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DR. Roentgen Rays "A Serendipity Event of an ERA"

Himani Kheary, B.R.I.T, NIMS Universiy, Jaipur, Rajasthan

In day today's life, when we got any kind of injury whether it is minor or major we directly go to the hospital and In the hospital ,first thing which our doctor prescribe is X-Ray to diagnose all types of sorts of problems for example. In broken bone, Sprain, injury due to any external object, heart failure, renal calculi, pneumonia, pneumothorax and many more.

There are many different-different modalities specialized for many types of diagnosis for eg. fluoroscopy which provide us the live imaging of our internal body parts during any invasive procedure, mammography- which is the standard screening method for breast cancer but could we think before the discovery of X-Rays how we diagnose all these problems, that time the only means of diagnosis is the cutting a person's open which is very time consuming as well as risky method of diagnosis.

In 1895, A Serendipity event was took place which leads to the discovery of X-Rays by Sir. Wilhelm Conrad Roentgen who was a professor at Wuerzburg University in Germany and working with a Cathode ray tube in his laboratory.

On, 8th of November in 1895, Roentgen observed a fluorescent glow from the crystal of the platinum cyanide which was present on a table near to the tube.

Tube on which Roentgen was working was s normal tube which consists of a glass envelope in which one cathode and one anode electrode were present and also the tube was fully evacuated from the air.

Every time, when he applied a high voltage through the tube, a fluorescent type of glow was produced from the crystal which is present near to the tube on the table. But due to the presence of normal light in the laboratory he was unable to notice the fluroscence of a crystal fully, so he decided to shielded his cathode ray tube with the heavy and thick black paper but that time also he was not clearly able to distinguish between the light and fluorescent ray ,and to make the visible difference between a ray and light very clear ,he painted his laboratory with the black paint and thick black paper so that not even a sunlight is able to reach inside and after that he discovered that the light which is emitted from a fluorescent crystal is green in color and generated by a platinum cyanide located a few feet away from the table.

After that he made many new experiments related to this new mysterious ray and concluded that this mysterious ray would pass through most of the substances by leaving shadows of solid objects and he decided to make a new announcement related to the discovery of a new mysterious ray but his did not able to decide what name should be given to this ray,and like as the concept of maths,he decided that let the ray is X ,he called them X which reflects the meaning of unknown Ray's.

After some days of this new discovery he found that X-Rays can pass through human tissues also, and make the differentiation between the tissues and bones very easy and visible.

The firs experiment of Roentgen was a film of his wife's hand (Annie Bertha) in 1895. But the interesting fact about this Ray's was that the first use of X-Rays was for an industrial purpose not for the medical because Roentgen produced a Radiograph of sets of weights in a box to make a prove of his discovery.

Roentgen's discovery was very serendipity event of an ERA and received the extraordinary interest of all the worldwide scientists as well as doctors because on those days most the magazine and newspapers were making many many new headings related to this discovery from which some are true while many are only assumptions.

Starting uses of an X-Rays.

In the starting month of discovery only many doctors makes use of these Ray's to make numerous kinds of medical radiographs which will be

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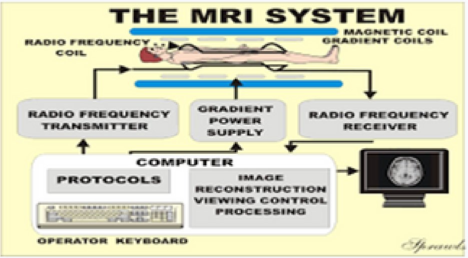
Basic Principals of MRI

Shubham Takate, Tejas Dhepe (BPMT Students), **Ravindra P.Gangurde** (Senior Radiographer),
Dr.Vasantrao Pawar Medical College Hosptal & Research Centre, Adgaon Nashik.

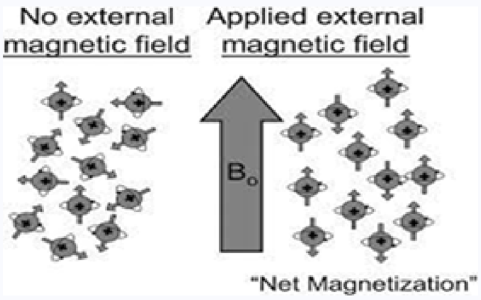
Four basic steps are involved in getting an MRI Image.

1. Placing the patients in the magnet.
2. Sending radio frequency (RF)pulse by coil.
3. Receiving signals from the patient again by coil.
4. Signals are sent to computers for complex processing to get image.



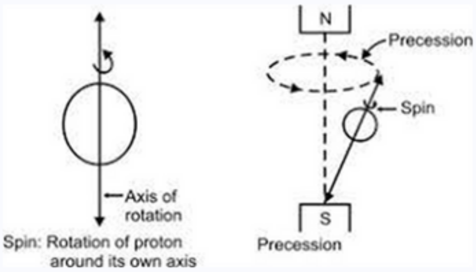
How does this proton help in MRI Imaging?

- MRI imaging is based on proton imaging.
- Proton is a positively charged particle in the nucleus of every atom.
- Since hydrogen ion (H++) has only one particle.
- Proton it is equivalent proton.
- Protons are positively charged and have rotatory movement called spin.
- Any charge, which moves, generates current.
- Every current has a small magnetic field around it.
- So every spinning proton has a small magnetic field.



Now patient is placed in the magnet

- These randomly moving protons align and spin in the direction of external magnetic field.
- Some of them align parallel and some anti-parallel to the external magnetic field.
- When proton aligns not only they
- rotate around themselves (called spin) but also their axis of rotation moves such that it forms a cone.
- This movement of axis of rotation of proton is called as precession
- The number of precessions of proton per second is precession frequency in hertz.
- Precession frequency is directly proportional to strength of external magnetic field.
- Stronger the external magnetic field higher is precession frequency.
- This relationship is expressed by lemurs equation.
- Precession frequency of hydrogen proton for 1 Tesla is 42 MHz and for 1.5 Tesla it is 64 MHz

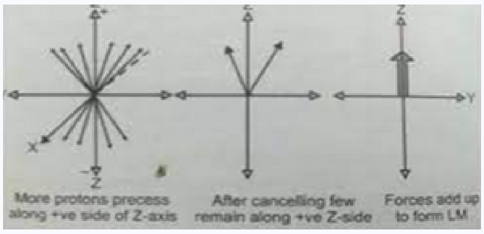


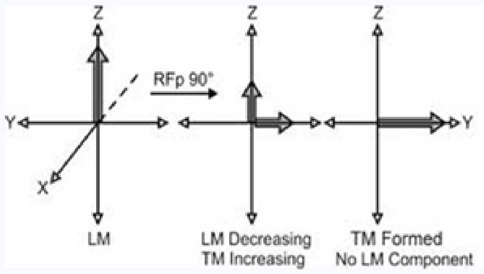
Magnetizition

- Now let us go one step further and understand what happens when proton align under influence of external magnetic field.
- For the orientation in space consider X,Y and Z axis system conventionally Z axis is the long axis of the patients as well as bore of the magnet .
- Proton aligns parallel and anti parallel to external magnetic field along positive and negative sides of z-axis. Force of proton on negative and positive side cancel each other. However there are always more proton spinning on the positive side or parallel to z axis than negative side.

Longitudinal magnetization

- Longitudinal magnetization along external magnetic field cannot be measured directly. For measurement it has to be
- transverse.
- So after cancelling each other proton remains on positive side, which are not cancelled.
- Forces of this proton add up together to form a magnetic vector along z-axis this is called longitudinal magnetization.





