Ask EuroSafe Imaging

Tips & Tricks

Interventional Radiology Working Group

Interventional Series – Episode 4:
Intra-Procedure: Online dose monitoring

Annalisa Trianni (Udine University Hospital, IT)
Werner Jaschke (Medical University Innsbruck, AT)
Marion Maher (University College Dublin, IE)

Essential Steps

1. Pre-procedure

- **Identify patients at higher risks**
- **Evaluate equipment performances**
- **Train the personnel involved**

2. Intra-procedure

- Optimize the procedure to reduce dose
- **Online dose monitoring**
- Use of alert levels

3. Post-procedure

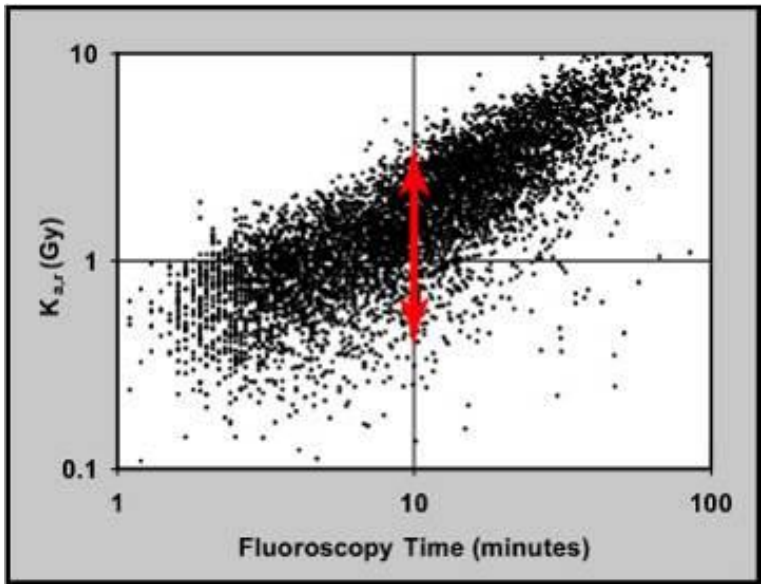
- Dose tracking
- Follow-up

Online Dosimetric Indicators

- Critical organs for deterministic effects (tissue injuries) are the skin and, in neuroradiological interventions, also the eye lens.
- In order to avoid tissue injuries, the practitioner should be aware how to estimate dose to the skin and eye lens.
- Interventional equipment are able to provide online information to the practitioner on the amount of exposure that a patient receives during the procedure.
- Three dosimetric indicators are available:
  1. Fluoroscopy Time (FT)
  2. Air Kerma – Area Product (KAP, also known as DAP)
  3. Reference Air Kerma (which is the total accumulated Air Kerma at the Interventional Reference Point; formerly named Cumulative Dose)

Fluoroscopy Time

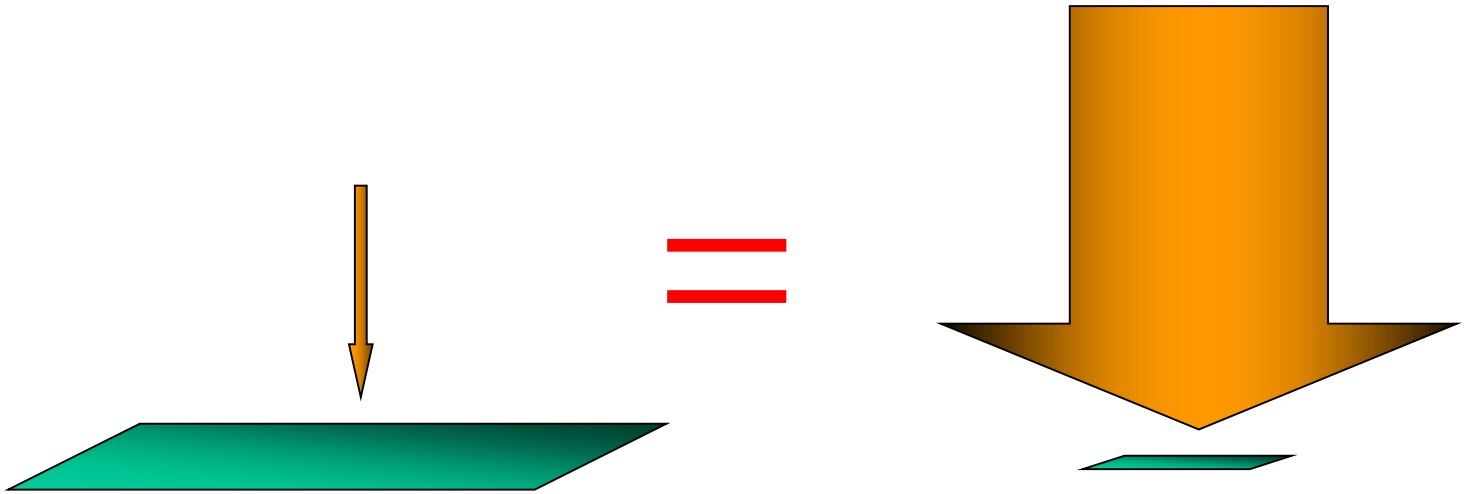
- For years, fluoroscopy time (FT) has been the parameter of choice to evaluate the dose received by the patient during an interventional procedure.



