

# Radiation Exposure to Patients and Radiologists during Interventional Procedures

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# Introduction - Purpose

Interventional radiology is a fast growing area for the examination and repairing patients' problems. Angiographies and angioplasties were performed at a mean annual number of 1800 during the last decade at AXEPA hospital.

Patients who undergo these interventional radiological examinations and the medical doctors who perform them receive a noticeable radiation dose. Thus, the optimization of the technique and the estimation of effective doses is essential.

# Materials and Methods

26 angiographies and 6 angioplasties performed by 4 doctors were included in this study.

They were classified as examinations of :

- lower limbs
- abdominal aorta
- aortic arch/carotid artery

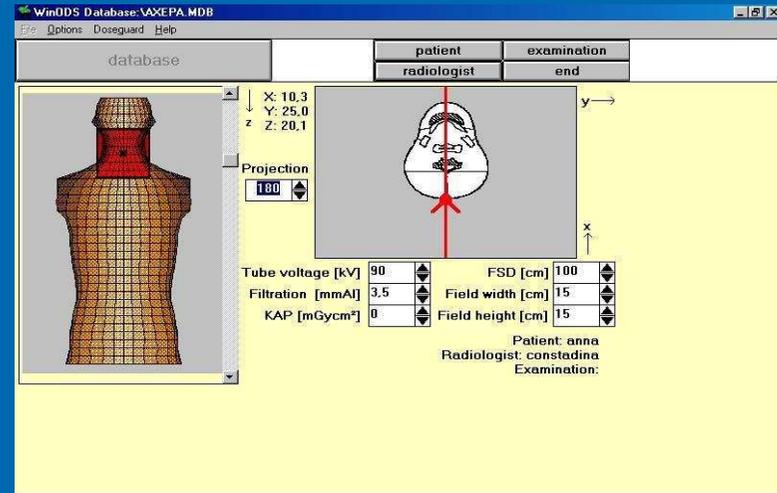
# Materials and Methods

- TLD sensitive dosimeters, namely LiF: Mg, Cu, P, were placed underneath and over the lead apron of the doctors at all the 32 examinations.
- TLD dosimeters were also placed next to the eyes and over the thyroid of 22 patients.
- DAP values, time duration and other parameters were also registered.



# Materials and Methods

Patients' effective dose, ED, and doses to the various organs were calculated with the aid of WIN ODS-60 software.



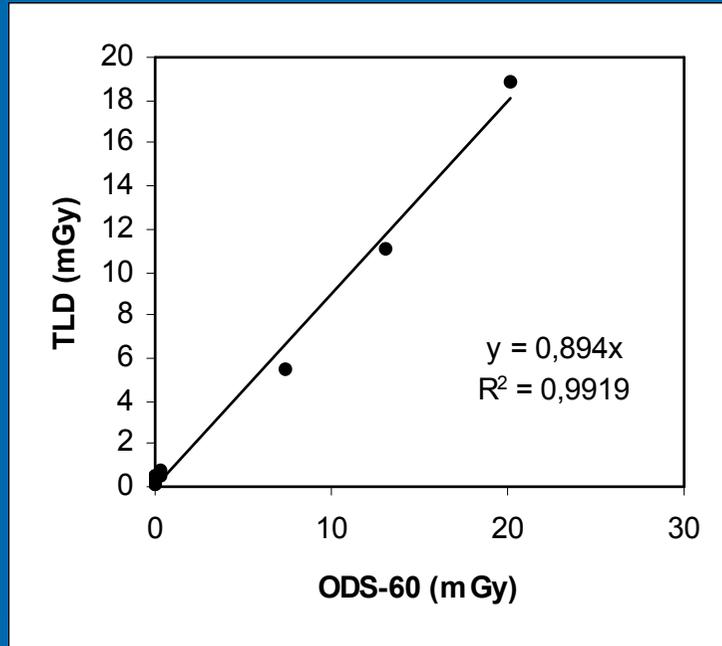
The effective doses were normalized to DAP measured in each procedure and the ED/DAP index was calculated

Based on TLD measurements, the Niklason method was applied for the calculation of doctors' ED