Transverse magnetization

Patient is placed in the magnet, longitudinal magnetization vector forms along Z-axis and in the long axis of the patient. At this stage radio frequency pulse is send. Recessing protons pick up some energy forms RF pulse. Some of these protons go to higher energy level and start processing anti-parallel. This result in reduction in the magnitude of longitudinal magnetization (LM) now add up to form a new magnetic vector in transverse (x-y) plane this is called as transverse magnetization.

For exchange of energy to occur between proton and RF pulse, precession frequency of protons should be same as RF pulse frequency. When RF pulse and protons have same frequency proton can pick up some energy from RF pulse.

This phenomenon is called as "resonance" the R of MRI.

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The Vital Role of Front Desk Executive & Cashier in Radiology Services

Amritpal Kaur, Front Desk Executive, Krshnna Diagnostic's Pvt. Ltd.

Introduction:
In the healthcare industry, radiology services play a critical role in the diagnosis and treatment of various medical conditions. Radiology services require a team of dedicated professionals to ensure the smooth functioning of the department. The front desk/cashier is an essential member of this team, and their role is crucial in ensuring the effective and efficient operation of the radiology department. This paper aims to explore the role of the front desk/cashier in radiology services.

Role of Front Desk Executive &Cashier: The front desk/cashier is the first point of contact for patients and visitors in the radiology department. They are responsible for managing the patient check-in process, scheduling appointments, and collecting payment for services. The front desk/cashier is also responsible for maintaining patient records and ensuring the accuracy of patient information. They serve as a liaison between the patients, radiology technologists, and radiologists, ensuring that all parties are informed and updated on the patient's status.

The front desk/cashier also plays a critical role in managing patient flow within the radiology department. They ensure that patients are seen in a timely manner and that there is minimal waiting time. They coordinate with the radiology technologists to ensure that patients are prepared for their exams and that the necessary equipment and supplies are available.

In addition, the front desk/cashier is responsible for managing the financial aspect of radiology services. They collect payment for services rendered, including co-payments, deductibles, and self-pay accounts. They also manage insurance claims and work with insurance providers to ensure that patients receive the necessary coverage for their radiology services.

Importance of Front Desk executive: The role of the front desk/cashier is vital in ensuring that the radiology department operates effectively and efficiently. Their responsibilities range from patient check-in to financial management, making them essential member of the radiology team. Without their support, patients may experience longer wait times, confusion over insurance coverage, and delays in receiving their radiology services.

Conclusion: In conclusion, the role of the front desk/cashier in radiology services is critical in ensuring the smooth functioning of the department. They serve as the first point of contact for patients, managing patient check-in, scheduling appointments, and collecting payment. They also play a significant role in managing patient flow and ensuring that patients are seen in a timely manner. The front desk/cashier is an integral part of the radiology team and their contribution is crucial in providing quality radiology services to patients.

Higher Education for Radiographers post Diploma / B. Sc in Radiology

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- Career Point University, Kota, Rajasthan
- Chettinadu University, Chennai, Tamilnadu
- Datta Meghe Institute of Medical Sciences, Sawangi, Wardha, Maharashtra
- Dhanalakshmi Sreenivasan University, Perambalur, Trichy, Kerala
- J. S. University, Faizabad, Utter Pradesh
- Kovai Medical Center & Hospital, Coimbatore, Tamilnadu
- Manipal Academy of Higher Education, Jaipur, Rajasthan
- Manipal Academy of Higher Education, Manipal, Karnataka
- Martin Luther Christian University, Shillong, Meghalaya
- MGM Institute of Health Sciences, MGM University, Navi Mumbai, Maharashtra
- NITTE University's - K. S. Hegde Medical Academy, Mangalore, Karnataka
- Pushpagiri College of Allied Health Sciences, Tiruvalla, Kerala
- Sri Ramachandra University, Chennaai, Tamilnadu
- Srinivas University, Surathkal, Mangalore, Karnataka
- SRM University, Chennai, Tamilnadu
- Swami Vivekanand Subharati University, Meerut, Utter Pradesh
- The Tamilnadu Dr. MGR Medical University, Chennai, Tamilnadu
- Vinayaka Mission, Salem, Tamilnadu

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- 1 Year PG Diploma in Magnetic Resonance Imaging (MRI) Technology.
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- Fellowship in Body/MSK & Neuro Imaging for 1 year.

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Homi Bhabha Cancer Hospital, Tata Memorial Centre, Varanasi, Utter Pradesh

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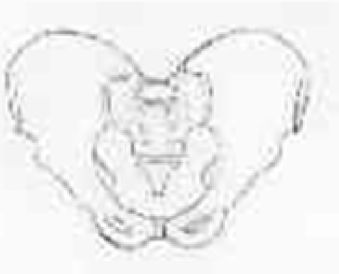
Inlet and Outlet Views : Pelvis Radiography

Ramesh Sharma, Rtd. Chief Technical Officer Radiology, NCI-AIIMS

Musculoskeletal plain radiographic imaging protocols are typically predicated on orthogonal views of the bone or joint being evaluated. Pelvic injury has been evaluated with 45 degrees inlet and 45 degrees outlet radiographs. While these views are perpendicular to each other, they may not be in the best plane to evaluate pelvic injury because of variable lumbopelvic anatomy. We hypothesized that inlet and outlet radiographic views optimized to examine the clinically relevant osseous landmarks vary substantially from routine 45 degrees inlet and outlet views

Inlet View of the Pelvis: (cauded projection)



Caudad projection, also called inlet view, best demonstrates ring configuration of pelvis, & narrowing or widening of diameter of ring is immediately apparent. evaluates for **posterior displacement** of pelvic ring or opening of pubic symphysis;

Technique:
x-ray is parallel to plane of sacrum, & sacrum is seen on end w/ vertebral body anteriorly & sacral lamina posteriorly;

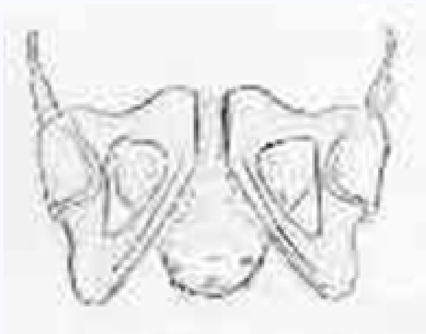
Musculoskeletal plain radiographic imaging protocols are typically predicated on orthogonal views of the bone or joint being evaluated. Pelvic injury has been evaluated with 45 degrees inlet and 45 degrees outlet radiographs. While these views are perpendicular to each other, they may not be in the best plane to evaluate pelvic injury because of variable lumbopelvic anatomy. We hypothesized that inlet and outlet radiographic views optimized to examine the clinically relevant osseous landmarks vary substantially from routine 45 degrees inlet and outlet views

Patient is positioned as in AP view of pelvis w/ beam tilted 25 degree caudally;

- or taken by directing X-ray beam 60 deg from head to mid pelvis, is best radiographic view to demonstrate posterior displacement;

Outlet View: (cephalad projection)
cephalad projection, also called the outlet or tangential view,shows the anterior ring superimposed on the posterior ring.

- evaluates for vertical shift of pelvis (migration of hemipelvis); proximal or distal displacements of anterior or posterior
  portion of ring are best appreciated on this view;
- sacrum appears in its longest dimension, w/ neural foramina evident.



