New Processing Software And Other Techniques For Reducing Radiation Exposure During Complex Interventional Procedures

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Complex Endovascular Procedures

Understanding and applying basic techniques can lower radiation dose to yourself and your patient during CEPs.

DSA has an exponentially higher dose than fluoroscopy.

So try to limit DSA and use fluoro looping when possible.

Use Angio Multiphase

Reduced frame rate in later stages of an angiographic run.

Disclosures

• None
Limit Magnification
Use Collimation

If the goal is to restrict exposure onto the patient then collimate.
If the goal is to achieve increased spatial resolution use magnification.

On image intensification systems BM increases in linear proportion to square of field size for.

Variable FOV capable.

Use FOV down.

AK at the patient decreases as a function of the:

- (patient to source distance)²

So raise the angio table.

Minimize the source to image distance (SID).

Drop the image receptor close to the patient.

Raise the Angio Table / Minimize the Patient to Detector Distance

Avoid Steep Angulation

The attenuation is increased due to increased patient thickness this leads to increased machine output to maintain constant AK at the detector.

New Software Developments

- **AlluraClarity (Philips Health Care)**
  - New image technology that reduces dose while maintaining image quality.

- **Adaptive Noise Reduction Algorithms**
  - Motion compensation to reduce anatomical noise in DSA.
  - Temporal filtering of consecutive images to allow for uncorrelated noise reduction.
  - Spatial noise filtering which ignores spatially dominant structures.

This allows for optimization of the image chain to maintain image quality and lower dose.

Patient and Operator Radiation Dose

Patient and Operator Dose was decreased by 60% with AlluraClarity.
**Tips to Limit Dose**

- Limit Fluoro time
- Minimize frame rates/ use low dose fluoro when possible
- Minimize use of DSA (use fluoro capture)
- Keep the table height high
- Keep the image receptor close to the patient
- Minimize steep angles (if necessary, collimate)
- Vary imaging angle to spread skin dose
- Keep patient’s extremities out of the beam
- Minimize use of magnification
- Monitor RAK rate during the procedure
- Be Aware of new software developments that can lower dose