# CALCUTTA ACADEMY OF RADIOLOGY

CALCUTTA ACADEMY OF RADIOLOGY NEWSLETTER, VOLUME III, ISSUE V, OCOTBER 2022

## INSIDE THIS ISSUE



## Dual energy CT scans

Dear friends, colleagues, juniors & seniors; we are happy to publish 16th. Edition of CAR newsletter .

Advancements in every field of Radiology are norm. CT scanner is a work horse and helpful in diagnosis of various conditions in every branch of Medical science except Obstetrics. Hospital where I work has recently acquired a dual energy 256 slice MDCT scanner. It not only provides the routine scan which can be conducted in any CT scanner but also conducts Dual energy CT scans which has wide applications.

Conventional single energy utilizes a single X-ray beam (ranging from 70 to 140 kVp with a standard of 120 kVp) emitted from a single X-ray tube. In DECT, two energy levels (typically 80 and 140 kVp) are used to acquire images that can be processed to generate additional datasets.

DECT has opened new clinical applications which help in better diagnosis such as Tissue characterization, Renal stone characterization, Renal mass characterization, Liver lesion characterization, Oncologic imaging and so on. You can also do MDCT angiography of Brain with Brain perfusion. One can also do virtual non-contrast scans. There are wide applications, which I am under the process of exploring. So far it looks quite interesting and rejuvenating. Will come up with clinical cases in future issues of this newsletter.

To understand DECT one must revisit physics associated with procuring such scans. In fact, to understand Radiology and to interpret images in a much better, we must understand the Physics in a much better way. IRIA and ICRI conduct Physics related webinars frequently and one must attend such webinars to update ourselves. I particularly relish MR physics which helps us to understand the sequences in a much better way.

In this issue we have stalwarts like Anirudh Kohli, Bhavin Jankharia and Sumita Kundu presenting interesting cases. Dr. Anup Sadhu has compiled history of Neuroradiology. I sincerely thank all of them for contributing to this newsletter.

Viral Parekh.

Dr. Bhavin Jankharia,
MBBS, DMRD, MD
Consultant Radiologist.

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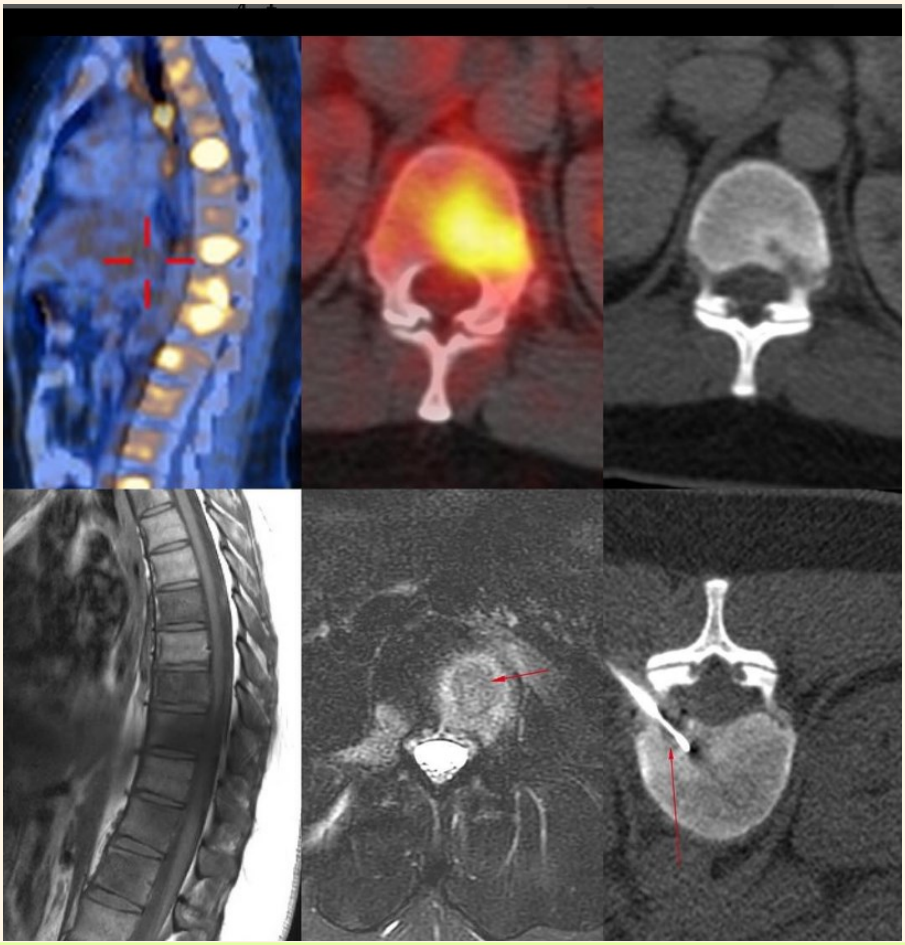
**Dr. Bhavin Jankharia needs no introduction to the Radiology fraternity. As you all know he is a renowned Radiologist and academician and has contributed immensely in propagating Radiology education. Presently, he is a Consultant Radiologist at Picture This by Jankharia. He is also a Trustee of Radiology 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.**

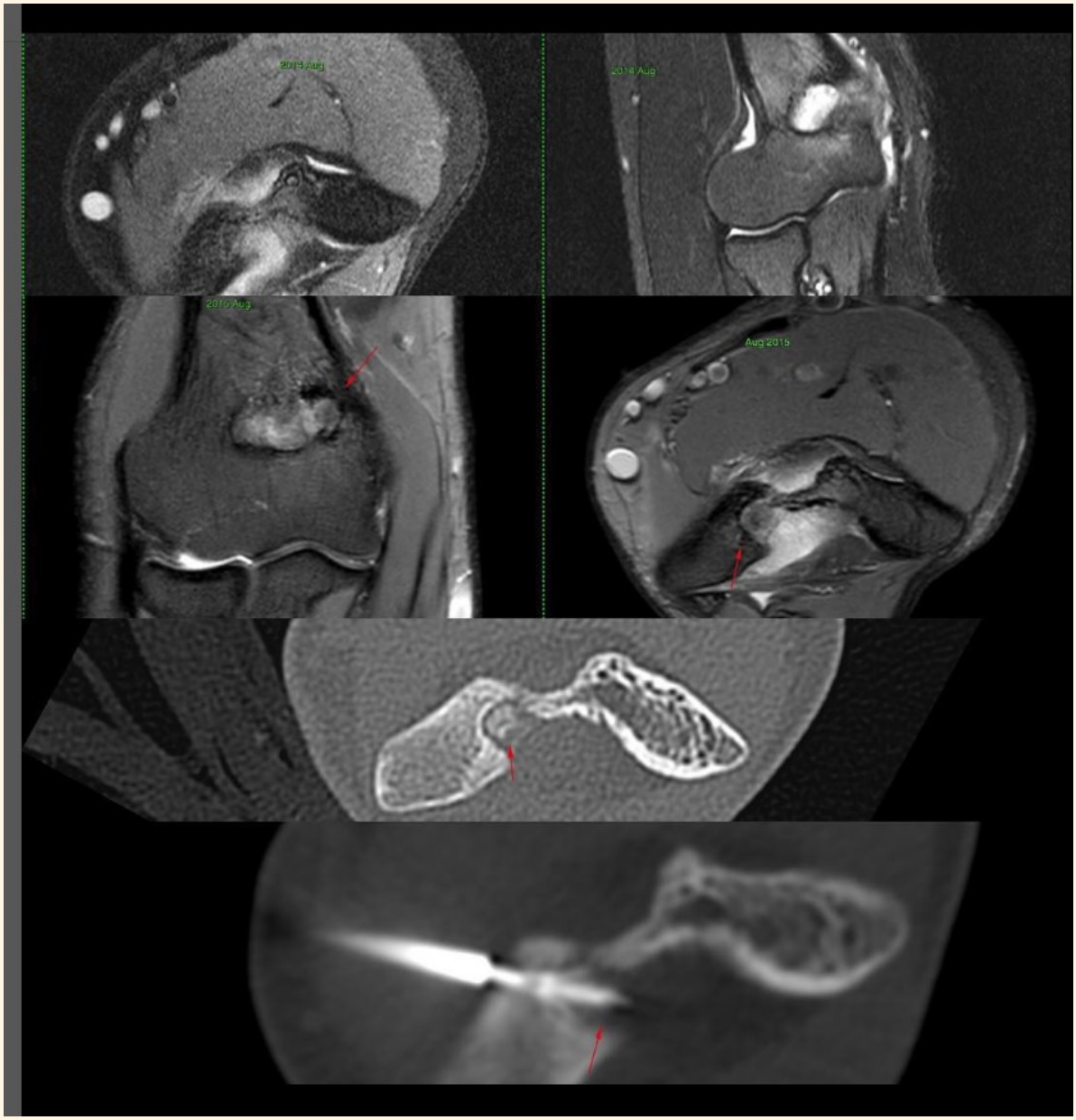
- **He has written 5 books, 35 chapters, 57 articles (PubMed listed)**
- **Presented 32 posters**
- **More than 1500 invited lectures over 27 years**
- **Editor-in-Chief, Indian Journal of Radiology & Imaging (2007-2012)**
- **Latest Book (2019): Computed Tomography of Interstitial Lung Diseases**
-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

## Case I - Multifocal bone disease in a young patient in India



Multifocal bone disease in a young patient in India.
This is a 28-years old with back pain. An MRI shows multiple bone lesions and hence he had a PET/CT done, which showed the same findings - multiple vertebrae and the sacrum. The first diagnosis was metastases, then myeloma and lastly tuberculosis.
Look at the clues. The CT scan shows ill-defined sclerosis with weird shaped osteolytic lesion. The MRI shows T2 low signal with edema. These are highly unusual for metastases or myeloma. We did a CT guided biopsy with an 18G needle and this shows granulomatous inflammation of mycobacterial aetiology.

