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The RPE of first choice in the medical area - why it is the MPE

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Introduction

- In the use of ionising radiation in medicine there are an increasing number of high dose practices where staff and patient exposure are correlated

Interventional radiology

Effective dose per procedure to the first operator (0.17 to 31.2 µSv for percutaneous coronary interventions - PCI)

- **For 400 proc/year -> up to 12 mSv/year**

Kim PK, et al. Occupational radiation doses to operators performing cardiac catheterization procedures. Health Phys 2008;94:211–227.

TABLE I. Typical Effective Dose Estimates for Select Procedures Performed Using Ionizing Radiation

Study	Typical effective dose estimate (mSv)
Chest X-ray	0.1
Chest CT (standard)	7.0
Chest CT (cardiac)	16
Diag. coronary angio.	7.0
PCI	15.0
RF arrhythmia ablation	15.0
TIPS	70.0
ERCP	4.0
Tc-99m heart (stress-rest)	11.4
Thallium heart (stress-rest)	16.9

An example and some questions

A CTO (Chronic Total Occlusion) cardiac interventional procedure:

- Total procedure time: 2 h; Fluoroscopy time: 50 min
- Patient dose: Total KAP: **500 Gycm^2 (100 mSv); Peak skin dose: 6 Gy**
- Total scatter dose at 70 cm from patient (10 uSv/ Gycm^2): **5 mSv** !!
- **Optimisation:**
  - Is patient exposure optimised ? Is staff exposure optimised ?
    Exposure are correlated. → optimisation has to be addressed to both patient and staff
  - Is equipment performances acceptable/optimised?
- **Justification**
  - Is the clinical procedure justified? Is staff exposure justified?
    → are the two justification processes to be performed independently?

How to conduct justification process?

Who are responsible for optimisation?

Core Curriculum

Catheterization and Cardiovascular Interventions 00:000–000 (2011)

Radiation Safety Program for the Cardiac Catheterization Laboratory

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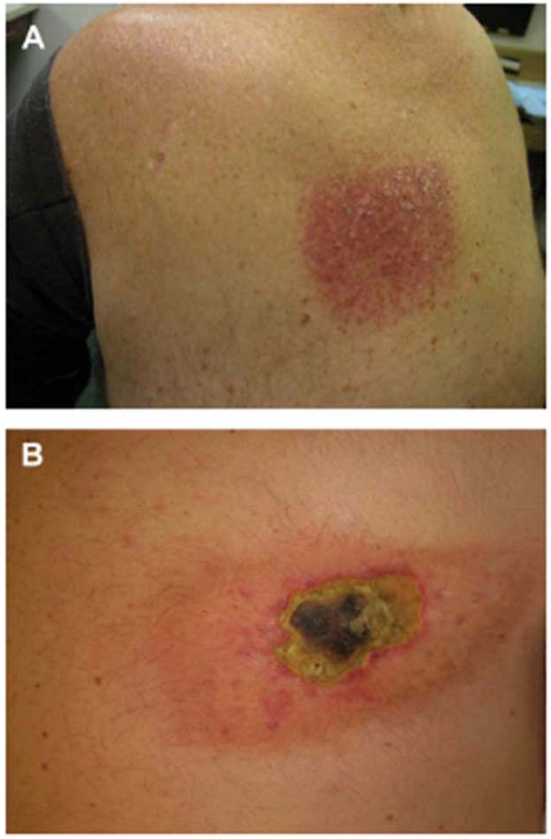

Fig. 1. Radiation skin (deterministic) effects. A. Dry desquamation (Poikiloderma) at one month in a patient receiving ~11 Gy calculated peak skin dose. B. Skin Necrosis at 6 months in a patient who received ~18 Gy calculated peak skin dose.

- Establishing a radiation safety program for the catheterization laboratory should be a **collaborative effort involving physicians, staff, medical or health physicists, quality assurance personnel, and hospital administration.**
- **Establishing safe radiation practice improves patient, staff and physician safety.**
- SCAI presents this review as a practical best practice approach to radiation dose management ...

MPE & RPE in European hospitals

- Since the implementation of the Medical Exposure Directive (MED), some Member states and many hospitals in Europe ask their Medical Physics Experts (MPEs) to assume also the role of Radiation Protection Expert (RPE) or Qualified Expert, as defined in Directive 96/29/Euratom.
- This choice is of particular importance for the optimization of occupational exposure in those situations when staff doses are intrinsically linked to patient exposures, such as interventional radiology.
- In smaller hospitals for economic and practical reasons this is the norm as employing separate MPE and RPE is considered unrealistic.

Today

- According to EFOMP survey:
  - 80-100% oh hospital managements are asking to medical physicists (or Medical Physics Dpts.) to assure the radiation protection duties in the hospital assuming the role of both MPE (QE) and MPE

EFOMP *"Malaga Declaration"*

- Taking into account this situation, EFOMP in 2006 developed and approved a statement called the "Malaga Declaration" that states that:
  "The Medical Physics Expert (MPE) as defined in the Directive 43/97 must be the professional to supervise and assume the responsibilities of the Radiation Protection activities in Hospitals, including patients, working staff, members of the public and visitors to the Hospitals".

EFOMP Actions

- Since 2006 EFOMP has insisted on the implementation of the Malaga Declaration in its dealings with national and international bodies concerned with radiation protection, such as national nuclear regulatory bodies, EU, IAEA and WHO.
- Because a proper implementation of the Malaga Declaration requires an effort to harmonise education and training of MPEs throughout European, specific guidelines have been approved or are under development in collaboration with relevant European scientific organizations (EAR, EANM and ESTRO), that include curricula for staff protection, dosimetry and exposure optimization.
- Another action in this direction is the week course on radiation protection offered at the ESI/EFOMP Annual School of Medical Physics (Archamps, France) since 2008 which also involves the radiation protection of workers and the general public.

Conclusion

- **For all these reasons EFOMP is supporting the principle that the RPE of first choice in the medical sector should be the MPE.**
- **The proper implementation of Malaga Declaration will require**
  - **To develop core curricula of MPs that includes workers and population radiation protection items**
  - **All Countries adopt in MPs schools the curricula**
  - **The RP competences of MPs are recognised by EU and European Countries**