

Radiation Protection during Interventional Procedures

Protect the workers:

1. Collimate

- Scattered radiation is approximately proportional to dose area product
- Image quality improves with collimation (less scattered radiation & better contrast)

2. Stay away from the tube side

- Scattered radiation is mainly generated at beam entrance

3. Stay away from the patient

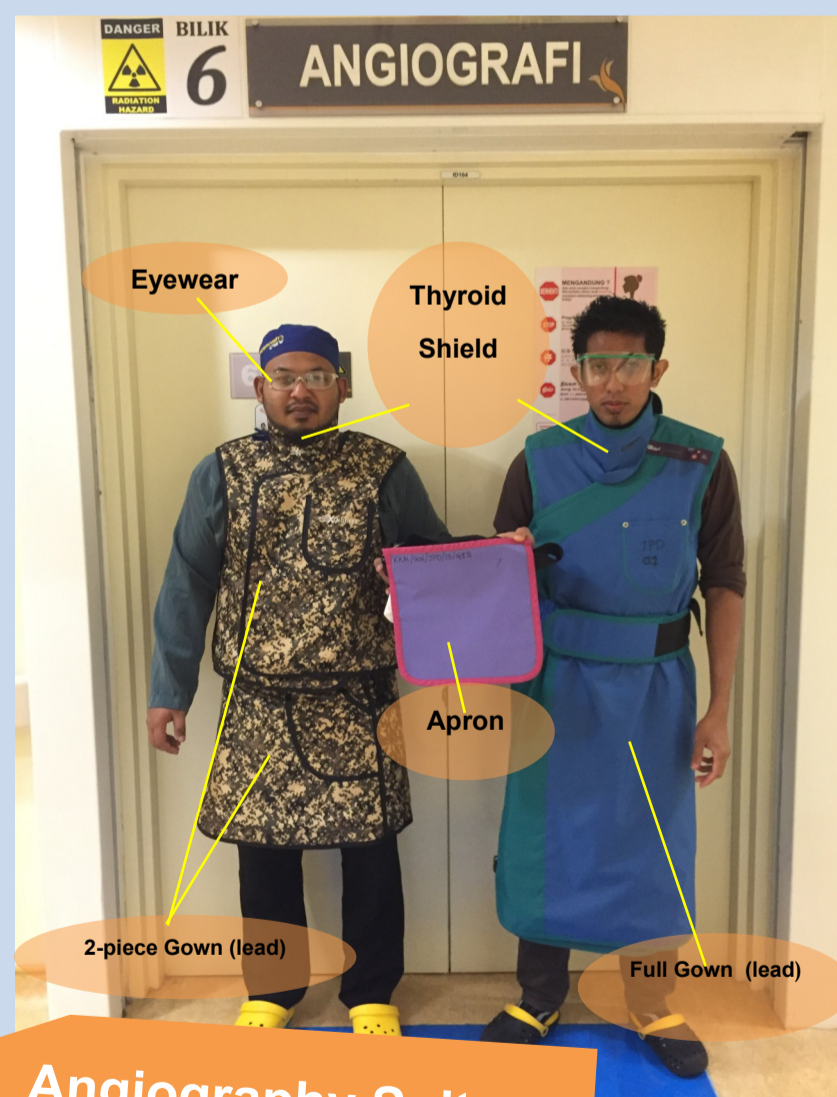
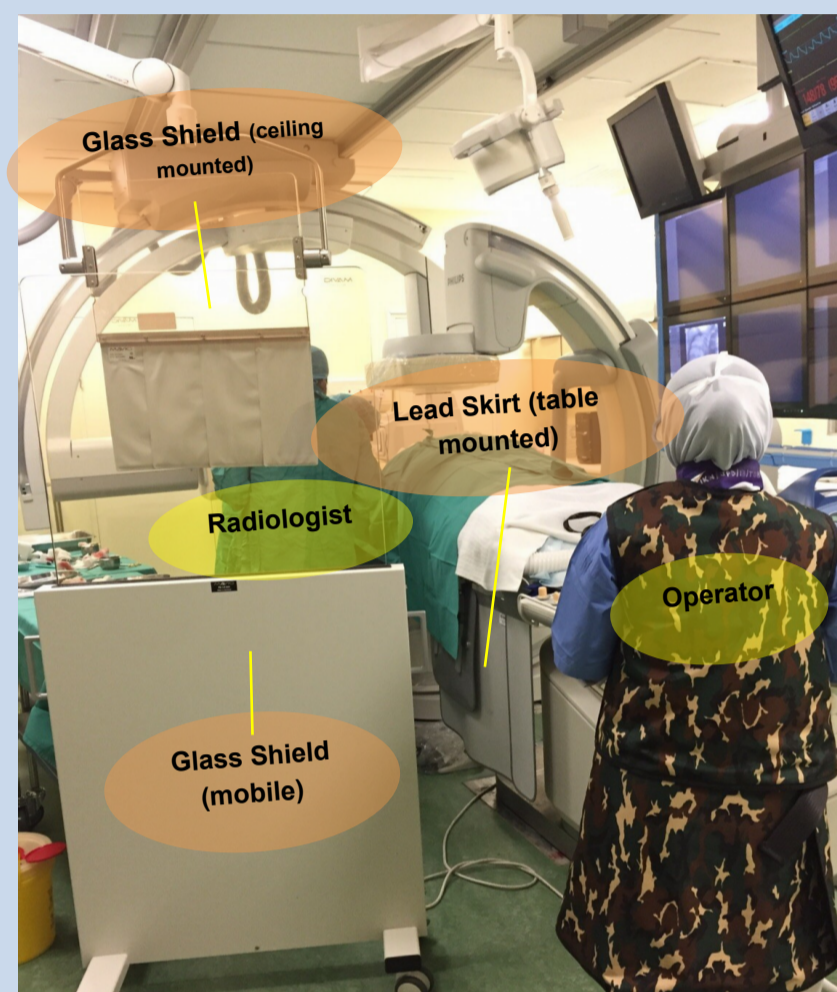
- Scattered radiation decreases with distance
Twice the distance equals to quarter the scattered radiation
(distance x 2 = ¼ scattered radiation)