- But FT does not correlate with patient dose → **NOT THE CORRECT PARAMETER FOR PATIENT SKIN DOSE**

Air Kerma - Area Product

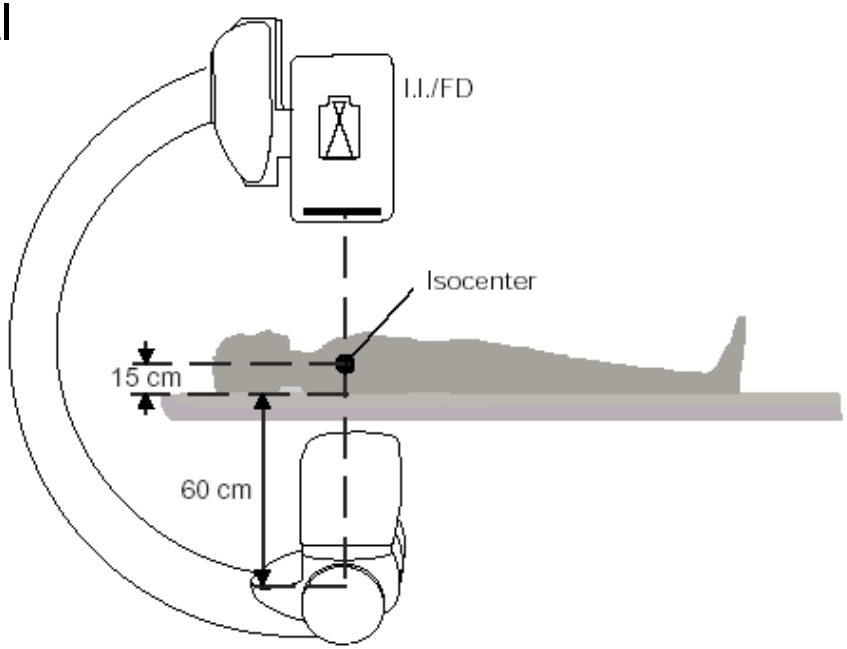
- The air kerma - area product (KAP) represents the total energy released to the patient.
- Same values of KAP can be obtained for high doses and small field sizes, and for low doses and large field sizes.



- KAP is a good indicator of stochastic dose → **NOT A GOOD INDICATOR OF MAXIMUM SKIN DOSE**

Reference Air Kerma

- Reference air kerma (CK) is the total air kerma accumulated in the interventional reference point (IRP) during the whole procedure.
- IRP is a point that should be representative for patient skin.
- For an isocentric system, the IRP is located along the central axis, 15 cm from the isocenter towards the source.
- For abdominal procedures it correlates quite well with skin dose → **THE BEST ONLINE TOOL AVAILABLE**



Do these parameters represent patient dose?

