

“Radiation Protection in the Clinical Environment” Webinar

Q&A

Tuesday 25th August 2020

Question 1. What is the average radiation dose for operator during a routine angioplasty and complex angioplasty?

Answer – Unprotected dose: approximately 3.5 micro Sieverts/minute with 6-10 Cine acquisitions

Question 2. Do the disposable shields increase patient dose?

Answer – The shields do not reflect radiation back to the patient, rather they absorb the scatter radiation and it dissipates across the shield.

If the RADPAD® is covering the field of view, it will cause the automatic exposure controls to increase the radiation to image through the shield. Therefore, place the RADPAD® Shield as close as possible to the field of view without covering the field of view.

Question 3. I am under the impression that in biplane interventional neuro radiology suites the exposure to anaesthetists are highest in the room, is this true? Should we insist on table skirts and radiation shields?

Answer - With the set-up of most interventional labs/theatres, Anaesthetists and circulating nurses are often closest to the source of the radiation (C-arm/tube) and the patient (source of scatter radiation).

Radiation under the table is 5x higher than above the table – table skirts and radiation shields should always be used.

Question 4. What is the panels thoughts on performing endovascular procedures during pregnancy if using all available personal protective equipment?

Answer – I would imagine it would be difficult to image the Aorta without imaging the womb/foetus to some degree. Patient drapes are available that can be placed underneath the patient to reduce the radiation to the womb/foetus. However, this placement could interfere with Aorta imaging efforts.

Question 5 - For Left PFA or BTK angiography, we use a left LAO view. This increases the scatter radiation to operator standing on right side of patient. How do we decrease this dosage?

Answer – LAO view means the C-arm/Tube is out from under the table and closest to the main operators exposing them to more scatter radiation than when in AP or RAO views. To protect operators, RADPAD® mobile shields can be placed between the operator and the tube. Additionally, a RADPAD® shield placed on the patient will reduce scatter off the patient to the operators.

Question 6 - Are any UK bodies recommending the use of leads for legs, RCR for example?

Answer - Not currently, we are putting together radiation guidelines for the European Society of Vascular Surgery so watch this space.

Question 7 – How can we, as operators, ask the Trust to provide the staffs with necessary protective gears? I mean, is it part of the budget of the trust to provide necessary gears?

Answer - This is a health and safety issue so budget is irrelevant. You must provide the evidence and insist on maximal protection.

There are numerous clinical studies and articles available on the dangers of Chronic Low-Dose Radiation exposure. In the same way there are over 40 clinical studies cited over 600 times noting the efficacy (and value) of implementing RADPAD® use to reduce operator occupational exposure to scatter radiation.

Given the latest studies and the links to early vascular aging (early onset atherosclerosis), early immune system aging (now is not the time to compromise one's immune system) and the role radiation exposure plays in mental health and cognitive function, it is justifiable to request proven protection devices.

Question 8 - Why would you use a RADPAD rather than a lead skirt - would they do the same job?

Answer – Yes, they do the same job, but they have different collateral impacts. Lead has a negative impact on the patient (reflective properties), while RADPAD® shields do not. RADPAD® shields are sterile, disposable shields made of non-lead materials. They are placed on the patient in front of the operator as close to the fluoro site without covering the fluoro site to create a shade zone for the operators to perform the procedure. In doing so, the RADPAD® does not reflect the radiation to the patient nor does it increase patient radiation dose (documented in several studies). In fact, the RADPAD® has been shown to reduce the patient radiation doses providing protection to operator and patient at the same time.

In several hospitals patient CT protocol does not allow Lead (Pb) to be used on patients as it traps the scatter radiation. This is one reason we do not use Lead in RADPAD® shields. Additionally, studies show that lead drapes on patients, while providing operator protection, does double the dose to the patient.

Question 9 – Of the 3 cardinal rules of radiation protection (time, distance and shielding from ionizing radiation,) which do you see as the most important for you?

Answer – (Tara) I'd sit on the fence as say all 3 of them. I've personally increased my shielding after reading Bijan's research and have become more aware of my personal dose rates. We've also done a lot of work to increase distance from the radiation source as well. Pay attention to all 3, no one rule is more important than another.

