Intro:

NAME : IQRAR HASSAN

ID : 14706

SUBMITTED : NIAMI MAHEEN

PAROGRAMM : RT

(1)

Q NO: 01

ANS PART OF DIGITAL Fluoroscopy:

First we discuse about the Fluoroscopy is a real time image.

=> And also we discuse about parts of Digital Fluoroscopy.

① x-ray Source or generator:

. When we take or gives to exposure to the patien in Digital Fluoroscopy. Machine:

=> inside the x-ray generator the o high energy electron will to ~~today~~ the cathod.

and Convert to x-ray.

(2) x-ray tube.

The x-rays reached to the x-ray tube and then pass to the tube.

=> the x-rays tube must be concide to the patient.

(3) Collimation!

Collimation work is that the x-rays collimat to the patient and no reduce patient dose in rooms.

=> Collimator is most important for x-ray work.

in Fluoroscopy Collimator is in circular or rectangular shape.

(4) Filteration:

When x-rays pass to the tube and the beam filteration attach to the tube and the filter all these x-rays they produce patient radiation does.

it is made up aluminium or copper filteration.

to reduce patient does.

(5) Table:

Table is part of Digital fluroscopy machine when the patient laying on the table and then gives

exposure to the patient.

(6) Grid:

Grid must be used in Digital Fluroscopy imaging System because it absorb Scatter radiation.

when radiographer gives high exposure to the patient it absorb unnecessary x-rays.

(7) Image Receptor

The x-rays image intensifiers is an electronic device which convert the x-rays to visible image.

there are two type of image intesifiers are used as

(i) CCD Charge Couple device

(ii) Flat Panel Detector

(5)

(i) Charge Couple device

It is Major change from Conventional Fluoroscopy to Digital Fluoroscopy.

=> it is used instead of TV Camera tube.

=> When the CCD is directly coupled to the image intensifier the entire CCD signal is sampled and drive to ABC System it is most advantage in Digital Fluoroscopy.

=> Charge Couple device give high Spatial resolution and high signal to noise ratio.

=> it lower patient radiation does.

=> and also linear response.

= Unaffected by magnetic field.
No maintance.
No spatial distortion
=> This response of CCD is to light very stable.

(8) Image display and Monitor:

=> When radiographer gives exposure to the Patient in Digital Fluoroscopy imaging system.
The x-ray control radiographic mode.
=> The x-ray hit the patient and the image receptor Convert x-rays to visible image
=> The visible image goes to Digital image analogue Convert and make video and also show on Monitor in video film.
it is also called real time image.

Q NO: 02

Ans: Prime factors of Radiographic Exposure:

(1) Milliamperes (mA)

→ control Radiographic density.

→ control quantity of x-rays produced.

→ control by adjusting the filament heat.

→ quantity of exposure is directly proposure to mA

(2) Exposure Time (second)

→ control Radiographic density

→ control quantity of x-rays produced

→

→ Control by adjusting the timer in x-ray circuit.

→ control duration of exposure.

→ quantity of exposure is directly propotional to exposure Time.

(3) Kilovolts (kvp)

→ control radiographic contrast.

→ control x-rays penetration.

→ control the quantity and quality of x-ray beam.

→ Increased kvp result in increas quantity of photons.

Increased kvp results in increased panatration of the body part.

Source-Imag Receptor Distance.

Affect the density and intensity of the x-ray beam.

Quantity of exposure is inversly propational to the square of distance

Each dimension of the radiation field is propational to SID. Therefore the field area is propotional to the square of SID and the Radiation intensity is inversily propational to the squar of SID.

Q NO: 03

Ans: IMAGE QUALITY FACTORS:

a) OPTICL Density.

optical densit is the degree of blackening of finished radiograph optical density have numeric value and can be present in varying degrees. from completely black in which no lights transmitted through the radiograph to almost clear.

→ A radiograph which is too dark is high OD cause by overexposure.

→ optical Density can be controlled by two major factors mAs and SID

→ Influenced by: KVP, Distance thickness of part, mass density Development Time speed, collimation

(3) Image Contrast.

> The function of contrast is to make atomy more visible

> Contrast are different in OD between adjecent anotomical structure or, variation in OD on a radiograph contrast Therefore is perhap the most important factor in radiographic quality.

> Imag contrast is necessary for outline border of a structure to be visible.

> Imag contrast is the result of diffrence in attenuation of x ray beem as it passes through various tissue of the body

> kVp is the major factor to controlled Radiographic contrast.

- High Contrast radiograph produce short Greyscale
- They exhibit black to white in just few apparent Step.
- Low contrast radiograph produced long greyscal.

Influenced by, mAs (toe, shoulder) Development Time, Collimation Grid ratio.

) Image Detail.

- Describ Sharpness apearence of small Structure
- imag detail must be elevated too means – Sharpness of imag detail and visibily.
- Sharpness is refer to Structural line or boarder of tissue

- Visibility of imag details describes the ability to see

detail on radiograph.

→ The visibility of imag detail is best measured by Contrast resolution.

Influence by: SID, OID Motion, factor repeated density.

→ Distortion:
The mis representation of object size and shape on radiograph.

→ poor aliment

→ Distor is reduced by positioning The anatomical part of interest in aplane parallel to that of imag receptor

→ The aligment is important for patient positioning.

Influence by:
aligment of tabe.
anatomical part and imge receptor.

Q NO: 04

ANS: Component of Imag Intensifier.

(a) Input phosphor:
made of cesium Iodide and is bondend to the curved surface of the tube itself.
→ It absorbs remnant x-ray photon energy and emits light in responce.

(b) photocathode
Made of cesium and antimony compunds.
These metad emits electrons in response to light stimulus in a process called photo emission

→ The photocathod is bonded directly to the input phosphor using a vary thin adhesive layer.

→ These layar are cerved so that all of the electron emitted from the photocathod travel the same distance to the out put phosphor.

→ Electrostatics focusing lenses.

→ They are not really lenses at all but are nagatively charged plate along the length of image intensifier tube.

→ These nagatowlly charged plate repels the electron stream. focusing it on the small output. posphore.

To Set the electron Stream in motion at a constant velocity, on accelarating and is located at the neck of the Imag Intensifier near the output phosphor

3 Accelaziting anode contain a a constaint potential at 25 KV

(4) output phosphor.
Made of Silver- activated Zinc cadmium Sulfid and is much Smaller than the Input PhotPhor. It is located at the end of the Imag Intensifier tube Just beyond the accerating.

→ Absorb electrons and emits light in response

→ The input phosphor faces the patient and recieve the x-ray exposure that contribute the remnant beam.

Q NO: 05 (A)

Ans Advantages of Flat penal imag receptor.

- → Distortion free imag ~~receptor~~
- → constant imag quality over the entire image.
- → Improved contrast resolution over the entire image.
- → High DQE at all radiation dose levels.
- → rectangular imag area coupelled to similar imag moniter
- → unflected by external magnetic field.

PART B (5)

Ans:

→ properties:

Due to the high quantum efficiencis of charge coupled divec CCD linearity of their out puts, ease of use compare to photographic plates and a verety of other reason, CCDs were very rapidly adopted by astronomers for nearly all UV to interrared aplications.

→ Used.

CCD is a divice for the movement of electrical charge, usually from within the device to an area where charg can be minupluted for example conversion into a digital value.