## Case II - 8 months of unnecessary pain and suffering



**8 mths of unnecessary pain and suffering**

**This 25 years old man had pain the right elbow starting March 2014. For a few months he was treated conservatively. An MRI done in August 2014 showed marrow edema in the distal medial humerus with effusion. It was reported as inflammation / infection, but luckily the surgeon did not put him on anti-TB treatment.**

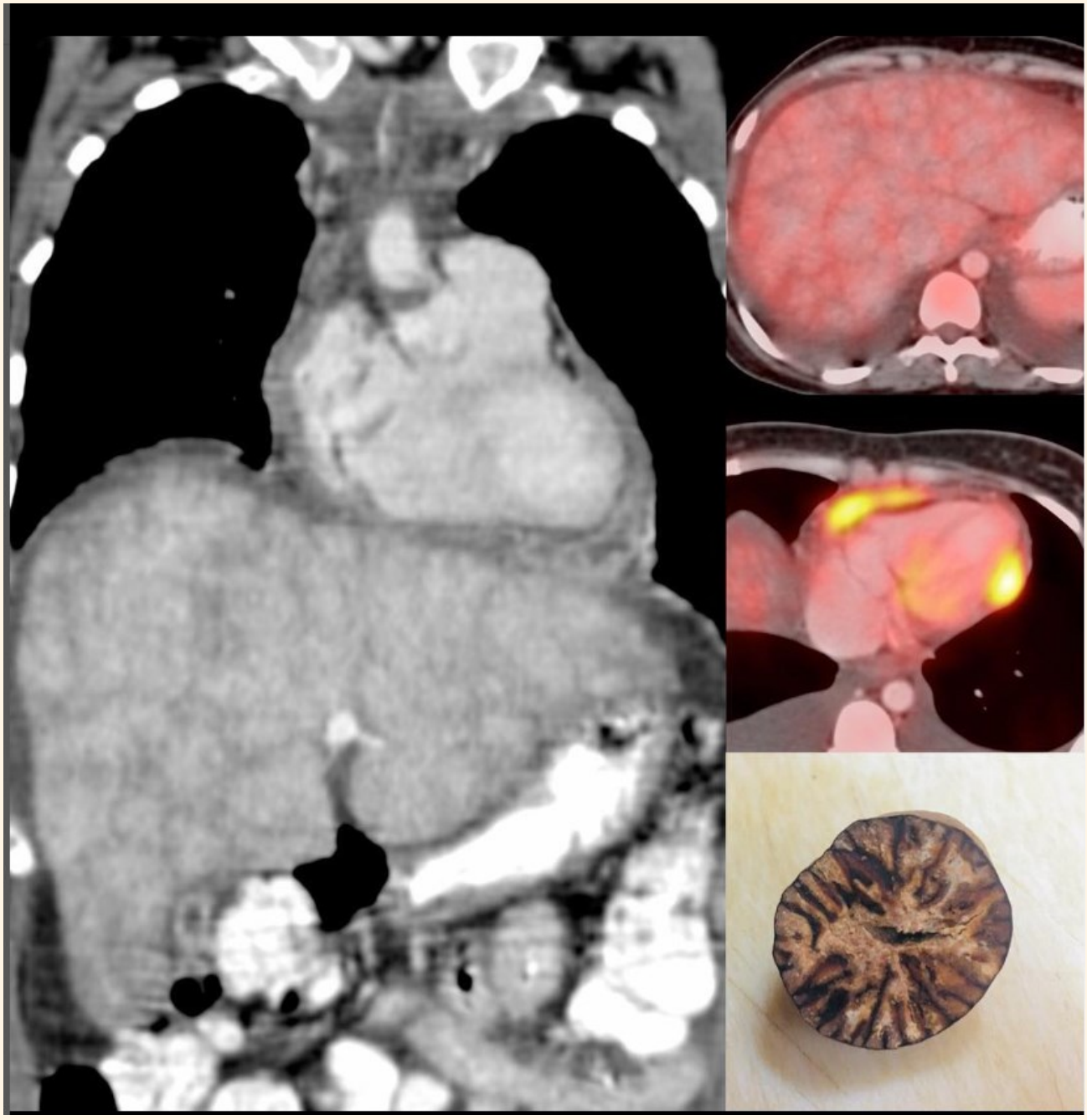
**The golden rule - always do a CT scan in a patient with unexplained marrow edema was not followed.**

**After a year of pain, more at night, responding to aspirin, a repeat MRI in August 2015 showed a possible focal lesion adjacent to the olecranon fossa medially with marrow edema. This time a CT scan was done and showed an osteoid osteoma. The RFA was simple to do. The average time it takes for the diagnosis of osteoid osteoma to be made is around 18-24 months either because the correct imaging is not done or for reasons such as these where a CT is not done in patients with unexplained marrow edema.**



Dr. Bhavin Jankharia, MD

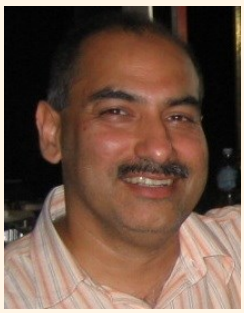
## Case III - Nutmeg Liver



**This 32-years old came for a PET. She has pericardial tuberculosis with patchy thickening (arrows). Despite the lack of biatrial dilatation, the bilateral pleural effusions and the appearance of the liver are highly suggestive of a restrictive physiology and consistent with constrictive pericarditis.**
**The liver shows signs of passive venous congestion as a result - this is often called a nutmeg liver (nutmeg shown for comparison)**



Dr. Bhavin Jankharia, MD

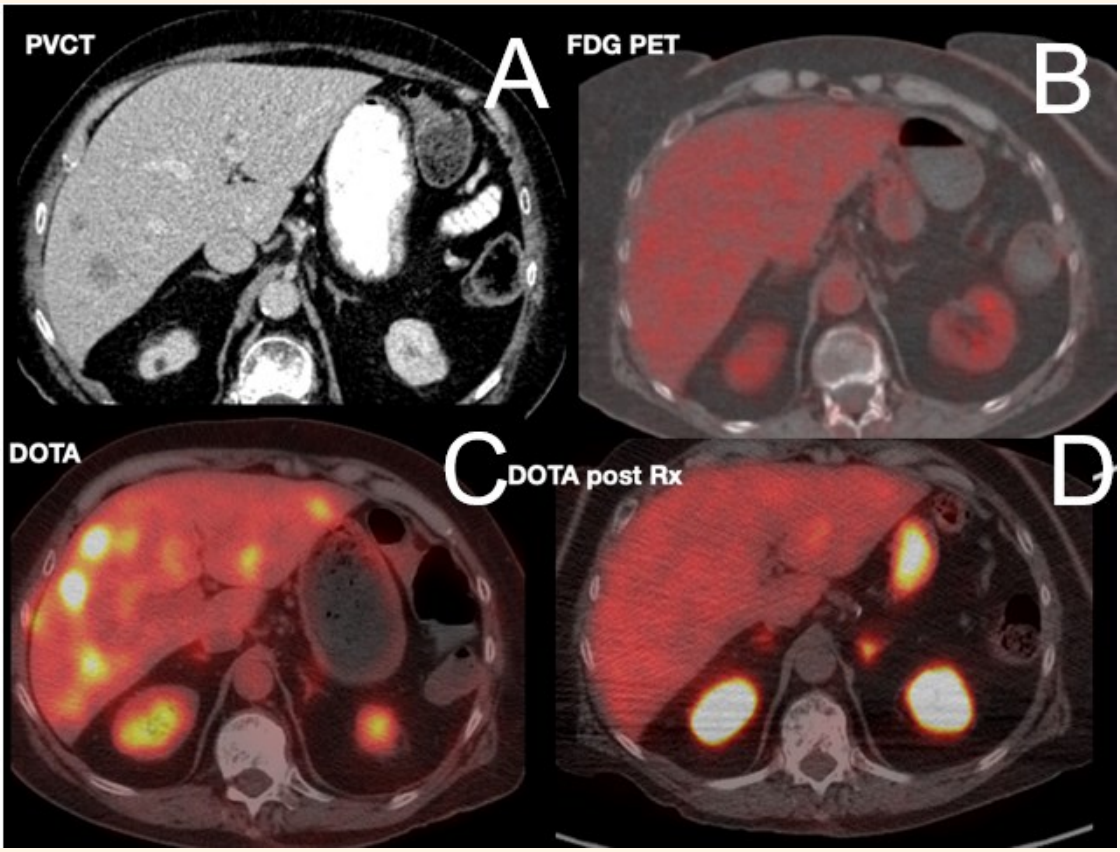


Dr. Anirudh Kohli
MBBS, DMRD, MD,DNB.
Chief Radiologist
Breach Candy Hospital
Mumbai.

