INVITED COMMENTARY

Shields Up! How Much Should You Rely on Your Lightweight Garments?

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Endovascular procedures have drastically increased in number and complexity during the past decade. While the pioneers of endovascular repairs probably knew about the risks associated with ionizing radiation exposure, the initial enthusiasm somehow concealed the danger and set aside physician safety. While the benefit/risk ratio regarding the exposure to ionizing radiation is often obvious for our patients, we have to keep in mind that the risk is completely unbalanced when it comes to the safety of physicians and medical staff. Unfortunately, occupational exposure to ionizing radiation can be a life threatening issue and we all know of a colleague who suffered from cancer at an early age. We must also consider that the new generation of vascular surgeons will be exposed throughout their entire lives, with an unpredictable risk of stochastic effects.

Fortunately, awareness of radiation issues is gradually increasing in the vascular surgery community. Over recent years, many publications have assessed technologies to reduce radiation in the operating room,[1,2] or to improve medical staff shielding. However, occupational exposure to X-rays remains a concern. In 2017, El-Sayed et al. demonstrated that acute DNA damage was found in vascular surgeons' blood after endovascular aortic repair,[3] despite the use of traditional protective garments. Interestingly, this DNA damage significantly decreased when parts of the body usually uncovered (the legs) were protected. This underlined the fact that the current level of protection is probably insufficient.

Current labelling of protective garments is poorly regulated. Manufacturers often provide attenuation properties at a single beam energy (which is not particularly representative of vascular surgeons' daily practice), whereas it is well known that this varies significantly over the photon energy spectrum, especially with lightweight aprons.[4]

In the study by Lu et al. in this issue,[5] the authors demonstrated that in a random selection of "good shape" radiation protection garments found in the operating room, the Xray attenuation properties of the front panel were lower than expected in half the cases. Moreover, when garments had a back panel, attenuation was below the value stated by the manufacturers in 90% of cases. In an experimental setting mimicking real practice, they demonstrated a 38 fold difference in the ability of the garments to reduce scattered radiation, while all were supposed to provide the same level of protection. This highlights the fact that even when "standard" individual radiation protection is available, a significant risk of radiation induced injuries remains. And still … in too many centres, too many of us do not have access to appropriate protection: thyroid collars, lead glasses, and table or ceiling mounted shields are often lacking.

The findings of the study by Lu et al. should be an invitation to leave no room for complacency.[5] Everything must be done to reduce radiation emissions in the operating room, from the strict appliance of the ALARA ("as low as reasonably achievable") radiation principle to raising one's awareness of radiation exposure and, of course, implementation of the latest technologies to limit occupational exposure, including optimal shielding. For example, the new generation of real time dosimeters offers the opportunity for vascular surgeons to visualise an estimate of the radiation they are exposed to in real time, and to adjust their behaviour accordingly.

You are exposed! Don't let others decide if this risk is acceptable or not: shield yourself, wear your dosimeters, teach your trainees, rely on your medical physicist and occupational medicine to improve your working conditions. Our current practices might appear acceptable to us now, but looking back in the near future, it will probably seem insane. What are we waiting for?

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