



# RADIATION PROTECTION IN TUNISIAN CARDIOLOGIC STAFF

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## INTRODUCTION

Fluoroscopically interventional procedures performed in cardiology increased these last 20 years. Cardiologists are the most exposure to ionizing radiation among professionally exposed physicians. ICRP recommends some advices to reduce occupational doses as low as reasonably achievable.

## PURPOSE

The aim of this study was to determine cardiologic staff knowledge about ionizing radiation and to determine the availability of Radiation Protection tools, in order to propose appropriate corrective measures.

## MATERIAL AND METHODS

- The study was performed in 3 cardiologic operating theaters equipped with an image intensifier unit in 3 University-Hospital Centers, in November 2011.
- We used a questionnaire in order to identify the knowledge of cardiologic staff (CS) about ionizing radiation (7 items), radiation protection (11 items), safety and security measures (15 items).
- We established a global score (GS) of knowledge to classify our population
- We used SPSS to statistic analysis

## RESULTS

### Socio-occupational characteristics of our study population

- 30 professionals were exposed to ionizing radiation. 24 of them (80%) answered to our questionnaire.
- 13 were men and the sex-ratio was 0,54 (**fig N°1**) and The median of the age was 34 years (LV: 26-54) (**Fig N°2**).
- The median duration of the exposure was 6 years (1-33) (**FigN°3**).
- Repartition of cardiologic staff (CS) in function of grade : 9 surgeons, 12 nurses and 3 superior technicians.

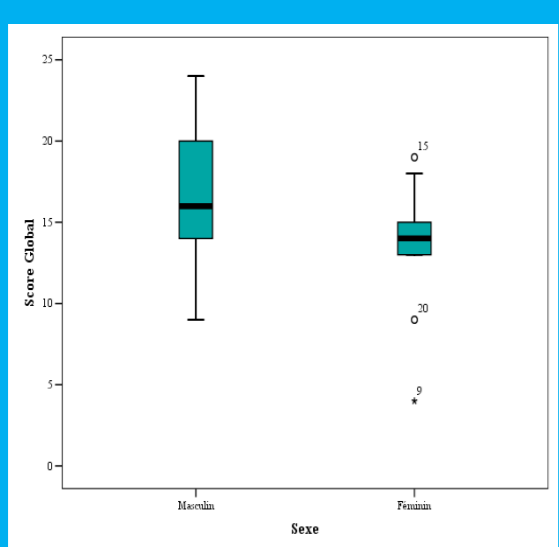


Fig N°1

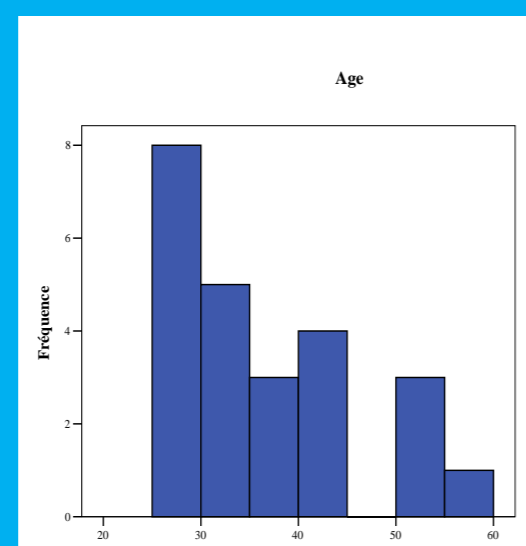


Fig N°2

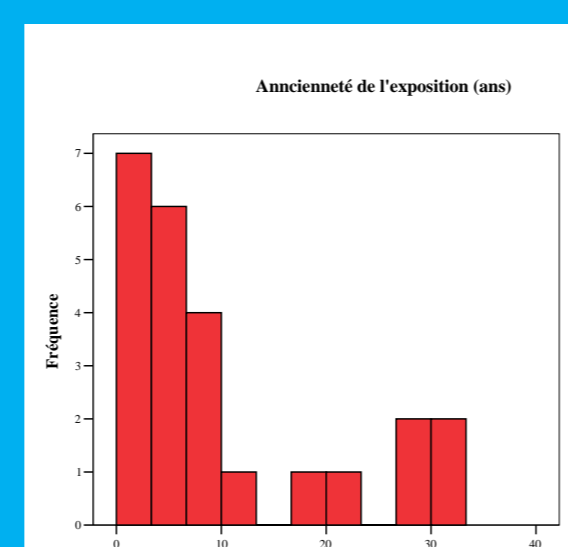


Fig N°3

### Score of knowledge of our study population

- The mean of the global score (GS) of knowledge was 14,5/29 (4-24) (**Fig N°4**).
- GS increases significantly with grade . It is better in doctors than in nurses and superior technicians (**Fig N°5 and 6**).