Technique: x-ray beam is perpendicular to plane of sacrum. Patient is positioned as in AP view of pelvis w/ beam tilted 35 degcephalad

Misc : In patients with severe flexion contractures of hip, AP view frequently appears similar to pelvic inlet view, because pelvis is tilted inferiorly;in such cases, better AP radiograph is produced if the hips are slightly flexed to place the pelvis in a more neutral position.

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And one more thing, we have conveyed this issue to you, as an enlightened Radiographer, now it is your responsibility to forward this issue to other Radiographers.

Thanks in advance,
Editor -in - Chief

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- Radiology and Radiotherapy Centers
- Orthopedic X-Ray Units and Dental X-Ray Units
- Nuclear Medicine Centers

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How to choose a right scanner for your department

J Venkat, MBA, Ireland recognized Radiographer (CORU), Asst. Professor, Global Hospital, Chennai

Introduction:
In this article, we will guide you to choose a right CT scanner with all critical specification and requirement

CT scan brand:
First, you need to choose the brand depending on your budget, patient load and service support in your region.
Here are few brands available in the market

- Toshiba: Aquilion and Activion
- Siemens: Somatom Emotion, Sensation, and Definition
- GE: BrightSpeed, Discovery, LightSpeed, and Optima
- Philips: Ingenuity and Brilliance
- Generally speaking: GE is easy maintenance, Philips is affordability, and Siemens is innovation, then Toshiba is power and quality

CT scanner Slices
There are 4, 8, 16, 32, 40, 64,128, 256 and 320 slices available. You need to choose the slices depending upon your type of cases, number of cases and your budget. High slices more expensive and more electricity charges and maintenance charges. Please look at the chart below and select the right slices.

Slices	4-8	16-32	64	128	256/320
General Imaging	Good Slow	Good fast	Good Faster	Good High speed	Good High speed
Trauma	Not good Slow	Good fast	Good Faster	Good High speed	Good High speed
Vascular	Not suitable	Good fast	Good Faster	Good High speed	Good High speed
Cardio	Not suitable	Not suitable	Good Slow	Better fast	Best High speed

X-ray tube and MHU: X-ray tubes are defined by the amount of heat they can withstand, measured in an MHU (Mega Heat Unit). The larger the number (MHU), the more heat the tube can take and the more exams it can perform amount of heat they can withstand. MHU can assist you in estimating how long a CT scanner tube will last. For example, a 7MHU tube can last more than 150 million mAs, while a 4 MHU tube lasts approx. 70-100 million mAs.

Bore sizes: It varies from 70cm, 80cm and 90cm. Larger bore size accommodate obese patients and more FOV. Higher FOV improves diagnosis. Larger bore size more suitable for interventional procedures.

Air cooled vs Water cooled CT systems
Air-cooled systems dissipate heat to the surrounding air through the outer covers of the gantry by a fan.
Water-cooled CT uses chilled water to reduce the temperature

The most widely used is air-cooling, but you can also get water-cooled models, mainly from Siemens and Philips, such as the Siemens Sensation line.

Benefits of air-cooled systems:	Benefits of water-cooled systems:
Less preventive maintenance	Almost zero noise
No water quality concerns	Clean – no dust from heavy airflow of fans
No need for an external chiller	No additional HVAC system per room
Takes up less space and is easier to install	Often cheaper acquisition cost
A cheaper cooling system in the long term Has a smaller footprint	Suitable for rooms with inconsistent humidity and temperature control as temperature changes have less effect on the water cooled system than on an air cooled system

CT scan workstation
A workstation is an option for most medical imaging equipment. It should be a high speed (minimum post-processing frame rate of 16 frames/sec). CPU with a speed of 3.0 GHz or better and with an independent hard disc storage capacity of 1 TB or more, with 19 inches or more. High-resolution medical grade color LCD monitors capable of simultaneously viewing and performing all post processing functions and filming independently without the help of main console.

Processing Softwares: This should include following criteria
(i) Perfusion CT for brain
(ii) CT Angio, VRT, MIP, MPR, 3-D Shaded Surface display, Image Fusion, Vesselsegmentation, luminal view
(iii) Virtual Endoscopy with facility for virtual dissection and computer aideddetection of polyps.
(iv)Advanced cardiac package including Coronary Artery Imaging, CalciumScoring, Myocardial Viability software, and Cardiac functional analysis and advanced VesselAnalysis including stenosis assessment. Facility for prospective and retrospective ECG editing,facility for automatic selection of rotation speed according to heartbeat and step and shoot forlow dose acquisition should be available. (for more than 64 slices)
(v) Automatic bone Removal facility.
(vi) Dental CT.
(vii) Lung nodule evaluation software.
(viii) DSA (for more than 16 slices

Laser Imager:
It is used to print CT scan images. Popular brands are Konica Minolta, Carestream, Agfa and Fujifilms. You can choose one of them depending upon the price and service availability. However, following specification should be considered
1. Resolution: 16 bits/ 500 dpi or more with minimum three ports
2. Support Multiple Film Sizes: one of which must be 17”x14”.
3. DICOM 3.0 Compatible

Warranty:
It should be 24 months from the date of satisfactory installation. The warranty should cover all the accessories including CT tube and all major components

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Roles of Six Sigma Quality Tools in Radiology

Sanjeev Kumar, Msc, Radiation and physics, District Hospital, Bathinda.

Abstract:
Radiology plays an important role in the diagnosis and treatment of various medical conditions. In order to improve the quality of radiology services, Six Sigma quality tools can be implemented. Six Sigma is a data-driven approach to quality improvement that aims to reduce defects and variability in processes. This paper explores the application of Six Sigma quality tools in radiology, highlighting the benefits and challenges of their implementation.

Introduction:
Radiology is a medical specialty that uses imaging techniques to diagnose and treat diseases. Radiology services are critical to patient care, and the quality of these services can have a significant impact on patient outcomes. Six Sigma quality tools can be implemented in radiology to improve the quality of services provided. Six Sigma is a methodology that aims to reduce defects and variability in processes, resulting in improved quality and efficiency.

Application of Six Sigma Quality Tools in Radiology:
Six Sigma quality tools can be applied in various areas of radiology, including image acquisition, interpretation, and reporting. The following are some examples of Six Sigma quality tools that can be used in radiology:

Process mapping: Process mapping is a tool used to identify the steps in a process and their interrelationships. In radiology, process mapping can be used to identify the steps involved in image acquisition, interpretation, and reporting, and to identify areas where improvements can be made.

Statistical process control (SPC): SPC is a tool used to monitor and control a process using statistical methods. In radiology, SPC can be used to monitor the quality of images and to identify areas where improvements can be made.

Failure mode and effects analysis (FMEA): FMEA is a tool used to identify potential failures in a process and their effects. In radiology, FMEA can be used to identify potential errors in image interpretation and reporting, and to develop strategies to prevent these errors from occurring.

Root cause analysis (RCA): RCA is a tool used to identify the underlying causes of a problem. In radiology, RCA can be used to identify the causes of errors in image acquisition, interpretation, and reporting, and to develop strategies to prevent these errors from occurring in the future.

Benefits of Six Sigma Quality Tools Implementation:
The implementation of Six Sigma quality tools in radiology can provide several benefits, including:

Improved quality: Six Sigma quality tools can help to identify areas where improvements can be made in the radiology process, resulting in improved quality of services provided.