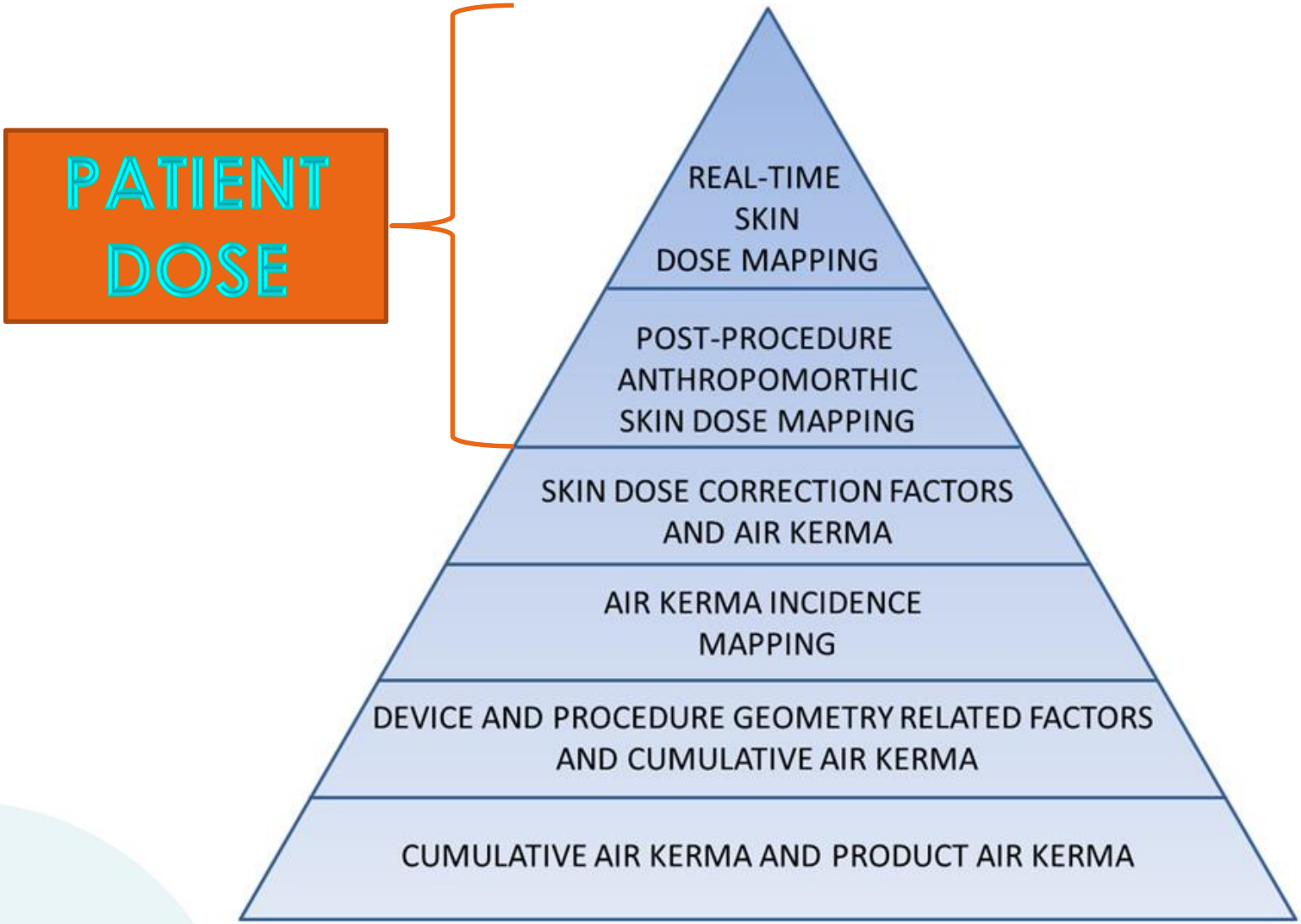
WHAT DO THEY REPRESENT?

- Standardized parameters to evaluate radiation output of the x-ray tube
- Useful tools to compare different equipment, protocols, procedures

WHAT DO THEY NOT REPRESENT?

- They definitely do no represent patient dose

Fluoroscopy Patient Dose Pyramid



Next Steps

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