Dr. Anirudh Kohli is a senior Radiologist from Mumbai. He needs no introduction and is one of the most competent Radiologists in India. He is also immediate past Editor of Indian Journal of Radiology & Imaging . He is presently working as Chief Radiologist at Breach Candy Trust Hospital, and is also a Consultant at Jaslok Hospital, Mumbai.

He has presented many papers in several National & International conferences on Radiology. He has many publications also to his name. Here, he is presenting three liver cases which have important teaching points.

## Case I

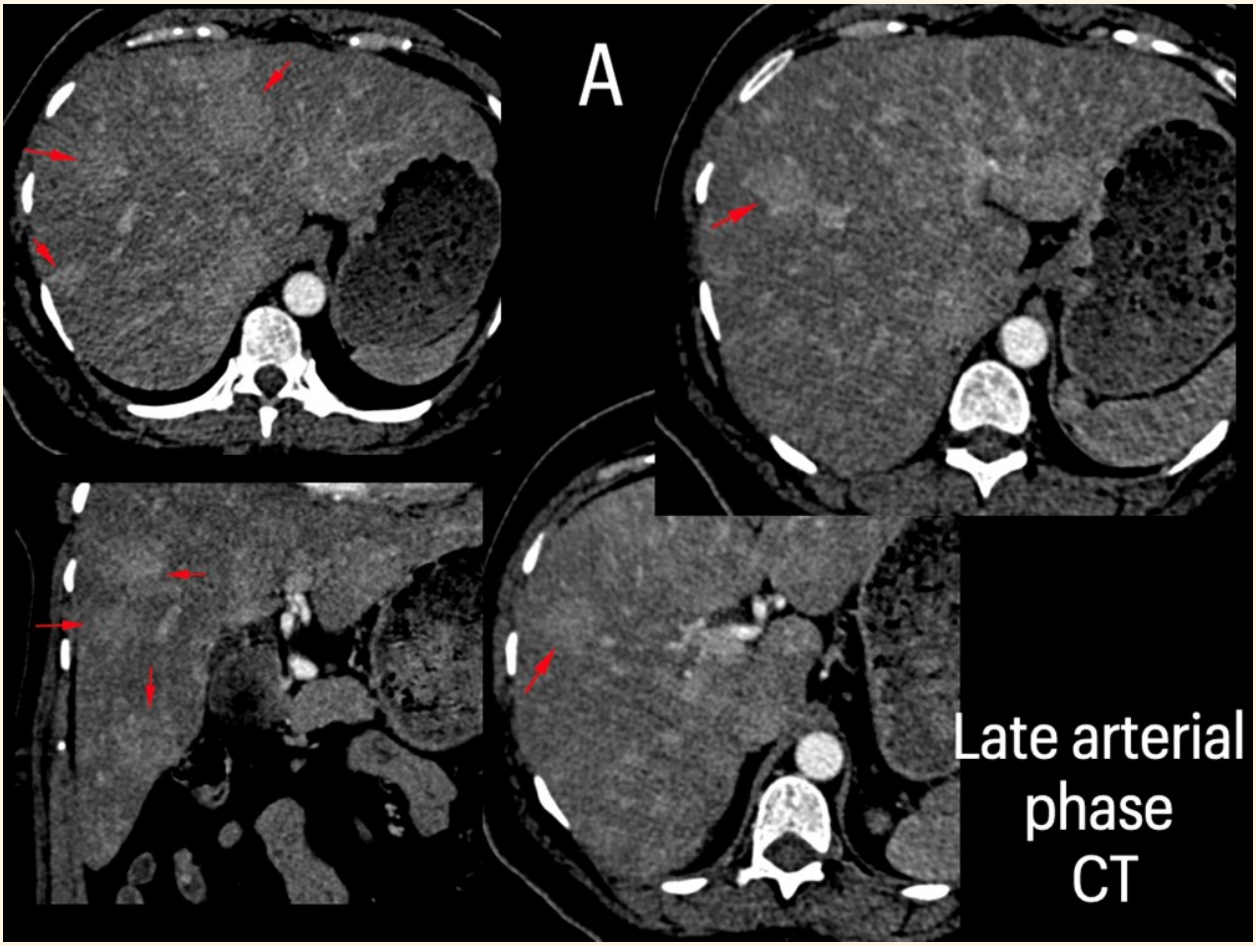



65 year old lady with a history of resected neuroendocrine tumor of the pancreas, now presents with multiple focal hypodense lesions on venous phase of MDCT (A) , arterial phase lesions are isodense. These are evidently metastatic deposits from the neuroendocrine tumor. To establish the diagnosis nuclear medicine studies or biopsy may be performed. Considering these may turn out to be metastatic deposits from neuroendocrine, nuclear medicine studies will be required to decide the next line of treatment. So instead of biopsy, nuclear medicine studies were performed. DOTATEC and FDG pet studies were performed. As seen in (B)-PET CT the lesions do not demonstrate any FDG pick up but on the DOTATEC studies (C) they demonstrate avid pick up of isotope. This confirms these are neuroendocrine metastases. Now that it is confirmed as metastases then how do the PET and DOTATEC help decide treatment. If the lesions are DOTATEC positive they will respond to receptor blocking therapy, if not and PET positive they will respond to chemotherapy. As the lesions were DOTATEC positive ,FDG PET negative receptor blocking therapy was used. (D) -demonstrates post receptor blocking DOTATEC scan- all lesions have responded to treatment, no lesions identified.

## Case II

**55 year old patient with history of resected CA colon has a surveillance CT scan for metastases.**

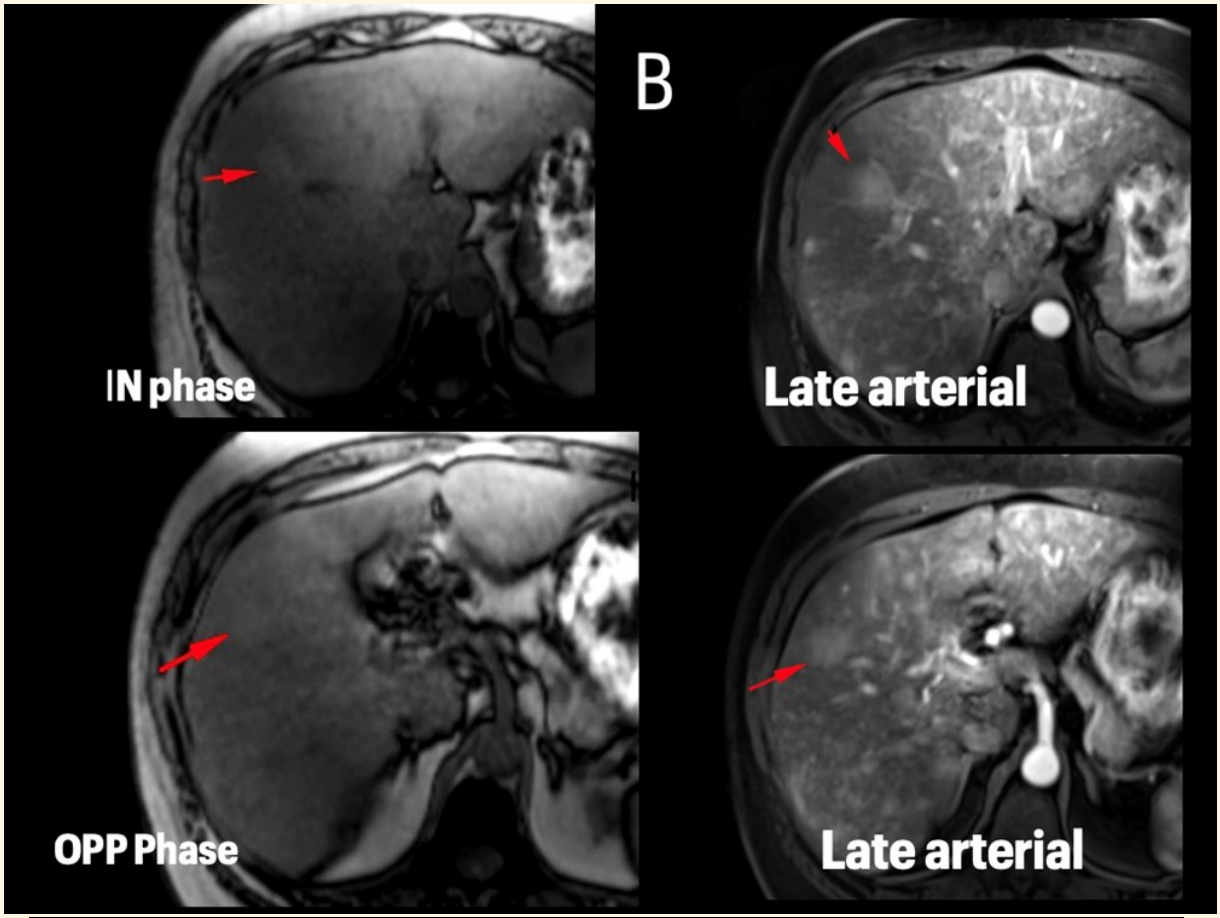
**Post contrast late arterial phase CT reveals multiple enhancing lesions in the liver (A). These are isodense on the venous phase. MRI was performed for confirmation as there was a doubt whether these were metastases!! (B) The lesions show similar enhancement on the late arterial phase of MRI similar to CT. On the opposed phase the liver is markedly hypo intense indicating fatty infiltration, the focal areas of enhancement are mildly hyper intense on the in and opposed phase. This indicates that the so called enhancing lesions are actually areas of fat spared liver on a background of fatty infiltration. The CT images also demonstrate a diffuse hypo density indicating fatty infiltration. (C) demonstrates a recap of the CT and MRI features. The clinician was not convinced and a biopsy had to be done to demonstrate normal Liver tissue!. In conclusion the enhancing lesions were actually normal fat spared liver tissue in a background of fatty infiltration of the liver. As we scan more and more patients with fatty infiltration these features are important to not call a normal fat spared liver as a ,metastatic deposit.**

