Worrisome Biologic And Dosimetric Effects Of Operator Radiation Exposure During Complex Interventional Procedures: How Can They Be Measured And Decreased

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Volume and complexity of interventions

Occupational radiation exposure

- Chronic low dose exposure
- Stochastic effect: No threshold?

Exposure and biological effects: Challenges

- Latency
- Tracing the agent in the body
- Sensitive tools to measure exposure
- Measuring at individual level
- Collecting accurate data prospectively
- Understanding biological mechanisms
Markers of DNA damage in circulating lymphocytes

H2AX: Gamma Histone 2AX
pATM: Phosphorylated Ataxia Telangiectasia Mutated

Study protocol

Dosimeter

Pre-op
Immediate post-op
24hr post-op

Quantification of lymphocyte H2AX in operators

BEVAR/FEVAR is associated with higher radiation

High leg radiation exposure

EVAR is associated with DNA damage

Screening time
Dose area product

BEVAR/FEVAR is associated with DNA damage

Time (mins)
***
120
60
0

Open AAA
EVAR
EVAR
BEVAR/FEVAR

***P<0.05

% H2AX

Pre Post 24hrs
Pre Post 24hrs
Pre Post 24hrs
Pre Post 24hrs

BEVAR/FEVAR (n=14)
IEVAR (n=15)

Variability in DNA damage observed during EVAR

Operator sensitivity to DNA damage varies in vitro

Leg lead shielding is protective

Summary

- Elevated markers of DNA damage after EVAR
- High volume operators at risk
- Variable susceptibility to radiation exposure?
- Studies needed to explore biodosimetry
- Learn radiation protection behaviours
- Wear a dosimeter and know your dose
- Insist on maximal shielding: lower leg lead