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Assignment CR and DR

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BS Radiology 4th semester.

Answer No: 01

Digital Subtraction angiography:-

=> is a fluoroscopy technique used in interventional radiology to clearly visualize blood vessels in a bony or dense soft tissue environment.

Used:-

=> Catheters
=> Vascular
=> Medicut
=> Contrast
=> Connector/100 cm. tubing
=> Surgical blade
=> Saline
=> Disposable syringes
=> Local anesthesia
=> Heparin
=> Surgical gloves
=> ElastoPlast

Procedure:-

=> During angiography, Patients may be sedated to reduce anxiety.
=> Their heart rate and rhythm, breating, and oxygen saturation are monitored throughout the procedure
=> Patient clean draped.

⇒ A local anesthetic is usually used in the area where the catheter is to be inserted, most commonly the femoral artery.
⇒ First a small incision is given, Medicut is inserted into the artery. Fluoroscopy is used to guide the needle to the Proper Position
⇒ The needle is then removed after Placing guide wire in the artery and vascular sheath is inserted over the guide wire.
⇒ The Cathere is then inserted along the guide wire through the Sheath.
⇒ When the Catheter is in the Correct Position, The wire is pulled out and dye is injected through the catheter.
⇒ Images are acquired during contrast injection.
⇒ Injection can be made directly into the artery of interest (selective arteriography)
⇒ oral fluid is given and analgesics are given if required.
⇒ Special care should be given in case of children and geriatric Patient since additional Patience is required.

Date: / /20

Answer No: 02

TYPES OF ARTIFACTS

(1) Image receptor Artifacts :-

- ⇒ Dust
- ⇒ Dirt
- ⇒ Scratches

(2) Software Artifacts :-

- ⇒ Histograms
- ⇒ Range / Scaling
- ⇒ Image compression

(3) Object Artifacts :-

- ⇒ Patient positioning
- ⇒ Collimator / Partition
- ⇒ Back scatter

Answer No: 03

Disadvantages of Digital Radiography :—

* Training and Learning Curve

⇒ Must learn machinery, technology and Positioning.

⇒ Must still adhere to good technique for acquiring images.

* Equipment Cost :—

⇒ Initial cost is high Compared with traditional radiography.

⇒ other technology costs associated with digital radiology (computer servers, etc).
⇒ Poorer spatial resolution.
⇒ Artifacts due to the imaging plate, image processing algorithms etc.
⇒ Non-availability of Post-Processing function.
⇒ More expensive than Screen film Radiography.

⇒ Lack of familiarit to radiologists and radiographers.

Answer no: 04 :: Imag

Image Quality::

The difference in appearance of conventional and digital radiographs can be striking However, when good-quality, well-maintained Conventional system and digital radiograph are compared, there is little difference in the actual diagnostic quality of the resulting image. In fact, good conventional system have slightly higher spatial resolution. In reality, however, operator error (such as over or underexposure) and poor equipment maintenance commonly result in poor radiograpic quality of Conventional radiographs.

Riadation Safety

→ Conventional ⊛ As discussed, poor exposure Selection and underdevelopment can result in a relatively high number of repeated radiographs. However, this can be minimised with good radiographic.

An Important way to ensure radiation Safety is collimation of the primary beam to the film, so an unexposed rim can be seen on all four edges.

Digital:- Digital radiographics can potentially reduce retaken radiographs. thereby decreasing radiation However, if overexposure occurs, it is largly adjusted automatically and the operator might be unaware of this therefore, higher than necessary exposure factor might be used routinely. This can outweigh the advantage of reduced retakes by increasing the overall radiation dose. To avoid unnecessary radiation exposure of personal, exposure factor should be regularly monitored and revieved.

⇒ further in-depth understanding in critical for digital radiography as the field is broad and is constantly evoluing.

Techniques

⇒ Film - Film speed, Processor Type, source to film Distance energy level. exposure time.

⇒ CR plates - samping rate, pixel resolution of scanner, exposure time.

Answer NO: 05

Digital image receptor :-

=> Digital image receptor is the device that intercepts the x-ray beam after it has passed through patients body, produces an image in digital form, that is, a matrix of pixels each with a numerical value.

=> Digital image receptor is in the form of a matrix of individual pixel elements, which work based on certain technologies the solid state technology and photostimulable phosphor plate technology.

=> when a pixel area is exposed by x-ray beam (after passing through patient's body), x-ray photons are absorbed and energy produces an electrical single.

=> This single is in the form of analogue data that is then converted into a digital number and stored as one pixel in an image.

=> Three type of solid state sensors are in use - charge couple device (CCD) complementary metal oxide semiconductor (CMOS) and thin film transistor.

Radiographic Receptor :-

⇒ The receptor used for most radiographic procedures Contains two intensifying screens mounted on each side of double-emulsion film.

⇒ Using two screens in this manner increases x-ray absorption and receptor sensitivity with the least amount of image blurring.