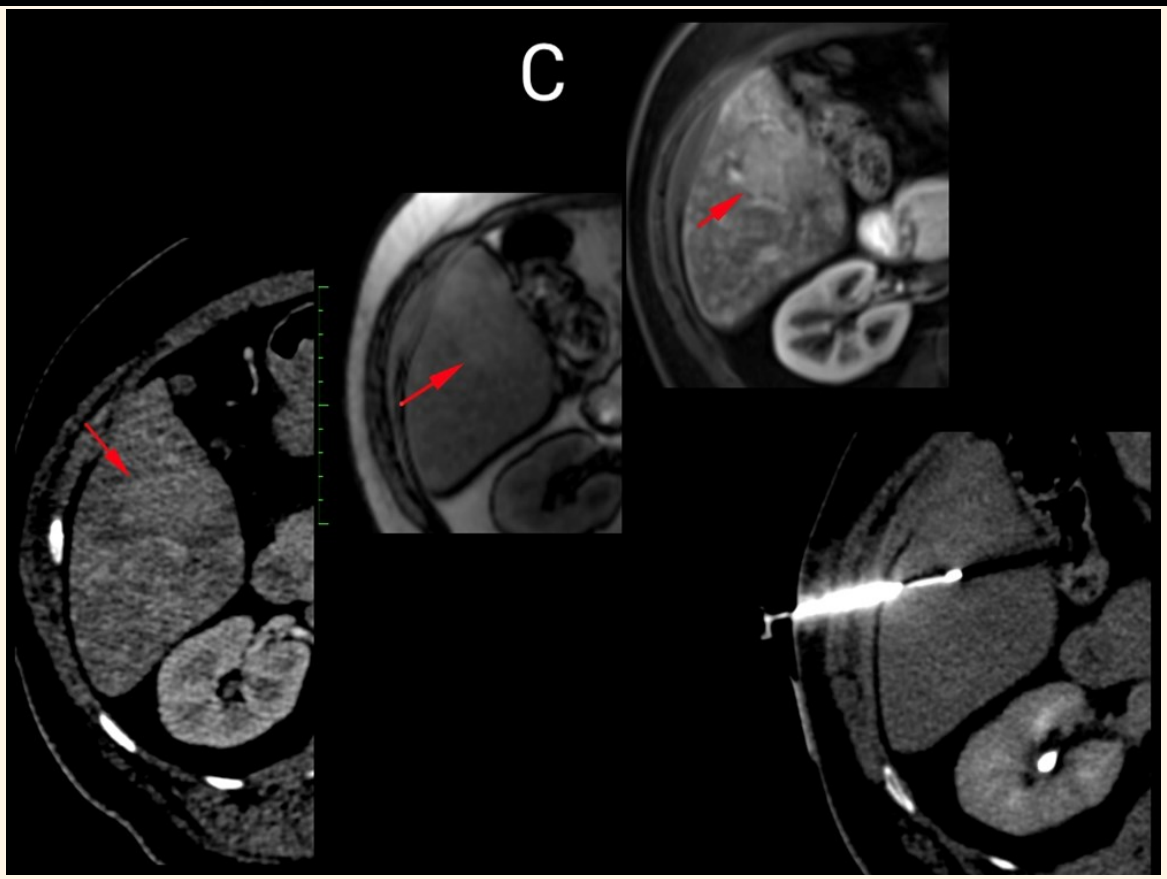




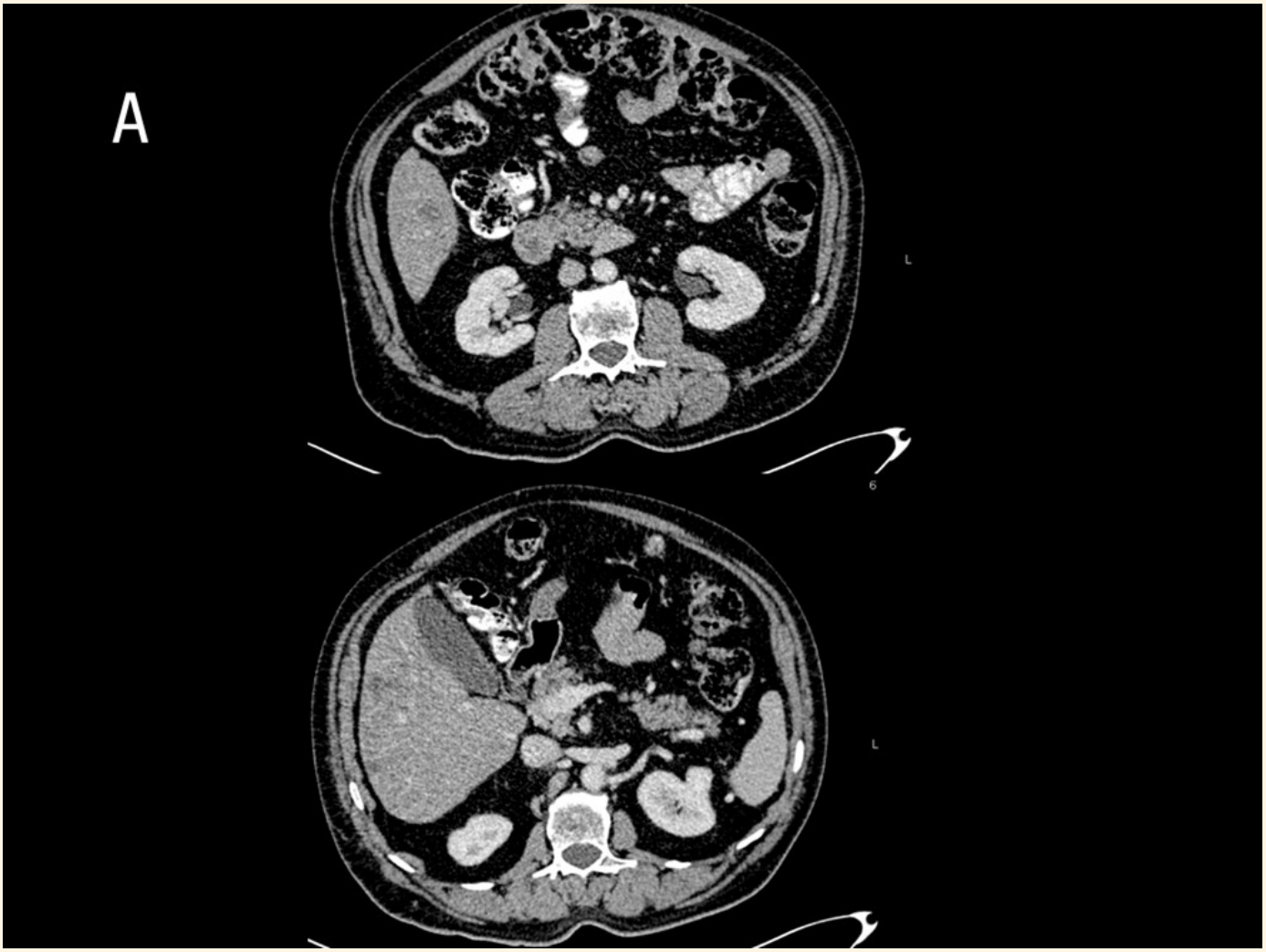

Dr. Anirudh Kohli, MD

Case II



## Case III

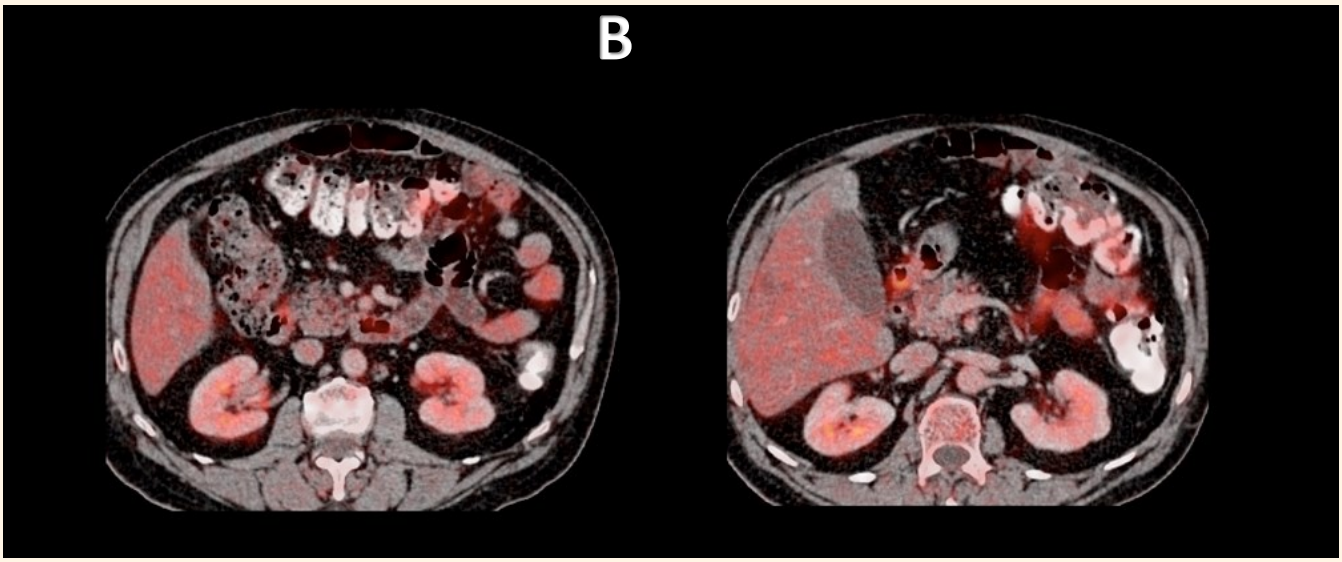


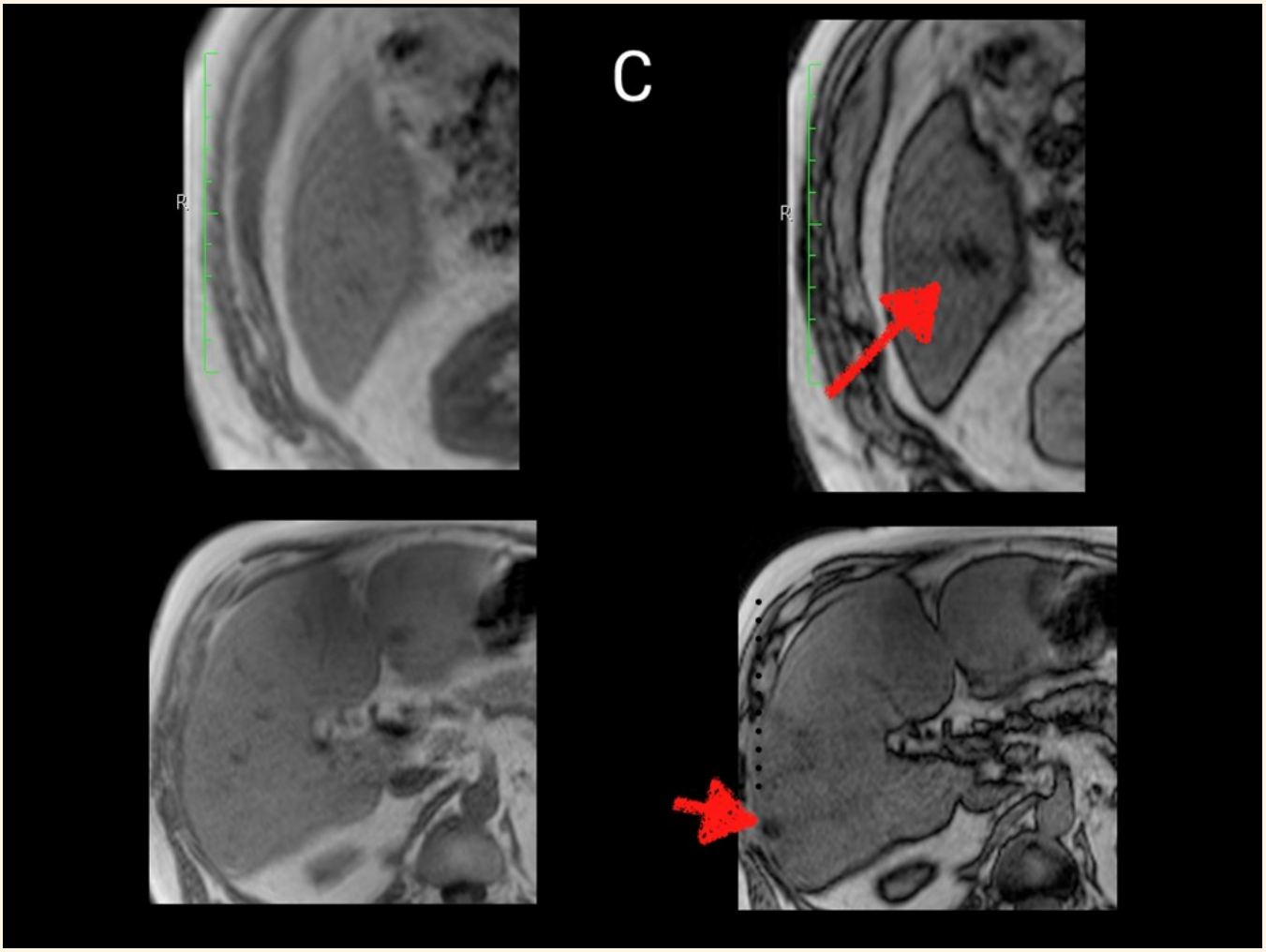

**71 year old male patient with history of Ca Rectum, surveillance CT demonstrates hypodense lesion on portal venous phase in liver (A) considered as metastases. FDG PET done for confirmation (B) reveals no FDG uptake! in view of this discord a MRI was done, (C) this revealed focal areas of hypo intensity on the opposed images indicating focal areas of fat infiltration. Again the clinician wanted confirmation by a biopsy though the Opposed phase images were diagnostic. The focal hypo density on portal venous phase images were focal fat infiltration which showed no FDG uptake and were hypointense on opposed phase images.**



