Verifying suitability of new paediatric CT protocols before clinical use – using catphan / detectability index

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AIM

- Wanted to set up new paediatric protocols on scanner A

- To deliver similar image quality as scanner B for similar/optimal doses

Scanners A & B: Some Key Features (also different manufacturers)

Scanner A

- Collimation 16x1.2mm
- Rotation time 0.6s
- Pitch 1.5
- 110kV
- Recon slice thickness 1.5mm (chest and pelvis) / 3mm abdo

Scanner B

- Collimation 80x0.5mm
- Rotation time 0.35s
- Pitch 0.8
- Most 100kV
- Recon slice thickness 1mm (chest and pelvis) / 3mm abdo

METHOD

- Siemens Apps set up paed protocols on scanner A with clinical / Med Phys input (chest, abdo + pelvis)
  - aiming for consistency with scanner B as much as possible
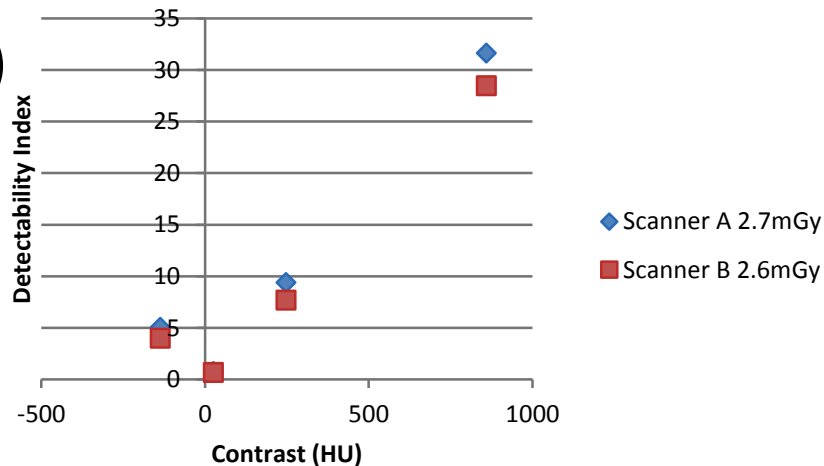- Acquired images of CATPHAN using clinical protocols on both scanners
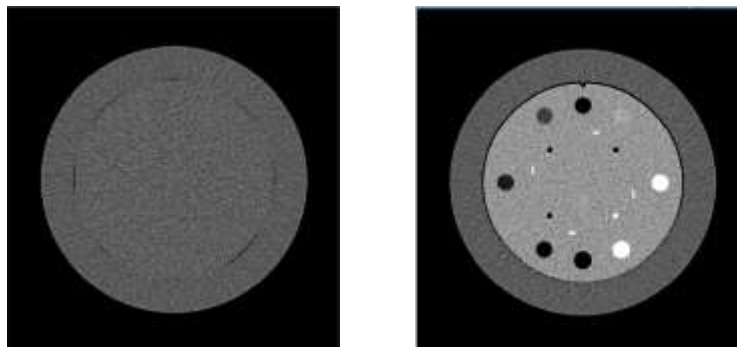
- Used ImageJ Plugin "David Platten's Quantitative Image Quality Analysis Tool" to calculate the Detectability Index as a measure of image quality
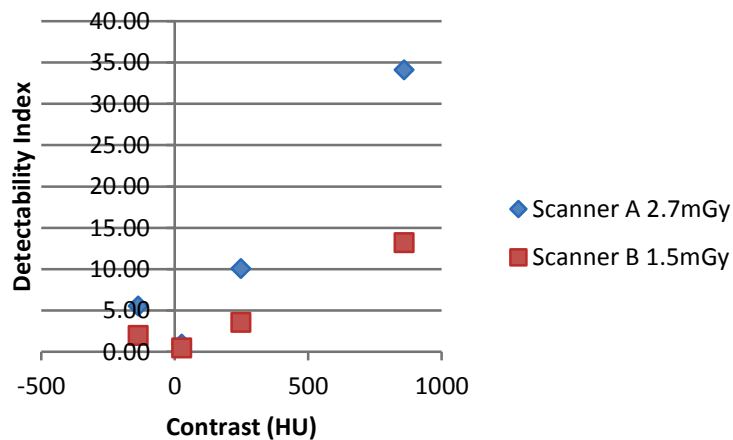
EXAMPLE OF RESULTS

- 'matched' doses (pelvis)

- Dose level selected by scanner (but fixed mA at average) (abdo)

DISCUSSION / THOUGHTS

- Concluded that scanner A protocols were viable

- Potential to reduce doses on scanner A to match acceptable image quality on scanner B – advise to try clinically first though

- This was a LOT of work (discuss errors)

- Our usual practice is for Apps to set up protocols and these are tried/adjusted over first few patients

- What do others do?

- Has anyone tried this or other approach in order to validate protocols prior to use?

SOMETHING TO LOOK OUT FOR

- After we had collected all the images, completed a lot of the analysis and generally used up most of the allotted project time…….

- User noticed that CTDIvol displayed for paed body scans referred to the 16cm phantom and not the 32cm (this was after a scanner failure and subsequent fix)

- Therefore most of our 'matched' dose scans were not matched!

- Good idea to check this in OpenREM