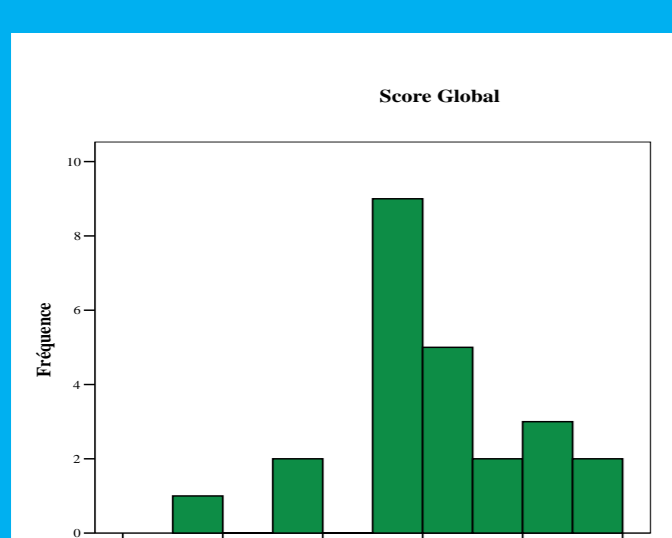


Fig N°4

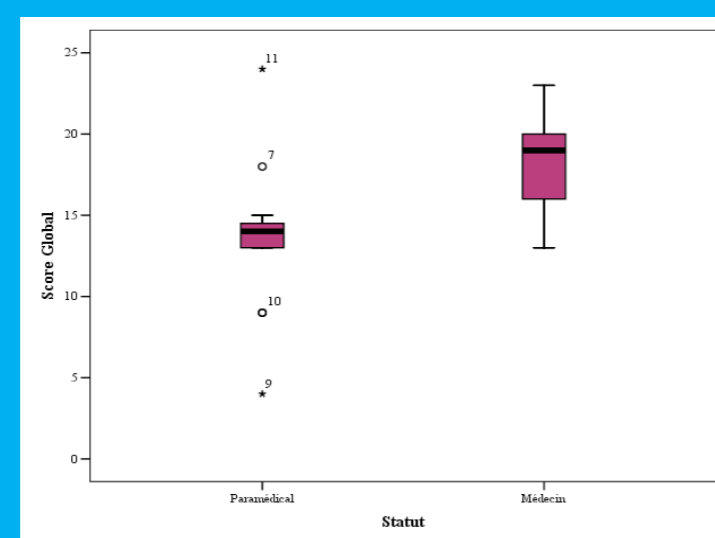


Fig N°5

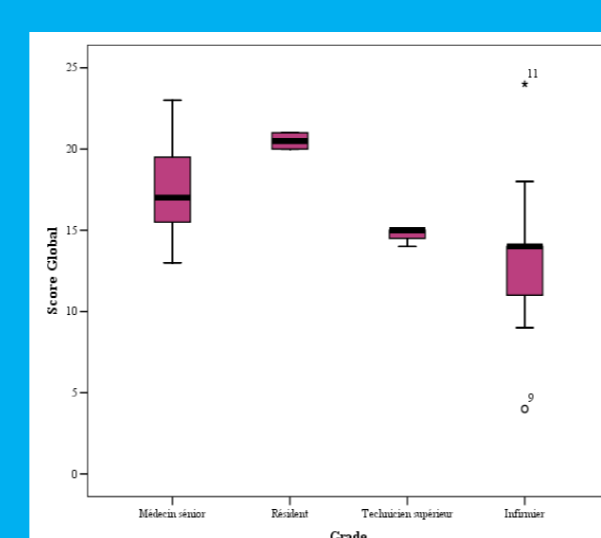


Fig N°6

### Radiation protection tools ailability

- Lead aprons and thyroid shields, are available and are worn by all the CS. However there no one had leaded glasses.

### Dosimeter availability

- All cardiologic staff have individual dosimeter that is usually worn under lead aprons.

## DISCUSSION AND RECOMMANDATIONS

- Interventional cardiologists who work in cardiac catheterization laboratories are exposed to low doses of ionizing radiation that could pose a health hazard.
- DNA damage is considered to be the main initiating event by which radiation damage to cells results in development of cancer. The most active interventional cardiologists have an annual exposure equivalent to around 5 mSv per head and a professional lifetime attributable to excess cancer risk on the order of magnitude of 1 in 100.
- The possibility of deterministic effects should also be considered when lens doses may be over the threshold. The estimated eye dose is around 0.5 mGy/procedure, in cardiac catheterization laboratories when no eye protection is used. Until recently, the dose threshold for radiation-induced lens opacities were considered 2 Gy for a single dose or 5 Gy for fractionated dose. The reasons for this high prevalence are that operator's eyes are exposed to scattered x-rays; the frequent failure of some cardiologists to use protective leaded eyewear and probably that the permitted occupational dose limits were too high even to provoke a mental alert.
- Cardiologists have a special mission to avoid unjustified or non-optimized use of radiation, since they have an exposure per head per year two to three times higher than that of radiologists.



- Dose optimization is essential to minimize both the patient's and doctor's risk in the catheterization laboratory. Decreasing patient dose will result in a proportional decrease in scatter dose to the operator.
- Protective shielding is also essential for operator protection. It includes structural (architectural wall) shielding, mobile shielding (with ceiling suspended leaded plastic and table-suspended drapes) and personal shielding (with lead aprons, thyroid collars and leaded glasses).
- However, the most effective shielding is the operator's knowledge of radiation risk , which is often suboptimal.

## CONCLUSION

Since interventional cardiologists have the highest radiation exposure among health professionals, major awareness of radiation safety and training in radiological protection are **essential and imperative**, and should be used in every procedure.

## REFERENCES

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