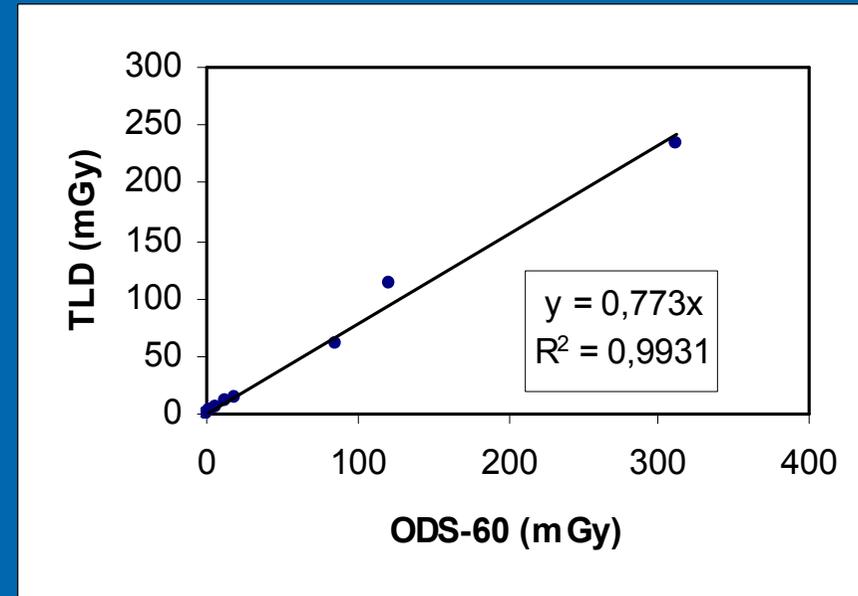
# Results - 1

Examination	<b>DAP</b> (cGy.cm <sup>2</sup> ) Range median	<b>ED</b> (mSv) Range median	<b>CF</b> (mSv/cGy.cm <sup>2</sup> )
Lower limbs	25-8728 4207	0,00 - 1,46 1,00	0,0002
Abdominal aorta	22325-31763 25531	2,63 - 49,32 19,29	0,0031
Aortic arch / Carotid artery	1709-24013 10563	0,07 - 45,12 10,10	0,0011

# Results - 2



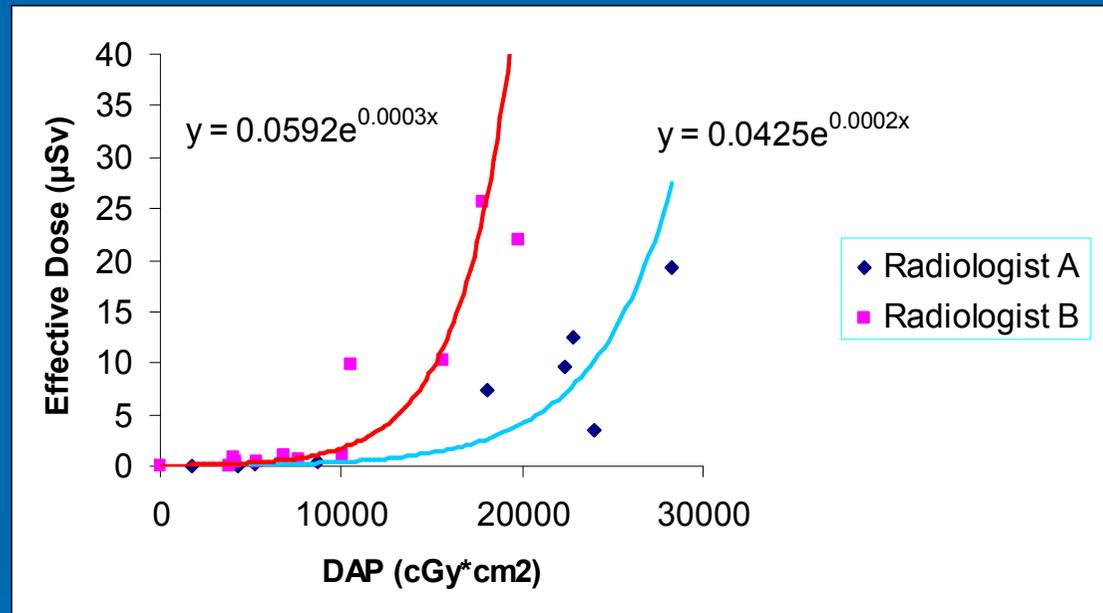
Correlation between patients' eye dose measured with TLD and WIN ODS-60 software



Correlation between patients' thyroid dose measured with TLD and WIN ODS-60 software

# Results - 3

Effective dose of radiologist A and B in relation with total DAP



\* Total number of procedures during 2009:

angiographies 1601

angioplasties 230

# Conclusion - 1

- The exposure of the radiologists varied depending on the x-ray parameters, the type and the complexity of the procedure, their position relative to the radiation field and their experience.
- Taking into consideration the annual number of examinations performed in the department, the estimated dose to the eyes surpasses the annual limit for population, so wearing protective glasses is recommended.

# Conclusion - 2

- TLD can be reliably used for the estimation of absorbed doses of superficial organs (eyes, thyroid)
- Patients receive considerable dose depending on the organs in the radiation fields, the duration and the ratio of fluoro/cine exposure
- Skin dose did not exceed the limit of 2 Gy, cutoff value for erythema