Dr. Anirudh Kohli, MD

## Case III

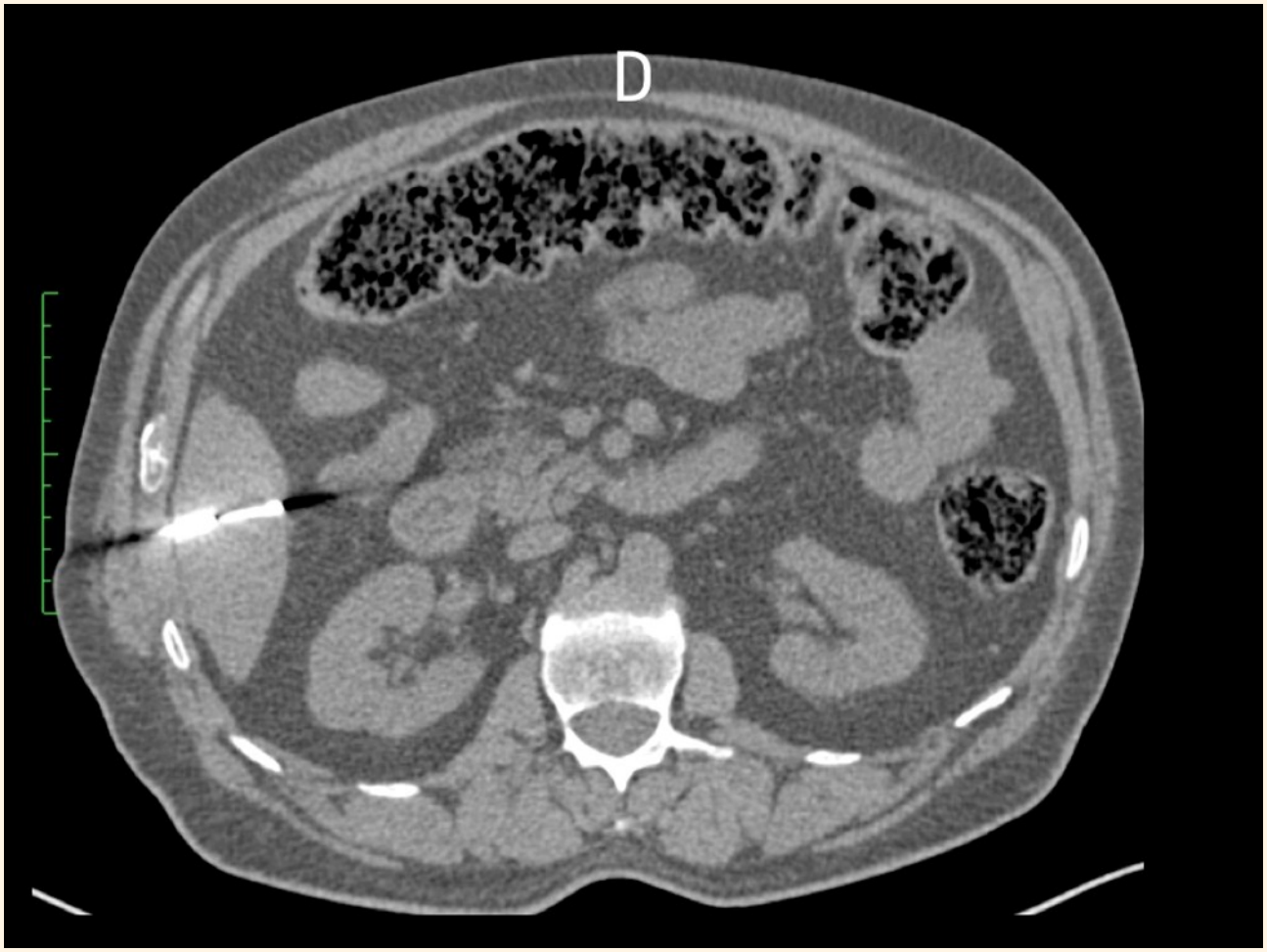





Dr. Anirudh Kohli, MD

## Case III






Dr. Anirudh Kohli, MD

Dr. Sumita Kundu,
MBBS, MD
Consultant Radiologist,
EKO MRI Centre,
Kolkata

Dr. Sumita Kundu is a senior Radiologist from Kolkata. She is working as Consultant Radiologist, EKO X-ray and Imaging Centre, Kolkata. since May 1990. She has done her MBBS from R. G. Kar Medical College, Kolkata. She did her Post-Graduation in Radiodiagnosis with Diploma in Medical Radiodiagnosis from Calcutta University, India, in 1985 – 86 and she did her M. D. in Medical Radiodiagnosis from Calcutta University, India, in 1990. She has done Fellowship in Neuroradiology from University of California, San Francisco, USA. and Fellowship in Cardiac MRI from John Hopkins Maryland, USA.

She has presented papers in several National & International conferences on Radiology. She has many publications also to her name.

## Case I

**History :**

**53 years / Male, presenting with weight loss and abdominal distension. USG showed asymmetric thickening of gall bladder wall with dilated common bile duct and CT (fig 1) showed (concentric gall bladder wall thickening – ? neoplastic. Common bile duct was found to be dilated in USG but not in CECT.**

**MRI & MRCP (Fig 2 to Fig 6)– concentric thickening of gall bladder walls with narrowing of lumen at junction of fundus and body. Common hepatic duct was ill-defined and common bile duct was tortuous with irregular & thick walls and mild oedema in adjoining soft tissue.**

**Lumen of common bile duct was otherwise normal in signal intensity and not dilated.**

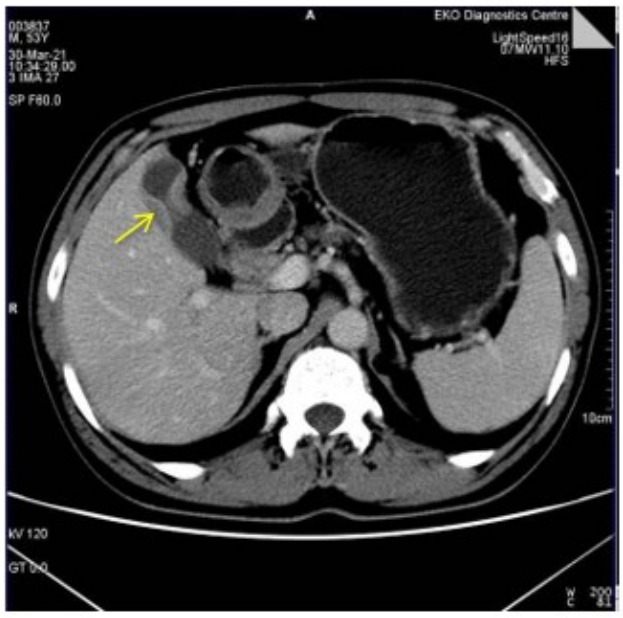



Fig- 1

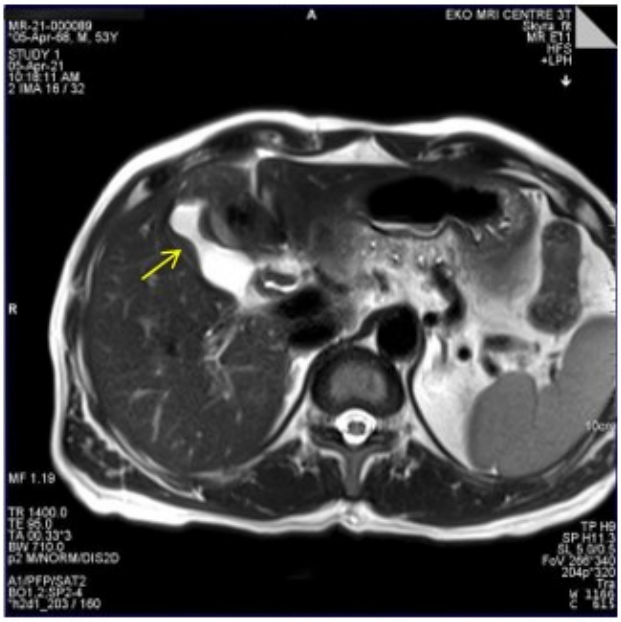



Fig- 2

CT & T2W Axial images showing wall thickening in GB with narrowing of lumen. MRI also shows thickened walls of extrahepatic biliary channel

## Case I

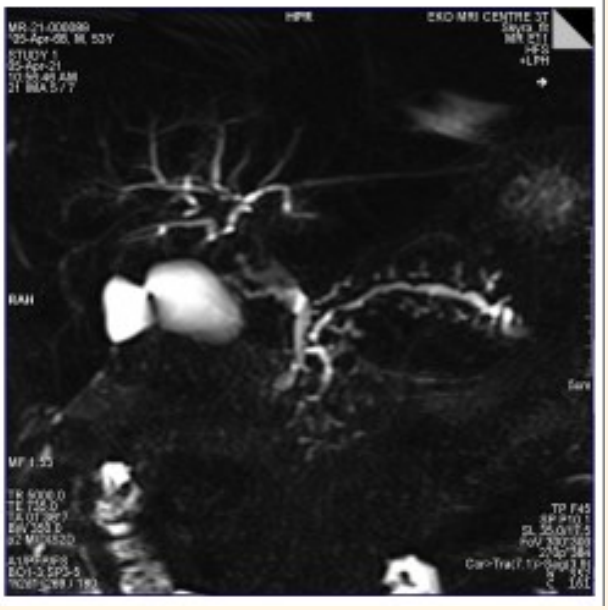
**Main pancreatic duct was mildly dilated (0.31 cm. in diameter) with dilated side branches. No focal parenchymal lesion was seen in liver and pancreas and no peri-pancreatic collection was noted.**

**CT guided FNAC showed atypical cells and biopsy was suggested to exclude possibility of carcinoma.**

**The patient was treated surgically with cholecystectomy and common bile duct excision with Roux-en-Y hepaticojejunostomy. Biopsy revealed IgG4 cholangiopathy with granulomatous reaction.**

Fig- 3

Fig- 4



Case I

## Discussion:

Immunoglobulin G4 related disease can affect various organs in the human body. This includes pancreas (Autoimmune pancreatitis) and extrapancreatic organs like biliary tree, gall bladder, retroperitoneum mesentery etc. This leads to varying symptoms and can be evaluated with various imaging techniques including USG, contrast enhanced CT, MRI & MRCP.

IgG4 sclerosing cholangiopathy usually affects male patients in 6th & 7th decades. They can present with hyperbilirubinemia, pain abdomen or vague symptoms. Their features may overlap with those of hilar or extrahepatic cholangiocarcinoma clinically and radiologically.

IgG4 sclerosing cholangiopathy is an autoimmune disorder and can be seen as an associated feature with Autoimmune Pancreatitis. About 60-80% of Type I AIP patients have changes in the biliary tree. This relationship has been recognised since 2001. Patients have increased serum levels of IgG4. Biopsy of thickened gall bladder or bile duct wall shows infiltration of IgG4 positive plasma cells with lobular inflammatory changes, eosinophiles and obliterative phlebitis. Treatment with steroids generally has good outcome.

Differential diagnosis includes intra-hepatic or extrahepatic cholangiocarcinoma and primary sclerosing cholangitis.

## Conclusion :

IgG4 cholangiopathy is a form of cholangiopathy / cholangitis of unknown aetiology. It can be associated with Autoimmune Pancreatitis. Differentiation from cholangiocarcinoma and primary sclerosing cholangitis is important as treatment with steroids has good prognosis.

## References:

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2. IgG4-related Disease from Head to Toe Radiographics, Published online : October 16, 2015, A Martinez-de-Alegria et al.
3. IgG4-related sclerosing cholangitis Yoh Zen et al, Journal of Gastroenterology 51, 295-312 (2016).
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5. The spectrum of IgG4-related disease in the Abdomen & Pelvis, Sandeep S. Hedgire et al AJR-201:14-22 July, 2013.



