



UCC

Coláiste na hOllscoile Corcaigh, Éire
University College Cork, Ireland



CALCULATING THE IONISING RADIATION DOSE TO THE OCULAR REGION OF PAIN PHYSICIANS DURING C-ARM GUIDED PAIN INTERVENTIONS: *A PILOT STUDY.*

RAYMOND KELLY⁽¹⁾, DOMINIC HEGARTY⁽²⁾, AISLING MCMAHON⁽³⁾

SCHOOL OF MEDICINE, UNIVERSITY COLLEGE CORK, COLLEGE ROAD, CORK¹, DEPARTMENT OF PAIN MANAGEMENT, SOUTH INFIRMARY VICTORIA UNIVERSITY HOSPITAL, OLD BLACKROCK ROAD, CORK². DEPARTMENT OF MEDICAL PHYSICS, CORK UNIVERSITY HOSPITAL, WILTON, CORK³.

BACKGROUND

- ICRP Eurotom directive (2013). Reduced ocular dose limit 7.5 fold. Must be adopted by 2018.
 - Ionising radiation dose has a deleterious effect on transparency of eye lens.
 - Threshold dose, above which risk/severity of lens opacity or cataract is increased (0.5Gray).
- Pain medicine procedures increased by 80% from 2005 to 2011 nationally (*indicated by HIPE data*).

OBJECTIVE: Can we accurately record Physician ocular radiation dose during pain management procedures?

- Cheap and readily available solution if hypothesis proven.

HOW?

- Pilot study indicated
- Single experienced operator
 - Consultant, 10 years experience
- Standard pain procedures
 - 35 cases over a 4 week period
- Standard C-arm
 - *Best case scenario, few variables, applicable to wider audience*
- OSL technology correlated to recorded exposure time and dose in milliGrays from the C-Arm



RESULTS

- Pain procedures totalling 14.8 minutes of IR was recorded ($n=35$, range of 11sec to 65 sec, median value; 22.5 sec).
- Primary Operator received a dose of 10.8mSv or 54% of the dose limit of 20mSv
- Data recording and the method of dosimeter analysis proved successful.
- Our finding suggests that there may be a need for compulsory ocular protection in the setting of the pain intervention suite.
- Exposure may be significant;
 - Consideration of experience of operator
 - Trainee exposure
 - Workload variables: Teaching, larger lists, case mix, working across multiple sites.

FURTHER INVESTIGATION

- Objective achieved; *Physician ocular radiation dose accurately recorded.*
- Extending the study to include a greater number of Pain Physicians over a prolonged period will be undertaken.

Key References

- Worgul B V, Kundiyeve YI, Sergiyenko NM, Chumak V V, Vitte PM, Medvedovsky C, et al. Cataracts among Chernobyl clean-up workers: implications regarding permissible eye exposures. *Radiat Res. United States*; 2007 Feb;167(2):233–43.
- 2013/59/Euratom. COUNCIL DIRECTIVE 2013/59/EURATOM of 5 December 2013 laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation, and repealing Directives 89/618/Euratom, 90/641/Euratom, 96/29/Euratom, 97/43/Euratom a. 2014;(December 2003):1–73.
- Health Information and Quality Authority. Health Technology Assessment of Scheduled Procedures. Spinal Injections for pain due to degenerative lumbar spine disease [Internet]. 2013 Available from: https://www.hiqa.ie/system/files/Spinal_injections.pdf .