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Radiation health and safety - Analysis of the compliance with the proper use of an individual radiation dosimeter among radiation workers

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Introduction

The personal ionizing radiation dosimeter is of fundamental importance in the disciplines of radiation dosimetry and radiation health safety and is primarily used to estimate the radiation dose deposited in an individual wearing the device. Workers exposed to radiation, such as radiologists, radiographers and radiology nursing staff are required to wear dosimeters so a record of occupational exposure can be made. According to the Radiation Ordinance (Cap. 303, Laws of Hong Kong) and Hospital Authority Code of Practice on Radiation Safety 2011, employers should provide to their employees, who are classified as radiation workers or required to work in controlled areas, a suitable personnel radiation monitoring device to monitor their radiation doses. Employees who are issued with dosimeter should wear it as instructed all the time they are at work.

Objectives

To evaluate the compliance with the proper use of thermoluminescent dosimeter (TLD) among radiation workers in our Department in terms of:

- The compliance rate of wearing TLD during fluoroscopic and IR procedures in the controlled areas.
- The compliance rate of correct wearing of TLD which is defined as correct facing, position and under lead apron.

Methodology

This was a prospective observational study over a 6 week period done in two separate phases. In the first phase, two radiologists performed spot checks in the controlled areas of one fluoroscopy room and two IR suites in our Department. They recorded if radiology staff were wearing TLD and if the TLD was worn correctly, in terms of position, facing and under lead apron. They also recorded reasons for not wearing TLD. Due to the unsatisfactory compliance rate, a number of rectifying measures such as radiation education talk, occupation health care promotions, emails alerts, posters and oral reminders and pre-procedural time out check were carried out in order to increase the awareness of occupational radiation health safety. And then a second phase of re-audit was performed after a 6 month period.

Result

In the first phase of the observational study, a total of 47 spot checks were done in the controlled areas of fluoroscopy room and IR suites, involving 12 (25.5%) radiologists, 23 (48.9%) radiographers and 12 (25.5%) nurses. Compliance rate of wearing TLD was low at 55.3%. The compliance rate among radiologists was the lowest (50%) while nurses was the highest (66.7%). For those who wore TLD in controlled areas (n=26), 57.7% worn with correct facing (n=15), 69.2% worn at correct position (n=18) and 96.2% worn under lead apron (n=25). For those who did not wear TLD (n=21), majority of them (71.4%; n=15) forgot to bring the TLD. After carrying out a number of rectifying measures, the compliance rate of wearing TLD improved significantly to 88% within the second phase study. Moreover, all audited radiation workers knew how to wear their TLD correctly.

Conclusion

Our analysis showed that despite the initial poor compliance of wearing the personal radiation dosimeter, through a number of educations, reminders and pre-procedural time out check, the awareness of the importance of occupational radiation dose monitoring could be increased.