4. Lower Source Image Distance (SID)

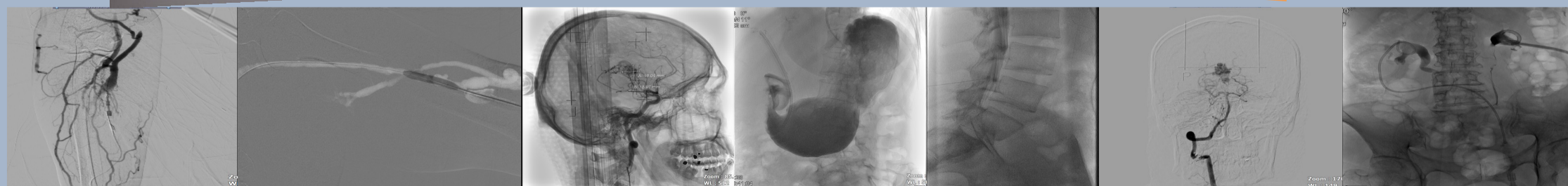
- The closer the detector to the patient, the lower the radiation dose

5. Radiation Shielding

- Scattered radiation is attenuated by matter
- Shields Used:
 - Apron (lead)
 - Glass shields (lead)
 - Eyewear (lead)
 - Thyroid Shields
 - Gonad Shields



Angiography Suite



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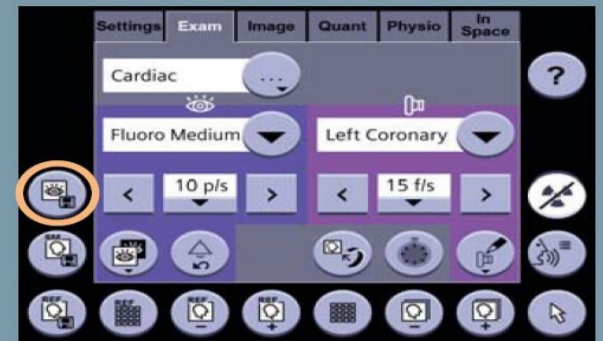
Protect the Patients:

1. Select the appropriate protocol

- Choose proper organ programme
- Use low dose acquisition
- Use Fluoroscopy Loop (Store Fluoroscopy)
- Use Low Dose 3D protocols

1.

Store Fluoro



2. Minimize Screening time

- $\frac{1}{2}$ time on the pedal = $\frac{1}{2}$ x skin dose
- $\frac{1}{2}$ time on the pedal = $\frac{1}{2}$ x dose area product

3. Use low frame rate

- \downarrow Frame rate = \downarrow Skin Dose

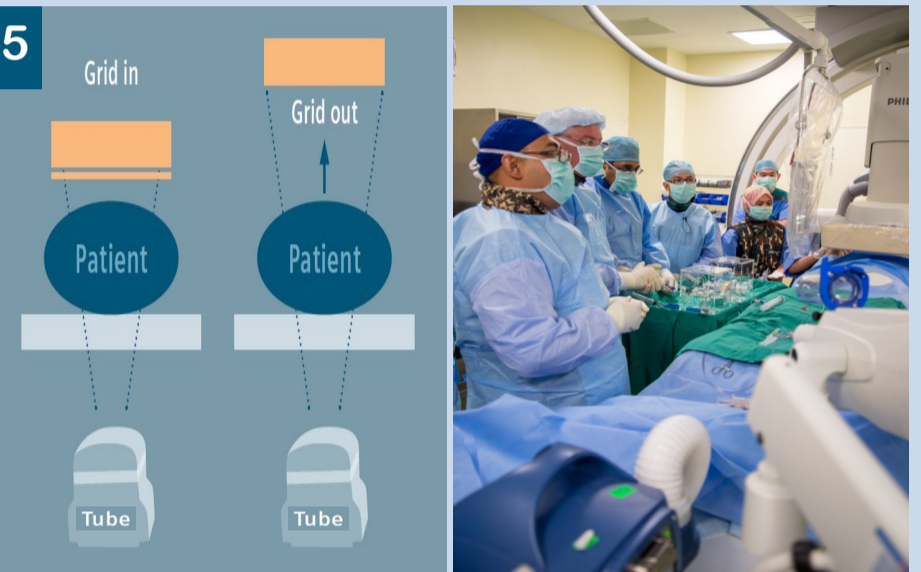
4. Limit Image Magnification

- reduce Zoom size = reduce Skin dose

5. Remove grid

- "Air Gap Technique" is used for small patients less than 20kg

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6. Use narrow angles as much as possible

- For every 3 cm increase in patient thickness, entrance dose is doubled
- narrow angles = \downarrow skin dose

7. Monitor skin dose

- Display of dose measurement : Patient entrance dose, dose area product, dose rate
- Enable audible and visual warning for skin dose limits