Increased efficiency: Six Sigma quality tools can help to reduce variability in the radiology process, resulting in increased efficiency.

Cost savings: By reducing defects and variability, Six Sigma quality tools can help to reduce costs associated with errors and rework.

Enhanced patient safety: By improving the quality of radiology services provided, Six Sigma quality tools can help to enhance patient safety.

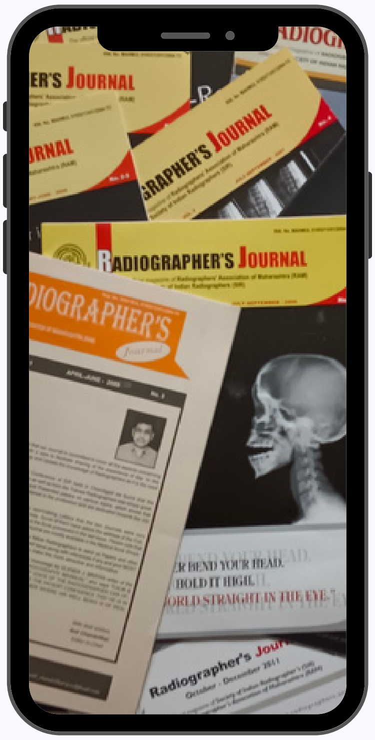
Challenges of Six Sigma Quality Tools Implementation:
The implementation of Six Sigma quality tools in radiology can also present several challenges, including:

Resistance to change: Implementing Six Sigma quality tools may require changes to the radiology process, which may be met with resistance from staff members.

Data availability: Implementing Six Sigma quality tools requires the collection and analysis of data, which may not be readily available in radiology.

Training and education: Implementing Six Sigma quality tools requires training and education of staff members, which may require additional resources.

Conclusion:
The implementation of Six Sigma quality tools in radiology can provide several benefits, including improved quality, increased efficiency, cost savings, and enhanced patient safety. However, the implementation of Six Sigma quality tools may also present several challenges, including resistance to change, data availability, and training and education. Despite these challenges.



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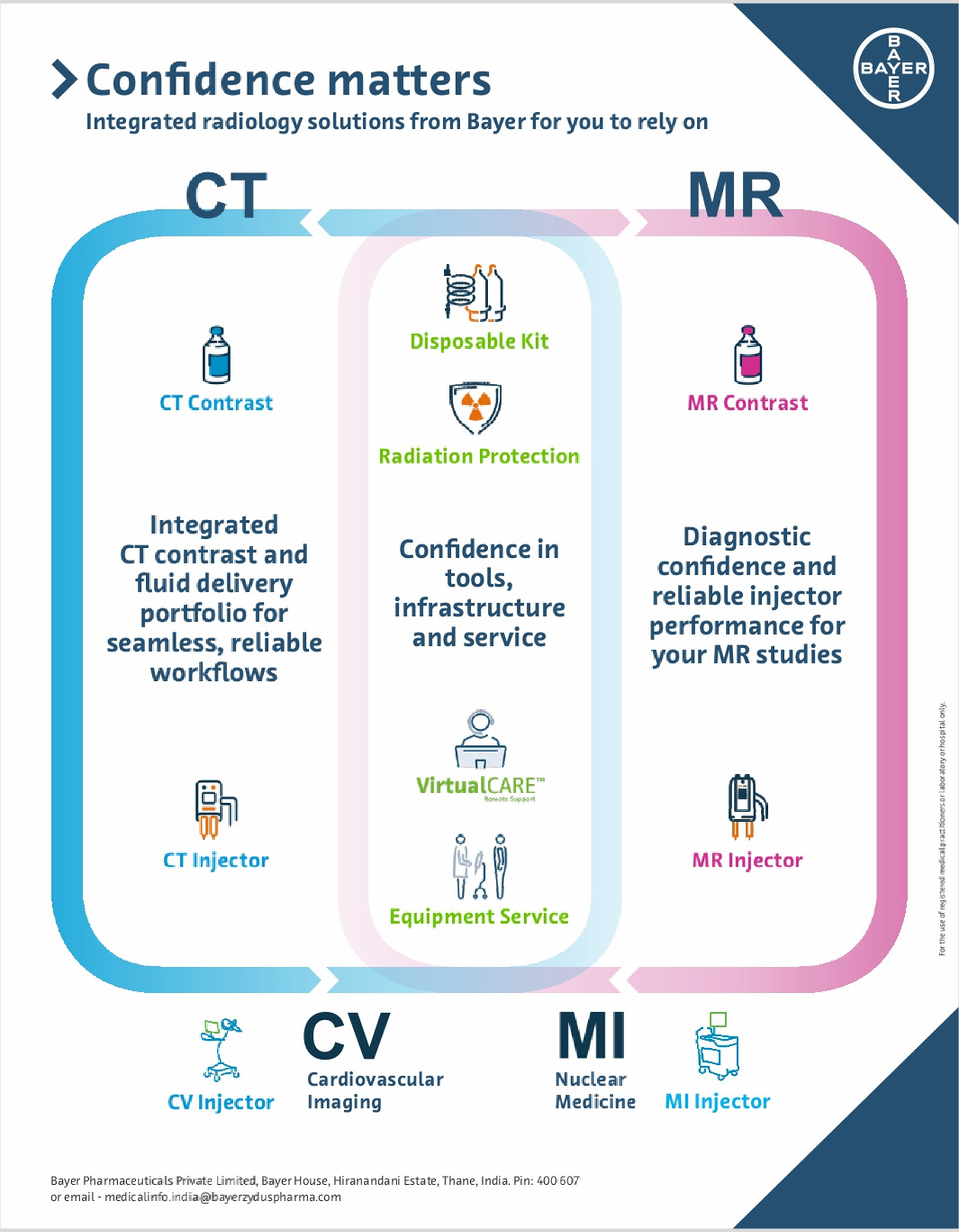
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MR Fingerprinting

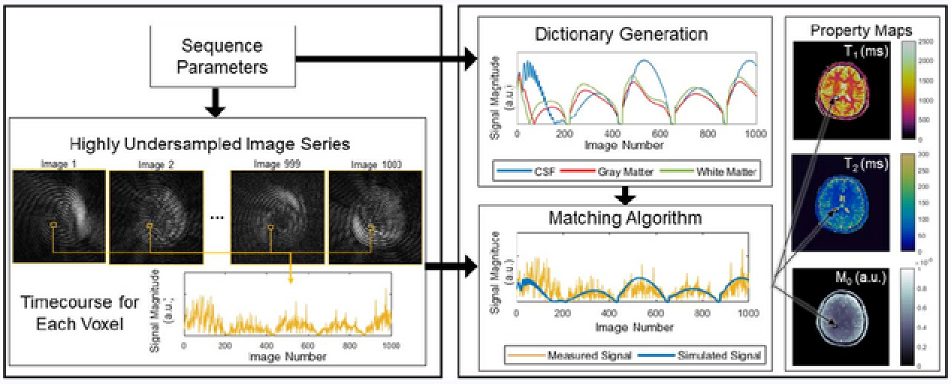
Vanessa Kathlyn Pereira, MSc MIT, K S Hegde Medical Academy, NITTE Deemed to be university, Magalore

Magnetic Resonance imaging has traditionally been a mixture of weighted tissue properties, provided by sequential, repetitive data acquisition with fixed parameters. Diagnostic evaluation was purely qualitative and highly dependent on system parameters. Magnetic Resonance Fingerprinting(MRF) makes it possible to glean quantitative information from scans that can enable decisions based on digital tissue data, and the target anatomy can be described objectively.

