, 2021.

We are hereby inviting good interesting cases and original work from our fellow Radiologists, which will be published on merit basis.

So, I request all of you to contribute to this Newsletter. Please send your material in Word format with good quality images. Please send your photograph and details of your place of work with email address also.

Your material should reach us by 15th. Of January, 2021. You can send the word file to our abovementioned email address or you can WhatsApp it to above-mentioned three phone numbers.

On our YouTube channel, we are presenting a new case every week and there is good response to such teaching videos. I hereby request all Radiologists to share their teaching videos with us and if they contain good teaching material, we will surely publish it on our channel. So friends, during this trying time, stay away from depression by engaging yourself in academic activities.

Our Telegram group is lagging behind in academic activities as compared to two WhatsApp groups, so I request all of you to join our Telegram group. Since, WhatsApp restricts the number of members to 256 only, whatever activity going on there is not helping the whole Radiology community.

Telegram can add up to whopping 200,000 members. So, if we post our study material there; it will reach to and benefit huge number of members.

So friends, take care and be safe.

So, see you all in next issue of CAR newsletter.

So long,

Anup Sadhu, Bijon Kundu and Viral Parekh.