

(1)

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Viva Assignment :-

Q1) What are disadvantages of DR?

* Disadvantages of Digital Radiography :-

- ⇒ poorer spatial resolution.
- ⇒ Artifacts due to the imaging plate, image processing algorithms etc.
- ⇒ Non availability of post-processing function.
- ⇒ Increased sensitivity to scattered radiation.
- ⇒ More expensive than screen-film radiography.
- ⇒ Lack of familiarity to radiologists and radiographers.
- ⇒ Require adequate infection control protocols.
- ⇒ Discomfort of sensors due to bulkiness and interference of cord.
- ⇒ Initial cost of system and cost for replacement equipment.
- ⇒ Biggest disadvantages of digital radiography is the cost of replacing existing radiographic equipment.

(2)

- Must have appropriate lighting for interpretation.
- Technical difficulties with equipment.
- Image quality.
- Sensors can be bulky for patients.
- Need a computer and X network.
- Lack of hard copy without additional equipment.
- Panoramic and Cephalometric units are more expensive than similar film units.
- Acceptance by third party carriers is variable.

Q.1) What is digital Subtraction Angiography Explain?

* Digital Subtraction Angiography

Digital Subtraction Angiography (DSA) provides an image of the blood vessels in the brain to detect a problem with blood flow.

- The procedure involves inserting a catheter (a small, thin tube) into an artery in the leg and passing it up to the blood vessels in the brain.
- Digital Subtraction Angiography is a fluoroscopy technique used in interventional radiology to clearly visualize blood vessels.
- In traditional angiography, images are acquired by exposing an area of interest with time controlled x-rays while injecting contrast medium into the blood vessels.
- The images are useful for determining anatomical position and variations, but unhelpful for visualized blood vessels accurately.
- The radiological equipment used to capture this is usually an x-ray image intensifier, which then keeps producing images of the same area at a set rate (1 to 7.5 frames per second).
- The radiologists controls how much contrast media is injected and for



how long.

→ The images are all produced in real time by the Computer or image processing while the contrast is injected into the blood vessels.

⇒ DSA provides an image of the blood vessels in the brain to detect a problem with blood flow.

→ A Contrast dye is injected through the catheter and x-ray images are taken of the blood vessels.

* Intravenous digital subtraction angiography:

→ (IV-Dsa) is a form of angiography which was first developed in the late 1970s.

⇒ (IV-Dsa) is a Computer technique which compares an x-ray image of a region of the body before and after radio-opaque iodine based dye has been injected intravenously into the body.

⇒ Tissues and blood vessels on the first images, leaving a clear picture of the artery which can then be studied independently and is a subtraction from the rest of the body.

⇒ IV-Dsa has also been useful in assessing patients prior to surgery and after coronary artery bypass surgery and some transplant operations.

Q(3) What are common artifacts in DR? How will you avoid them?

* Artifacts:-

Artifacts is any false visual feature on medical image that simulates tissue obscures tissue.

⇒ Artifacts interfere with diagnosis

⇒ Artifacts produced by dust can be corrected easily with proper cleaning unless the dust is internal to the optics of a computed radiography imaging system.

⇒ Artifacts can be controlled when the cause of the artifacts is understood. In screen-film radiography three classification of artifacts occur - processing, exposure, and handling or storage in digital radiography.

⇒ Three classification of the artifacts can be described - image receptor, software, and object artifacts.

⇒ Digital radiographic image receptor have unique artifacts associated with pixel failure.

* Software Artifacts:-

Digital radiographic images are obtained as raw data sets.

⇒ These images are ready for "processing" For "processing" images are manipulated into for "presentation" images that

that the radiologic technologists can use for QC and for interpretation by the radiologist.

* Object Artifacts:

Object artifacts can arise from the technologist's error in patient positioning, x-ray beam collimation histogram, selection.

→ Back Scatter radiation.

→ Physician typically learn to recognize some of these artifacts to avoid mistaking them for actual pathology.

→ An artifact is any false visual features on a medical images that simulates tissue or obscures tissue.

⇒ Artifacts interfere with diagnosis and must be avoided. Similar to accidents, artifacts are avoidable.

⇒ Artifacts can be controlled when the cause of the artifact is understood.

(Q4) Compare the image quality of Screen-film radiography and DR, which one is superior?

Screen-film

Radiography

- ⇒ Screen-film is use of silicon films within a cassette being placed behind the object to be imaged and exposed to an x-ray beam.
- ⇒ Less sensitive to scatter than DR.
- ⇒ Controlled by scatter reduction.
- ⇒ Not easily quantified past 10³ sensitivity.
- ⇒ Screen-film can not be numerically modified.
- ⇒ Screen-film can not be easily transmitted.
- ⇒ Can not be magnified.
- ⇒ Screen-film has a much narrower latitude to get the correct exposure.

Digital radiography

- ⇒ Digital can potentially ^{reduce} phosphor plates are used in digital radiography.
- ⇒ Digital radiography referred to specialized modalities that produced digital images.
- ⇒ Digital images can be numerically processed.
- ⇒ Digital images can be easily transmitted through networks and archived.
- ⇒ Charge-coupled devices.
- ⇒ Direct conversion.
- ⇒ DR use active matrix flat panels consisting of detection layer.
- ⇒ Active matrix array of thin film transistors and photo diodes.
- ⇒ DR the image

Screen filmRadiography

- Small change in photons energy
- Greater impact!

DigitalRadiography

- is converted to digital data in real-time
- ⇒ Available for review within seconds
- ⇒ spatial resolution is better in digital radiography is compared to with screen-film
- ⇒ Decreasing radiation

* Which one is superior:-

- The image quality of screen-film radiography and digital radiography
- * digital radiography is compared to screen-film is superior.
- ⇒ Conventional radiography is still used more widely than digital radiography by this dominance it fast & unwinding.
- ⇒ The reason behind the declining popularity of are fixed dose latitude fixed non-linear-grey scale response and limited potential for reducing dose to the patients.
- ⇒ Digital radiography is fast and can be easily transmitted through network and achieved.
- ⇒ Direct conversion.
- ⇒ They are converted to the digital data in real time.

(15) what are differences between image receptors used in conventional radiography and digital radiography?

Conventional Radiography

- The receptor used for most radiographic procedures.
- Two Intensifying Screen
- Increase x-ray absorpion
- Receptor sensitivity
- Least amount of image blurring.
- Photo sensitive phosphor plate
- ⇒ Method is film-based.
- Uses intensifying screens
- Screens emit light when x-rays strike them.
- Film is placed between two screens.
- Using imaging plate.
- Need a cassette reader.
- ⇒ Re-usable metal imaging plate replace film and cassette.
- Used in Bucky and x-ray equipment.
- Storage phosphor plates are similar used in screen film radiography.

Digital Radiography

- Digital imaging is a broad term.
- Electronic images.
- Photo Stimulable phosphor plate.
- Image intensifiers
- Acquisition in digital form (CCD camera).
- Sensors are the receptors for digital images
- ⇒ using traditional x-ray film.
- There are two digital image receptor or sensor.
- ⇒ Direct solid state
- ⇒ Indirect photo-stimulable phosphor.
- Flexible radiographic film.
- Receptor provide direct digital output.
- ⇒ No process and reader required