MRF is a recent approach to quantitative magnetic resonance imaging that allows simultaneous measurement of multiple tissue properties in a single, time-efficient acquisition. The ability to reproducibly and quantitatively measure tissue properties could enable more objective tissue diagnosis, comparisons of scans acquired at different locations and time points, longitudinal follow-up of individual patients and development of imaging biomarkers.

Magnetic Resonance Fingerprinting (MRF)

MRF can be described as a three-step process comprising of data acquisition, pattern matching, and tissue property visualization. The data acquisition involves deliberately varying MR system settings and parameters, i.e. the MRF pulse sequence, in a pseudo random manner in order to generate unique signal evolutions, or “fingerprints”, for each combination of the tissue properties of interest. The fingerprints from individual voxels are compared with a collection of simulated fingerprints contained in a dictionary generated for that MRF sequence. The best match for the voxel fingerprint is selected from the dictionary through a pattern-matching process. Once there is a pattern match, the combination of tissue properties that were used to generate the simulated fingerprints are identified as the underlying tissue properties in that voxel and these tissue properties are depicted as pixel-wise maps that are perfectly registered to one another, thereby providing quantitative and anatomic information.



Data Acquisition

In MRF, there is a fundamental difference in the way data are acquired, as compared to conventional MRI. Instead of repeating the same acquisition parameters over time in a particular sequence until all the data in k-space have been obtained and used to reconstruct images with weighting by a particular property; in MRF the acquisition parameters such as the radiofrequency excitation angle (FA) and phase, repetition time, and k-space sampling trajectory, are varied throughout the acquisition, which when implemented properly can generate a unique signal timecourse for each tissue. The acquisition is made sensitive to multiple tissue properties by simultaneously varying multiple sequence parameters throughout acquisition providing fingerprint-like signal revolution for the combination of desired tissue properties.

Dictionary Generation and Pattern matching

Every MRF acquisition sequence has its own dictionary that is calculated before scanning. The dictionary is a database of possible unique signal evolution or fingerprints. It is equivalent to the database where all the known fingerprints are stored, together with all the information relative to each person. In the forensic case, each fingerprint points to the feature identification of the associated person such as name, height, weight, eye color, date of birth, etc. In the case of MRF, each fingerprint in the dictionary points to the MR-related identification features of the associated tissue (such as T1, T2, relative spin density, B0, diffusion, etc.). A pattern matching process compares the fingerprint with the dictionary. Pattern matching involves matching the patterns of signal evolutions generated for individual tissue voxels, against the best corresponding entry in the overall dictionary of possible signal evolutions generated for that sequence. When there is a match, the properties of this fingerprint are assigned to a map.

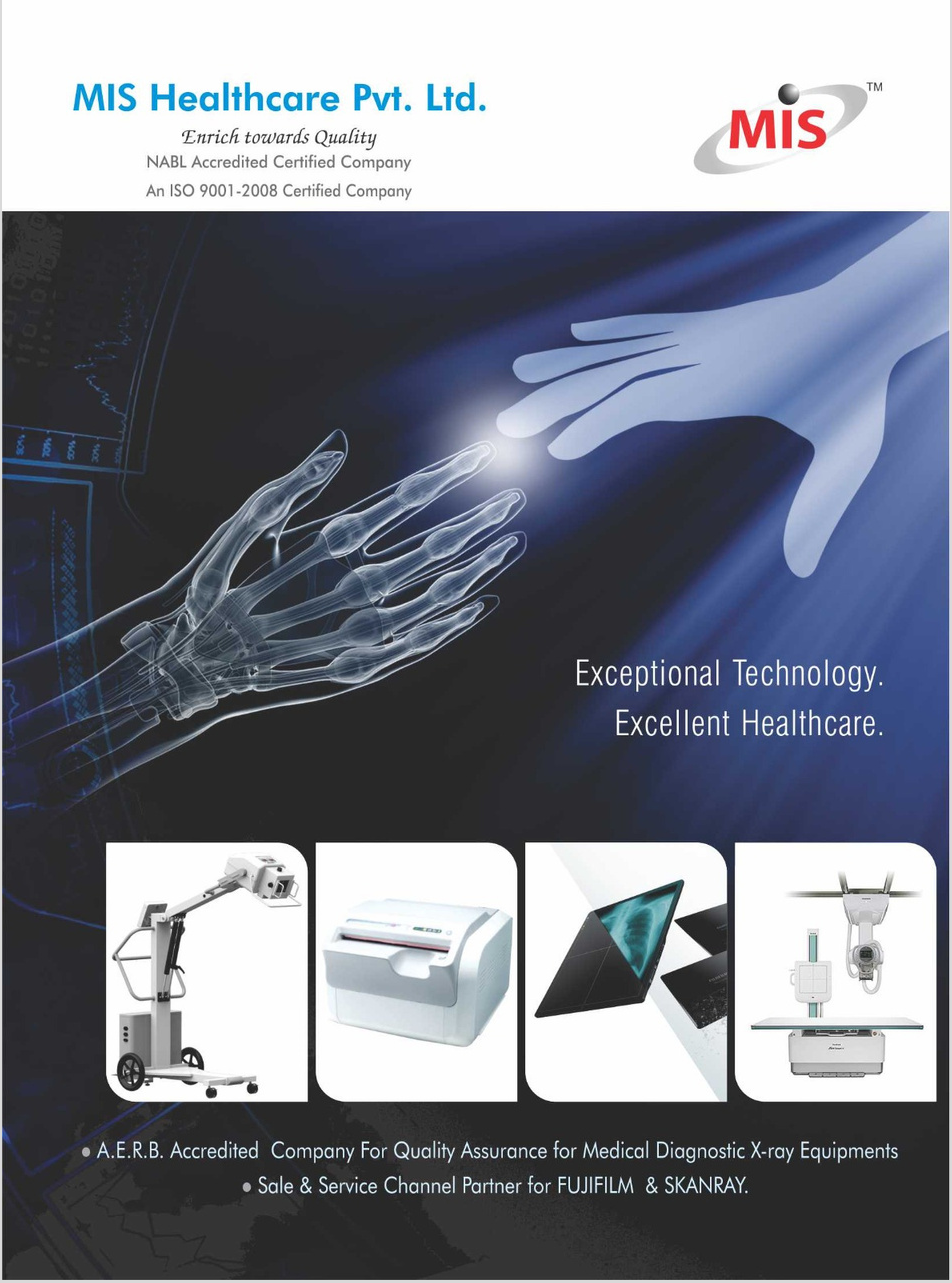
Clinical applications

MRF has been validated with phantom studies as well as in normal volunteers and patients. The T1 and T2 values obtained with MRF studies have shown a good correlation with conventional T1 and T2 mapping methods. The utility of MRF has also been demonstrated in preclinical and animal studies. Clinical applications of MRF to date have been greatly focused on the brain and prostate and have shown promise in the abdomen, musculoskeletal and cardiac applications.It has been used to differentiate between various brain tumors, separate prostate cancer from normal prostatic tissue and characterize liver metastases.