Dr. Sumita Kundu, MD

## Case II

**History :**

**8 months / Male. Parents took the infant for opinion of paediatric surgeon due to concerns about constipation in the infant and detection of an abdominal subhepatic cyst in prenatal ultrasonography.**

**MRI of the whole abdomen was performed and a lobulated SOL with central cystic signal and thick lobulated hypointense walls in T2 weighted images (fig. 1 to fig.5) was seen in right upper abdomen, anterior to the inferior vena cava and the right kidney measuring about 2.05 cm. x 3.48 cm. x 4.2 cm. It showed a lateral projection towards second / third part of duodenum without definite communication with the lumen favouring a duodenal duplication cyst vs. other cystic lesions. There was no involvement of the biliary tree in MRCP(fig-6) . Remaining abdominal organs were unremarkable. The patient was treated with surgical resection of the cyst. Post operative findings confirmed a Duodenal Duplication Cyst.**

Fig- 1

Fig- 2

Fig- 3

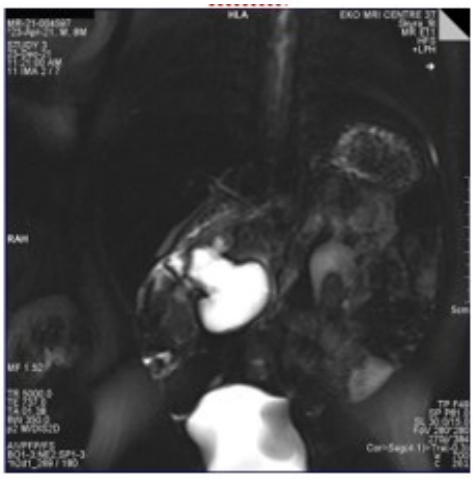

Fig- 4

## Case II

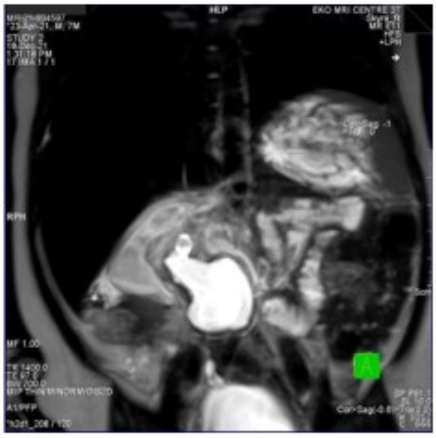

Fig- 5

Fig- 6

**Discussion :**

**Enteric Duplication Cysts form a group of congenital malformations of the digestive tract due to developmental defect during embryogenesis. These malformations can occur in any part of the digestive tract but are commonly seen in the mesenteric border of ileum. Most duplication cysts do not communicate with gut lumen.**

**Duodenal duplication cyst is a rare developmental anomaly seen in about 2 to 12% of all such conditions of the digestive tract. Usually diagnosed in infancy and childhood, they can occasionally be seen in an adult. These cysts are usually located in second or third part of the duodenum with shared muscle layers between the cyst and duodenal wall – gut signature or double wall sign. There may be pancreatitis due to compression of pancreatic duct.**

**Though rare, possibility of development of malignant lesion later in life can occur and hence surgical treatment is advocated.**
**Treatment of duodenal duplication cyst depends on size, location of cyst and its relationship with adjoining organs.**

1. **Ideally, complete surgical excision is done with excellent prognosis.**
2. **Endoscopic marsupialisation is also an alternative procedure.**
3. **Excision of cyst with pancreaticoduodenectomy is needed if biliary tree and pancreatic duct are involved.**
4. **When complete excision is not possible, excision of the duplication as far as possible with removal of ectopic gastric tissue and mucosal stripping is recommended.**
5. **Differential diagnosis includes pseudocyst of pancreas, retroperitoneal cystic teratoma, choledocele and Neonatal meconium pseudocyst.**

**Conclusion :**

**Duodenal duplication cysts though rare and often asymptomatic, need to be treated surgically as they can develop symptoms later like pancreatitis and be associated with life threatening complications including rare chance of malignant transformation.**

**References:**

1. **Type B choledococele vs. duodenal duplication cyst. A diagnostic dilemma and its management : a case report. KarthicKeyan M, et al, Journal of Medical Case Reports 13, Article November 16 (2019).**
2. **Duodenal duplciation cyst. A case report, Diogo Roviz et al. Eurorad : Case 12542 published on 20.04.2019.**
3. **Duodenal Duplication Cyst : a potentially malignant disease. B Seeliger et al, Ann. Surg. Oncol. 2012, November.**
4. **Duodenal Duplication cysts in children : Clinical features and current treatment choices. Dipasquale V.et al. Biomed Hub 2020, 5 : 50**



Dr. Sumita Kundu, MD

## From the pages of History…

### THE HISTORY OF NEURORADIOLOGY

The history of neuroradiology can be divided into five periods.

1. That of infancy, was from 1895 to 1918.
2. The second began in 1918 with Dandy's two great and almost simultaneous discoveries of ventriculography and encephalography, together with his prediction of air myelography.
3. Then followed in 1927 Moniz's great contribution, cerebral angiography.
4. Cross sectional imaging CT, MRI thereafter
5. Functional imaging, connectomics

The story of neuroradiology starts with a celebrated failure
On February 5th, 1896 , Thomas A. Edison received a cable from Randolph Hearst ,the publisher of the New York Journal

**WILL YOU AS AN ESPECIAL FAVOR TO THE JOURNAL UNDERTAKE TO MAKE CATHODOGRAPH OF HUMAN BRAIN KINDLY TELEGRAPH ANSWER AT OUR EXPENSE**

As expected , Edison took the challenge. He made several changes in regular Crook's tube so that the Xray will cover the entire surface of head. On Feb 14 th ,He gave up. In addition to technical failures ,he placed part of the blame on the "Insuperable Obstacles "imposed by the skull itself.
In the USA, the first to use x rays in for the diagnosis of a patient with neurological disability was Harvey Cushing, the father of modern Neuroradiology.( Nov 6,1896)
For the next 20 yrs. neuroradiology was confined to plain x-ray of skull.
Arthur Schuller in 1912 published the first textbook on Radiology of the skull
In his book he pointed out value of observing calcified pineal gland ( remember our pre-CT days!).

**Role of Waltar Dandy !1886-1946)—ventriculography, air encephalography 1918 onwards**

Dandy's first reported series consisted of twenty cases about which he commented, ". . . . Even in the few cases here reported, ventriculography has proven of great practical value. For the first time, we have a means of diagnosing internal hydrocephalus in the initial stages . . . before a considerable amount of cortical destruction has resulted." He anticipated that ventriculography might not only demonstrate the presence and extent of hydrocephalus but might even demonstrate the shadows of the ventricular system as well as the displacement or compression of the ventrides . Furthermore, Dandy found that in many of the ventriculograms, air passed out of the ventricular channels and could be seen over the surface of the brain. He concluded that the air had followed the normal pathways by which the cerebrospinal fluid circulates. "These observations at once gave promise of new possibilities in intracranial diagnostic studies." He proceeded then to withdraw cerebrospinal fluid from the spinal subarachnoid space and to replace it with equal amounts of air, varying from 20 to 120 ccs, after which radiographs were obtained. Dandy was especially interested in the status of the cisterns and in their role in the production of hydrocephalus.



Compiled by Dr. Anup Sadhu, MD

## From the pages of History…

## THE HISTORY OF NEURORADIOLOGY

### Egas Moniz (1874-1955)

In the early 1920s, Egas Moniz, professor of neurology in Lisbon, Portugal, undertook a task no one really considered possible : the radiographic imaging of the brain in a living human subject. At the time, the only approach to visualizing cerebral abnormalities was Dandy's method of introducing air into the ventricular system. Moniz's supposition was that if he could introduce radiopaque material that would concentrate in the brain. In June 1927, in their third case, portions of the internal carotid artery in the sylvian fissure were distinctly seen. Moniz was triumphant, and he left immediately for a meeting of the Society of Neurology in Paris, where he had done his postgraduate training. His work was greeted with great enthusiasm, and he was invited to present his method a week later in the French Academy of Medicine. Moniz spent the following years evaluating the procedure and supporting the findings with surgical or autopsy proof. Working day and night, he wrote sixty-one papers in the 4 years between 1927 and 1931.His first book on cerebral angiography was published in Paris in 1931 with a preface by Babinsky, one of the prestigious neurologists of the day, in which he praised Moniz for his courage, daring, and enthusiasm. In i949, Moniz received the Nobel prize, not for his work in angiography but for the introduction of frontal lobotomy , a procedure that was subsequently discarded.

### ERA OF CT SCAN

The development of computed tomography (CT) in the early 1970s revolutionized medical radiology. For the first time, physicians were able to obtain high-quality tomographic (cross-sectional) images of internal structures of the body. Over the next 10 years, eighteen manufacturers competed for the exploding world CT market. Technical sophistication increased dramatically, and even today, CT continues to mature, with new capabilities being researched and developed. Computed tomographic images are reconstructed from many measurements of x-ray transmission through the patient (called projection data). The resulting images are tomographic "maps" of the x-ray linear attenuation coefficient. The first practical CT instrument was developed in 1971 by DR. G. N. Hounsfield in England and was used to image the brain . The projection data were acquired in approximately 5 minutes, and the tomographic image was reconstructed in approximately 20 minutes. Since then, CT technology has developed dramatically, and CT has become a standard imaging procedure for virtually all parts of the body in thousands of facilities throughout the world. The fundamental task of CT systems is to make an extremely substantial number (approximately 500,000) of highly accurate measurements of x-ray transmission through the patient in a precisely controlled geometry. A basic system generally consists of a gantry, a patient table, a control console, and a computer. The gantry contains the x-ray source, x-ray detectors, and the data-acquisition system (DAS).



