

Are Malaysian Orthopaedic Surgeons Unwittingly Exposed to High Cancer Risks?

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INTRODUCTION

Intraoperative radiation exposure is a clear and present Orthopaedic occupational hazard. Surprisingly, Orthopaedic Surgeons are not classified radiation healthcare workers (CRHCW). Unlike Orthopaedists, CRHCW exposure to radiation is well-documented internationally in accordance to law. Alarming, annual radiation exposure remains unmonitored, unpublished, and therefore unknown in Malaysian Orthopaedic Surgeons.

METHODS

We determined cumulative annual radiation exposure in Orthopaedic Surgeons. Comparisons to safe limits for non-CRHCW, and known doses for CRHCW at the same tertiary referral centre were made. A retrospective review of 12-month dosimetry data from 1st April 2018 – 31st March 2019 was undertaken. Radiophotoluminescent dosimeters under radiation protection equipment recorded radiation exposure. Verification of monthly readings by the institutional Radiation Protection Officer reduced background contamination. Descriptive and inferential statistical analyses were performed.

RESULTS

Mean cumulative annual Orthopaedic (non-CRHCW) radiation exposure was 2.17 mSv year⁻¹. This is double the 1 mSv year⁻¹ recommended annual radiation exposure for non-CRHCW. Orthopaedic Surgeons had significantly higher mean annual radiation exposure than CRHCW, 1.57 mSv year⁻¹ (p<0.05).

DISCUSSION

Despite increasing C-arm fluoroscopy and image intensifier use as operative adjuncts, Orthopaedic Surgeons have not received the

standardised education, radiation monitoring, nor protection offered to CRHCWs. Previous local studies extrapolated, failing to quantify annual radiation dose per radiation guidelines¹. Due to radiation exposure, Orthopaedic Surgeons face a 29–85% increased risk of cancers compared to CRHCW^{2,3}. Radiation safety is the legal responsibility of the employer. It is however important to be self-aware of cumulative annual dose exposure. Personal dosimetry monitoring encourages individuals to improve radiation safety practice. Thus, radiation exposure risks and outcomes like cancer are reduced. Institutional reforms, like gazetting Orthopaedic Surgeons as CRHCW, should be considered to improve radiation safety protection.

Table 1 Annual Radiation Exposure

	Ortho	CRHCW	p-value
Radiation	2.17±0.21	1.70±0.59	0.029

CONCLUSION

Orthopaedic Surgeons are exposed to significantly higher ionising radiation than CRHCW, due to a variety of factors. Yet Orthopaedic Surgeons do not avail of dosimeters nor radiation protection leave⁴ unlike CRHCW. By monitoring Orthopaedic radiation exposure, non-dose-dependent stochastic risks of radiogenic cancers in Orthopaedic Surgeons can be reduced.

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