References

·Magnetic Resonance Fingerprinting: Implications and Opportunities for PET/MR: Kathleen M. Ropella-Panagis, N. Seiberlich, V. Gulani

·Magnetic Resonance Fingerprinting-An OverviewAnanya Panda, MD, DNB,1 Bhairav B. Mehta, PhD,1 Simone Coppo, PhD,1 Yun Jiang, PhD,2 Dan Ma, PhD,1 Nicole Seiberlich, PhD,1,2 Mark A. Griswold, PhD,1,2 and Vikas Gulani, MD, PhD1,2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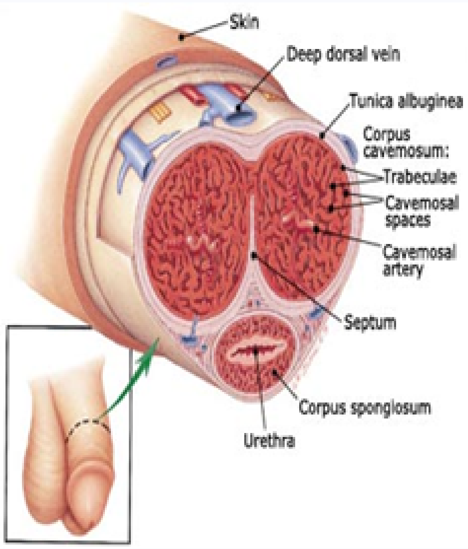
CAVERNOSOGRAPHY

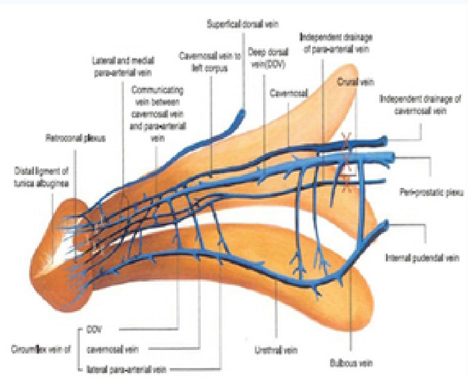
Mr. Murugesh. E, BOT, M.Sc (Psy), DRDT, MRT, Radiographer - Govt. Medical College, Omandurar Govt. Estate, Chennai.

Cavernosography is the radiological examination/Visualization of the corpus cavernosum of the penis following the injection of Radio-Opaque contrast media.

Acute Penile "fracture" or rupture of the corpus cavernosum is a relatively rare and unusual surgical emergency. Corpus cavernosography is a useful radiological procedure employed in the investigation of penile fracture.

Vascular anatomy of Penis:





Mechanism of Erection: During sexual arousal, nerve messages begin to stimulate the penis. Impulses from the brain and local nerves cause the muscles of the corpora cavernosa to relax, allowing blood to flow in and fill the open spaces. The blood creates pressure in the corpora cavernosa, making the penis expand and creating an erection.

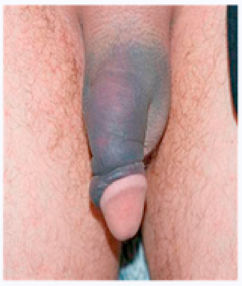
Indication of Cavernosography:

- Penile fracture
- Erectile dysfunction (Vascular Incompetence

Procedure Requirement:

- Fluroscopy unit with IITV
- Sterile tray setup
- Butterfly needle
- Non-ionic isoosmolar contrast (Iohexol)
- Saline for dilution
- Papaverine
- Insulin syringe

Penile Fracture Egg Plant Deformity



Penile Fracture Distortion & Hematoma

Patient preparation:

- Groins Cleanly shaved
- NPO on the day of procedure
- Bladder emptied before procedure
- Procedure clearly explained to the patient
- Consent obtained

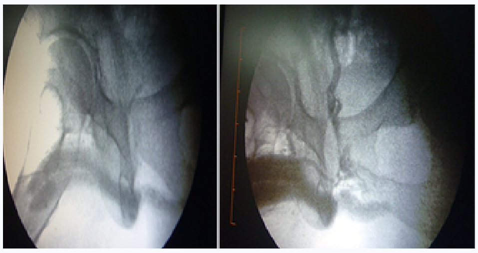
Procedure Steps:

- Under Sterile Aseptic condition, cavernosography is performed by injection of 15 to 70 ml of half- to quarter-strength nonionic contrast dye directly into the uninvolved corpora under live fluoroscopy.
- Injection is continued until both corpora are filled and tumescent changes are observed.
- Anteroposterior and oblique radiographs should be obtained over several time intervals.
- Early films are reviewed for filling defects and extravasation at the suspected hematoma site.
- 10-minute-delayed films should ascertain for delayed extravasation.

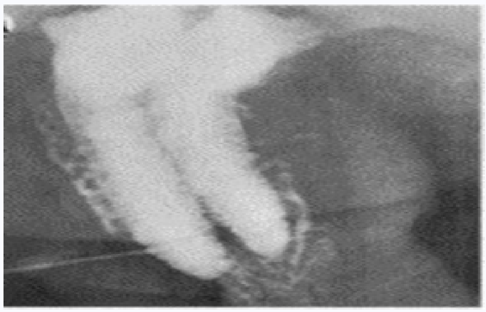
Intra-operative cavernosography can be performed on the operating room table in an identical manner.

Scout film is taken before the injection of Dye/Contrast

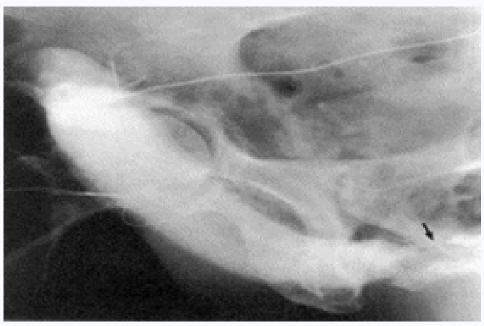
Butterfly needle inside corpora



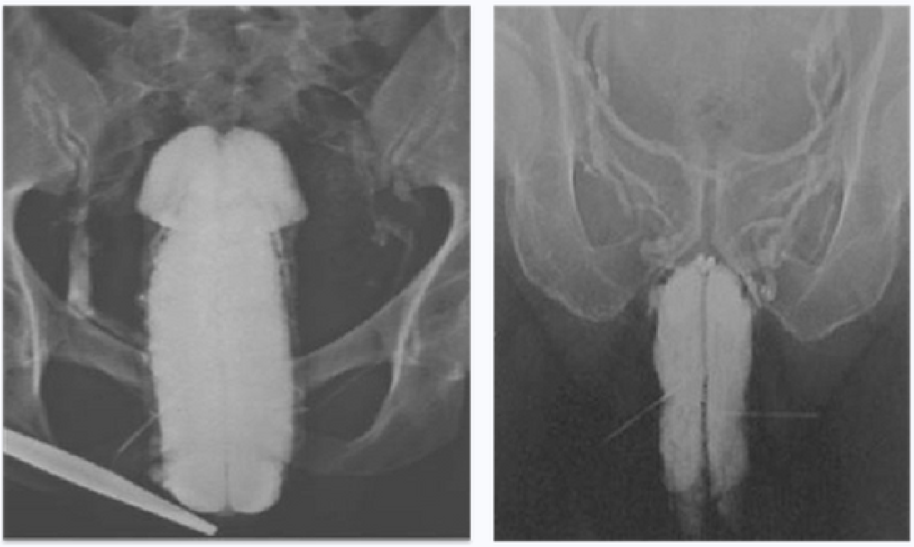
Fluroscopy image showing Normal Vascular anatomy of Penis (Venous system)



