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O003 Radiation-related chromosomal aberrations observed in high volume endovascular operators performing X-ray guided surgery

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Introduction: The biological effects of chronic, low dose radiation, to which operators performing fluoroscopy-guided procedures are exposed, are unknown. We have previously demonstrated acute DNA damage/repair in lymphocytes from operators performing fluoroscopy-guided endovascular aneurysm repair (EVAR), but these markers normalised after 24 hours and did not inform on the residual accumulated effects of chronic radiation exposure. In the present study cytogenetic techniques were used to examine for chromosomal aberrations in endovascular operators.

Methods: Peripheral blood lymphocytes were isolated from high volume endovascular operators performing EVAR and age-matched radiation naïve general surgeons as controls. Giemsa staining was used to visualise the full complement of chromosomes and all dicentrics, where 2 centromeres are present in a single chromosome, were identified. The genome was analysed for abnormal exchanges of genetic material between chromosomes using multiplex fluorescence in situ hybridisation (mFISH).

Results: Lymphocytes from 18 operators (12 exposed, 6 controls) were analysed. A higher frequency of dicentric chromosomes were found in exposed operators compared with controls (0.0011 vs 0.0004, respectively, P=0.002) after examining 54,000 lymphocytes. Twice as
many complex chromosome rearrangements were seen in endovascular operators compared with controls (0.48% vs 0.24%). Aneuploidy, the abnormal loss of chromosomes, was more frequent in endovascular operators with a median difference of 0.35 per chromosome ($P=0.004$).

**Conclusion:** We have found a higher frequency of chromosomal aberrations in endovascular operators compared with radiation naive colleagues. This justifies further individual biological profiling for genomic instability and personalised radiation risk assessment.

**Take-home message:** Radiation-related DNA damage occurs in endovascular operators despite current radiation protection measures. Biological dosimetry could be a useful tool, allowing personalised risk assessment.