(Eric) Time is difficult to control. With practice comes speed so some procedures are getting shorter, but with technology comes new technique resulting in new, longer procedures. Over time they get shorter and new procedures emerge. This makes it difficult to control fluoro time beyond being considerate of the pedal and the use of fluoro save.

Distance is difficult to control as we move from femoral to radial access or even percutaneous access. Radial and percutaneous access mean higher doses to operators. Best practice would be to leave the room for all acquisitions, but this is not always practical. Plus, with patient BMI's increasing, it means more scatter to the operators.

Shielding is more manageable and is a bit like putting on the seat belt in the car. You must get used to implementing best practice and incorporating the shields and barriers available to reduce operator exposure to scatter radiation.

Question 10 – Can scatter radiation be reflected off walls or does it just get stopped when it hits walls/doors etc?

Answer – Yes, scatter radiation rolls like a fog bouncing off everything in the room – some things more than others. Low energy photons bounce off the table and back down to the floor. Higher energy photons pass through the table and settle in the patient. Even higher energy photons will pass through the table, the patient and into the operator. The highest energy photons will pass through the table, the patient and the operator and die off at the wall. Cine and DSA acquisition with unmanaged collimation and frame rates can result in scatter radiation reach distances much farther than 2-3 meters.

Question 11 – Can you control the production of scatter radiation?

Answer – Yes, you can control production of scatter radiation with 'low dose' setting and equipment. Scatter radiation though is also dependent on the patient size so the larger patients will give off exponentially more scatter radiation than smaller patients.

Question 12 – What are your views on the belief that protective caps can actually trap scatter radiation within the brain?

Answer – Lead caps and shields can trap and reflect the radiation. It has been shown in the field that lead patient drape result in double the radiation dose to the patient. Because radiation enters the brain through the face, a Lead cap could have the same effect on the operator – an increase dose to the wearer inside the cap.

RADPAD® No-Brainer caps, shields and drapes will not trap or reflect the radiation, rather they will absorb it causing no increase dose or harm to the patient. Studies show a reduction of 55% inside the cape with a .07 mm Pb equivalent RADPAD® No-Brainer cap.

Question 13 – What are your views on humeral shield for left-arm when standing close to the C-arm?

Answer – Humeral shields will offer added upper arm protection to the wearer. Xenolite Humeral Shields are available as Velcro or sewn attachment to an apron.

Alternatively, wearing a RADPAD® radio protective sleeve will also reduce radiation exposure to the radio-sensitive bone marrow in the upper arm. And if fitted correctly, the sleeves can reduce radiation to the under arm and radios-sensitive lymph nodes.

Question 14 – Do you have specific protocols in place for the use of RadPad?

Answer – Yes! Place the sterile RADPAD® shield on the patient in front of the operator as close to the fluoro site as possible. Do not place RADPAD® shields in the field of view as they will impact the image quality (by blocking radiation!). If the RADPAD® is in the field of view, slide it out of view or fold the corner under itself keeping it out of view.

After the procedure dispose of the RADPAD® in the regular waste with the surgical drape. There is no Lead (Pb), Latex, or PVC/Vinyl in RADPAD® disposable products. This is supported with a 3rd party non-toxicity report.

APC have a range of exemplar protocols from existing sites across the UK which can be used in your department. Get in contact for further information on usage depending on BMI, case-type etc.

Question 15 – Are there specific types of apron for people who suffer from MSK issues?

Answer – Non-Lead aprons or Lead blended aprons can be lighter weight than traditional Lead aprons.

In addition to being lead-free, we would encourage use of skirt & vest sets to distribute the weight more evenly across the body. Our back-saver and weight-relief styles are also designed with MSK issues in mind. They provide additional lumbar support and reduce weight on the shoulders for added comfort. Support belt accessories are also available.

Question 16 – Am I better wearing a one-piece apron, or a skirt and vest set?

Answer – Two-piece sets seem to be friendlier on the MSK system as the weight is distributed more evenly across the body, not only the shoulders.

There are also back-saver and weight-relief styles available which provide additional lumbar support and reduce weight on the shoulders.