Normal Study - Corpus cavernosography

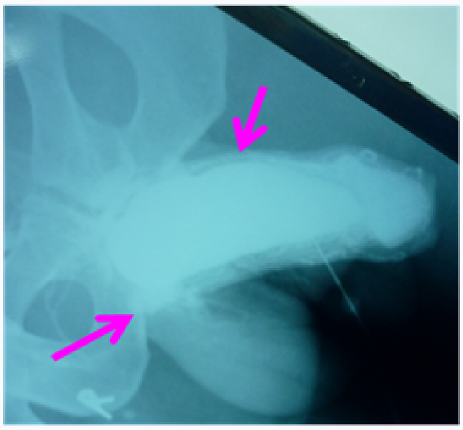


Bilateral proximal site specific leakage



Erectile dysfunction showing venous leak into pelvis vessels

Suspected Leakage



Post papaverine - Normal erection mild dorsal bending

AUG showing mild leak

Post-procedure care:

- Re-Assurance
- Hydration
- Management of Priapism

Limitations and Complications:

- Primary limitations to cavernosography include the time, expertise, and equipment required to perform the study.
- Complications of cavernosography include allergic reaction, corporal fibrosis, and priapism of acute fracture of the penis.

Conclusion:

- Cavernosography - Emergency Modality in Evaluation of Morphology-Anatomical-Physiological Dysfunction in Penile Trauma.

Expertise Knowledge is the Key to Success

Reference:

1. Hricak H, Marotti M, Gilbert TJ, et al. Normal penile anatomy and abnormal penile conditions: evaluation with MR imaging.
2. Satragno L, Martinoli C, Cittadini G. Magnetic resonance imaging of the penis: normal anatomy.

आप भी अपना पाठक धर्म निभाएँ

पत्रिका का अंक मिला, डाउन लोड किया, पढा और डिलीट कर दिया. केवल इससे पाठक धर्म नहीं निभ जाता. पत्रिका में प्रकाशित सामग्री से आप सहमत हो सकते हैं या उसमें आप कुछ और जोड़ सकते हैं, तो ऐसे मामलों में अपनी टिप्पणी अथवा प्रतिक्रिया हमें अवश्य लिख भेंजे. इसी प्रकार पत्रिका में जो मुद्दे उठाए गए हों, जो प्रश्न खड़े किए गए हों, उन पर भी खुल कर बहस करें और हमें लिख भेंजे. तात्पर्य यह है कि आप केवल पाठक ही न बने रहें, पाठक धर्म भी साथ में निभाते रहें इससे जहां अन्य पाठक बंधु लाभान्वित होंगे वहीं हमें भी विभिन्न रूपों से मार्गदर्शन मिलेगा. हाँ तो, जब भी समय की मांग हो, कलम उठाना न भूलें.

और एक बात, ये अंक हमने आप तक पहुंचाया, एक प्रबुद्ध रेडियोग्राफर के नाते अब ये आप की ज़िम्मेदारी बनती है कि इस अंक को आप भी और रडीओग्राफेर्स तक पहुंचाए यानि फॉरवर्ड करें.

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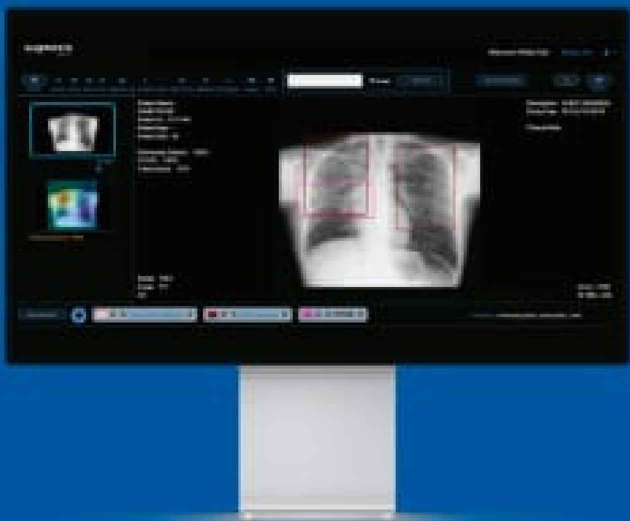

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Radiation Risk-Benefit Communication during Paediatric CT Imaging

Ashish Raut, Msc. Radiation Technology, Cheif Radiology Tecnologist, National Cancer Institute, Nagpur.

Radiation dose knowledge and effective communication skills are essential for radiographers to be able to appropriately fulfil their legal responsibilities to justify each medical exposure. Furthermore, they enable the optimisation of imaging protocols and techniques according to the child's characteristics and underlying clinical conditions. Previous studies have shown that radiographers do not provide paediatric patients and their parents/guardians with adequate information about doses and risks before a procedure. However, they have a legal responsibility to explain the radiation risk associated with performing the procedure as well as the associated risk of not performing the same procedure. There are several obstacles to describing ionizing radiation risk, including the ionizing radiation language that is not readily understood by non-imaging personnel. This study aimed to explore and describe the radiographers' experiences of radiation risk-benefit communication during pediatric CT imaging at cancer hospitals.

Methods

Radiation risk-benefit communication can be defined as the communication of information about the potential benefits and risks of a radiation-based examination as well as the alternative imaging methods available to the patient

1. Communication of radiation risks and benefits is a legal requirement and must be done effectively before a procedure is undertaken.
2. Effective communication is an important part of healthcare professionals' roles and it should be tailored to suit each patient and enable patients to form informed decisions.
3. Effective communication skills must be complemented with adequate radiation dose knowledge for imaging professionals to sufficiently execute their roles in justifying and optimising imaging protocols for children.

Job satisfaction during radiation risk-benefit communication as well as mutual benefit between the radiographer and the patient's parents or guardians were established as positive experiences. These boosted radiographers confidence and enhanced their participation in radiation risk-benefit communication with paediatric patients' parents and guardians.

- While CT -scanning of children, we should keep in mind that we should complete the scan in minimum time and minimum exposure.
- We also have to keep in mind that while scanning the children paediatrician kept watching the children during the scan keep watching child's pulse rate and spo2 also.
- The actual CT scan does not take long at all and should be completed in less than 10 minutes. It is very important that your child lay very still in order for the scan to be completed. A seat belt will be placed across their body. The bed will move through the CT scanner and come back out once or twice. During this time, your child will need to hold their body still in order to get clear pictures. Depending on the type of exam, your child may need to hold their breath.
- Your child will have the sedation medicine as a liquid to swallow, a nasal spray or intravenously about 20 to 45 minutes before the scan is scheduled. in under of paediatric Doctor .
- Children may receive a higher radiation dose than necessary if CT settings are not adjusted for their smaller body size. so it can our responsibility to take care of that and CT Technologist may be responsible for that . In the last decade improvements in CT equipment have allowed for better images at lower doses. The use of appropriate settings has also become much more widespread, resulting in reductions in doses for children. There is no need for higher doses in children, and appropriate settings should always be used.
- Perform only necessary CT examinations. Communication between paediatric health care providers and radiologists can determine the need for CT and the technique to be used. There are standard indications for CT in children, and radiologists shouldreview reasons prior to every paediatric scan and be available for consultation when indications are uncertain. When appropriate, other modalities such as ultrasound or magnetic resonance imaging (MRI), which do not use ionizing radiation, should be considered.

Adjust exposure parameters for paediatric CT based on

Child size: guidelines based on individual size / weight parameters should be used.