Compiled by Dr. Anup Sadhu, MD

## From the pages of History…

## THE HISTORY OF NEURORADIOLOGY

### ERA OF MRI

**The history of MRI technology begins with the study of magnetic resonance or how electrons and atoms' nuclei respond to magnetism. In the 1930s, physicist I.I. Rabi developed a way to measure the magnetic properties (spin) and sodium movement. In his work, Rabi developed a form of MR imaging called nuclear magnetic resonance (NMR). That work became the basis of medical MRIs.**
**During the 1940s, physicists Felix Bloch and Edward Purcell, working independently, studied the atomic and molecular magnetic resonance properties of solids and liquids. Their research later allowed MRI scanners to use the body's water content to develop magnetic resonance images.**

**In 1952, Purcel and Bloch won the Nobel Prize in physics. Publishing their paper in 1955, Gunnar Lindström and Erik Odebladalso, two Swedish researchers, also investigated NMR's uses. They theorized that the differences in water and biological tissue response were because distinct tissues absorb and organize water molecules differently.**

**In 1969, Dr. Raymond Damadian (Died Aug3,2022) hypothesized that magnetic resonance could differentiate cancer cells from non-cancerous cells, and he successfully demonstrated his hypothesis with rats. Damadian found that various kinds of tissue emissions had different response lengths, with longer response signals from cancerous tissue.**

**Damadian, a physician, scientist, and professor at the Downstate Medical Center State University of New York in Brooklyn, developed the original idea of applying NMR to medical imaging (MRI). His research into the sodium and potassium content of living cells led him to his first experiments with nuclear magnetic resonance (NMR).**
**Damadian discovered that it's possible to distinguish between cancer cells and healthy tissue through nuclear magnetic resonance (NMR) because of the differences in relaxation times between the two. From that research, he proposed an MR body scanner in 1969.**

**In 1972, Damadian filed the first patent of MRI technology. Upon approval of his patent in 1974, Damadian designed and built a full-body MRI machine. The first MR (magnetic resonance) scanning machine, which he called "Indomitable," is now in the Smithsonian.**

**On July 3, 1977, Damadian achieved the first human NMR image — a cross-section of his postgraduate assistant Larry Minkoff's chest. The image revealed Minkoff's heart, lungs, vertebrae, and musculature and became the method known as magnetic resonance imaging (MRI).**



Compiled by Dr. Anup Sadhu, MD

## From the pages of History…

## THE HISTORY OF NEURORADIOLOGY

### Recognition for key contributions-

Richard R. Ernst developed Fourier transform methods that paved the way for modern MRI. He was awarded the 1991 Nobel Prize in Chemistry for "contributions to the development of the methodology of high resolution nuclear magnetic resonance (NMR) spectroscopy." Paul C. Lauterbur and Sir Peter Mansfield were then jointly awarded the 2003 Nobel Prize in Physiology or Medicine "for their discoveries concerning magnetic resonance imaging." Reprinted with permission from The Nobel Foundation. Another early and essential contribution to MRI was made by Richard Ernst at the Swiss Federal Institute of Technology in Zurich. During the 1960s he had introduced Fourier Transform NMR spectroscopy . In 1975 he realized that one should be able to generate 2- or 3-D NMR images by applying switched magnetic field gradients as NMR signals were acquired (phase encoding), and then employing the Fourier transform methods that are now a mainstay of modern MR image reconstruction.

### ERA OF CONNECTOMICS

A connectome is, simply defined, a map of the brain that seeks to marry its structure and functional features. It should, ideally, give us an idea about how certain functions emerge from the structural substrate. In doing so, a connectome seeks to model the brain as a dynamical system with an underlying complex network of interconnections. Once the brain is reduced to a graph consisting of nodes and edges, principles of graph theory can be applied to derive important insights into the brain as well as brain related pathologies. The term connectome was coined by Olaf Sporns and Patric Hangman derived from the term genome. The mapping of the complete brain structure and function has been done for a nematode C. Elegans. Similar attempts have been made with higher order mammals. In humans, a fully connected, structural recreation of the brain is still a work in progress, but brain atlases exist where brain structures are spatially located and given coordinates. The connectome now has become a widely adopted model to represent the brain in its structural and functional capacity.

(The process of building a connectome at a macrolevel is as follows:
1. Perform DTI and Tractography to obtain the connectivity profile of the brain. This serves as the structural substrate for the connectome.
2. Through fMRI determine the functional behaviour of the brain. This would correspond to the functional dynamics of the connectome. The functional behaviour is time dependent, therefore, to be considered as a time series.
3. Perform a cluster analysis between the structure and the functional substrates inorder to identify correlations.
4. Perform network analysis on the connectome to derive insights.)

The story continues to never end human instincts to achieve more.



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| Hyperlinks of academic material published on YouTube by Calcutta Academy of Radiology | |
|---|---|
| 1 | Imaging of acute Pancreatitis—Dr. Anirudh Kohli |
| 2 | USG of rotator cuff - Dr. P. K. Srivastava |
| 3 | PET CT Physics - Dr. Sikandar Sk. |
| 4 | PET CT in Neurology - Dr. Sikandar Sk. |
| 5 | CAR - Case of the week - Case 1 - Megalencephalic leukoencephalopathy with subcortical cysts. - Dr. Viral Parekh |
| 6 | CAR - Case of the week - Case 2 - Adenocarcinoma of terminal ileum - Dr. Viral Parekh |
| 7 | CAR - Case of the week - Case 3 - Stener lesion - Dr. Nivedita Chakraborty |
| 8 | CAR - Case of the week - Case 4 - Anterior shoulder dislocation - Dr. Nivedita Chakraborty |
| 9 | CAR - Case of the week - Case 5 - Secondary intracranial hypotension. - Dr. Viral Parekh |
| 10 | CAR - Case of the week - Case 6 - Intramyocardial Dissection - Dr. Ritu Agarwal |
| 11 | CAR - Case of the week - Case 7 - Radiation Necrosis and BT - RADS - Dr. Nivedita Chakraborty |
| 12 | CAR - Case of the week - Case 8 - Undisplaced right ulnar styloid base fracture - Dr. Nivedita Chakraborty |
| 13 | CAR - Case of the week - Case 9 - Hypoglycaemic encephalopathy. - Dr. Viral Parekh |
| 14 | CAR - Case of the week - Case 10 - Myocardial annular dysjunction - Dr. Ritu Agarwal |
| 15 | CAR - Tribute to Wilhelm Conrad Roentgen - Immortal Roentgen. |
| 16 | CAR - Case of the week - Case 11 - Dacryocystocele with anatomy of Nasolacrimal apparatus. - Dr. Viral Parekh |
| 17 | CAR - Case of the week - Case 12 - Tubercular osteomyelitis - Dr. Nivedita Chakraborty |
| 18 | CAR - Case of the week - Case 13 - Marchiafava Bignami disease - Dr. Viral Parekh |
| 19 | CAR - Case of the week - Case 14 - Parosteoal Sarcoma - Dr. Nivedita Chakraborty |
| 20 | CAR - Case of the week—Case 15 - Adrenal haemangioma - Dr. Viral Parekh |

| Hyperlinks of academic material published on YouTube by Calcutta Academy of Radiology | |
|---|---|
| 21 | CAR - Case of the week - Case 16 Patellar GCT - Dr. Nivedita Chakrabarty |
| 22 | CAR - Case of the week - Case 17 - MEN Syndrome - Dr. Sayan Sarkar |
| 23 | CAR - Case of the week - Case 18 - Langerhans cell histiocytosis - Dr. Sayan Sarkar |
| 24 | CAR - Case of the week—Case 19 - Hepatic angiomyolipoma - Dr. Viral Parekh. |
| 25 | CAR– Case of the week - Case 20 - Cirsoid aneurysm - Dr. Viral Parekh |
| 26 | CAR CME - Heart Anatomy |
| 27 | CAR– Case of the week - Case 21 - Pancreatic metastases - Dr. Viral Parekh |
| 28 | CAR - Case of the week - Case 22 - Intrapulmonary teratoma - Dr. M. Bhattacharya |
| 29 | CAR– Case of the week - Case 23 - Gall stone ileus - Dr. Viral Parekh |

We have a new blog , where we publish cases, quizzes and various other education materials. Please

We are on YouTube

You can send your good case to us. We will publish it in our channel.

CAR
Calcutta Academy Of Radiology
A Platform For Radiology Education & Interaction

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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. Another CME on Neuroradiology was organized in July 2022, We have plans to organize more such CME programmes in future .**

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

**We are on WhatsApp and Telegram**

# Next issue will be published in December, 2022

**We will be bringing out such Newsletters with a frequency of one issue every two months. So, next issue will be published in December, 2022.**

**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 November, 2022. 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.**

**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.**

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