Region scanned: the region of the body scanned should be limited to the smallest necessary area.

Organ systems scanned: lower mA and/or kVp settings should be considered for skeletal, lung imaging, and some CT angiographic and follow up examinations.

Scan resolution:

The highest quality images (i.e., those that require the most radiation) are not always required to make diagnoses. In many cases, lower-resolution scans are diagnostic. Providers should be familiar with the dose descriptors available on CT scanners and minimize the use of CT examinations that use multiple scans obtained during different phases of contrast enhancement (multiphase examinations). These multiphase examinations result in a considerable increase in dose and are rarely necessary, especially in body (chest and abdomen) imaging.

Conclusion:

Although CT remains a crucial tool for paediatric diagnosis, it is important for the health care community to work together to minimize the radiation dose to children. Radiologists should continually think about reducing exposure as low as reasonably achievable by using exposure settings customized for children. All physicians who prescribe paediatric CT should continually assess its use on a case-by-case basis. Used prudently and optimally, CT is one of the most valuable imaging modalities for both children and adults.

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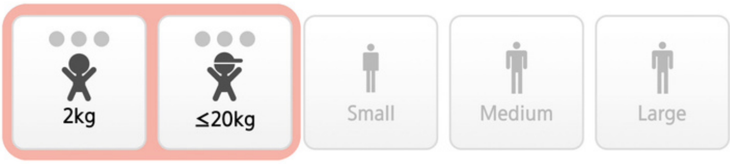
Patient Size



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MRI Protocol for Brachytherapy Planning for female pelvis cervical and vaginal cancer.

Anurag Kumar Shukla, Homi Bhabha Cancer Hospital & Research Centre, Visakhapatnam, Andhra Pradesh

This study is for radiation planning protocol for cervical and vaginal cancer in HBCH & RC Visakhapatnam Andhra Pradesh.

Preparation before scan :

- Scan time = Approximately 20 minutes
- NPO for 4 hours prior
- Void prior to exam start
- Consent from patient relative should be taken.
-

Instructions:

- The doctor will indicate if vaginal gel or syed device/Applicator is needed.
- Brachytherapy Doctor will be place the syed device/Applicator while patient is on MR table.
- Instruct patient to do not move their pelvic area during the scan.
- If gel is needed nurse will push the gel to cervix under supervision of brachytherapy doctors.

Medical physicists will assist the brachytherapy doctors while inserting the syed device/Applicator.

Patient positioning :

- Patient should be in supine position.
- Then instruction regarding the scan is given to the patient.
- Torso coil is fixed tightly to avoid the patient movements.

Then position marker is given at sacrum level.

Parameters for the scan:

Plane	Mode	S/G (mm)	FOV	Scan Range	Notes
SAG T2	TSE	3/0	350 mm	Sacrum to anterior abdominal wall. L4 to buttocks.	Confirm good coil placement
3D AX T2	3D TSE	1 mm slice interpolated to 0 mm	270 mm/ Fit toPatient	Entire Vagina, Cervix, or Uterus depending on area of interest	Anterior sat band. Reformat other 2 planes at 1 mm.
AX T2	TSE/HI-RES	3/0	200-240 mm/Fit to Patient. Matrix 512 x256-512.	Entire Vagina, Cervix, or Uterus depending on area of interest	Call radiologist for planning! Use all planes to obtain true axial to organ of interest.
COR T2	TSE/HI-RES	3/0	200-240mm/Fit to Patient	Minimize to relevant anatomy	Call radiologist for planning! Obtain true coronal to organ of interest. L-R phase direction

Contd. from Page No. 2......

DR. Roentgen Rays "A Serendipity Event of an ERA"

useful in the guidance of their work also in June 1896,only 6 Months after the announcement of the discovery X-Rays were used by many physicians in the battle ground to locate bullets and injuries of bones in the wounded soldiers.

Before 1912, X-Rays were not used in the industrial field because of the requirement of very high voltages due to which X-Ray tubes broken down for the production of highly penetrating power which would be useful in the industrial field but after the invention of high vacuum Coolidge's X-Ray tube in 1913, X-Rays makes it use for an industrial purpose.

And in the honor of Roentgen's were, he got his first noble prize in physics in 1901.
But along with the clinical use of X-rays which proved very helpful, there were some potential side effects from this newly discovered Ray's, which were proved by some scientists including Thomas Edison, Nicola Tesla and William J Morton with the help of some related injuries from experiments of X-rays.

Conclusion

Nowadays, we have better understanding about the risks versus benefits associated with radiation exposure and also we have many different types of laws and protocols to minimize the overexposure or unnecessary exposure of the radiation to the human life. Due to the presence of risk associating factors of this amazing radiation, we can't ignore the development of today's new imaging technologies for eg. (Magnetic resonance imaging) ,Computed Tomography, Ultrasound, Mammography, Fluoroscopy, Digital Subtraction Angiography (DSA),Dental Radiography and many more which make the better diagnosis of the new disease before it completely visible outside.

"Don't make a bad legacy for an accidental Discovery"

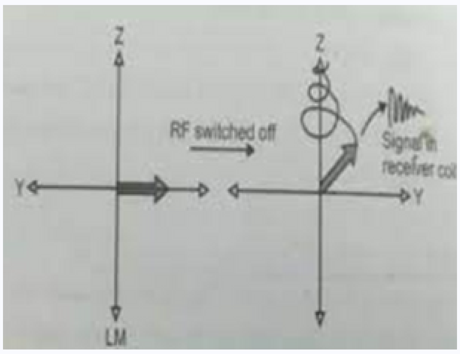
Contd. from Page No. 4......

Basic Principals of MRI

RF pulse not only causes protons to go higher level but also makes them precess in step or in phase.

MR Signal

Transverse magnetization vector formed has a precession frequency. When it moves it produces electric current. The coils receive the current as MR Signal. Strength of the MR signal depends upon magnitude of transverse magnetization. Mr Signals are Fourier transformed into MR image by computers.



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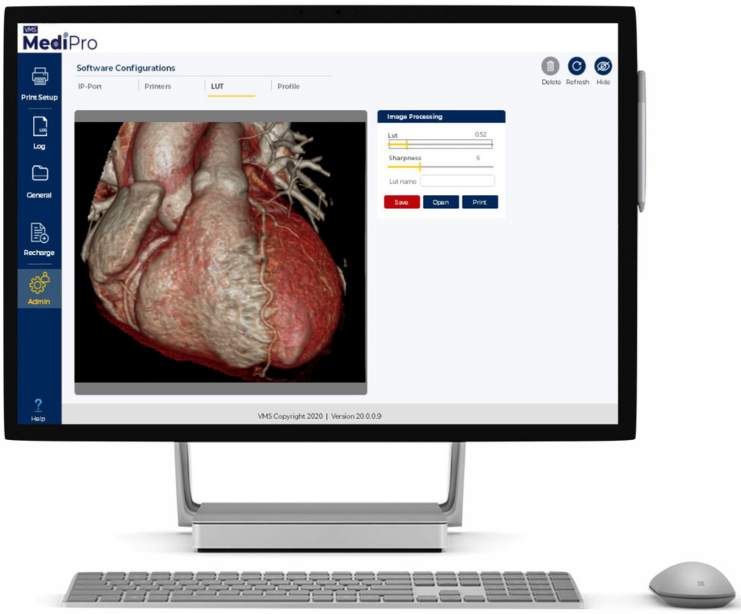

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