

“Radiation Protection: Are Your Team Fully Protected?”

Q&A from speakers Dr Bella Huasen, Eric Radtke and Professor Bijan Modarai

Wednesday 14th July 2021

1. I suffer from MSK issues; what combination of protection would be best for me?

- Dr Bella: You need to protect yourself the same as any IR or endovascular because of being in the CT room. Lead cover, lead eye cover, and paddle to exposure while you're outside the room. Also, you need to add weight training outside of work. This is currently done in Sweden, which helps your muscles and back.
- Wearing as lightweight leads as possible that fit correctly is best. If you wear a size too big, you will have extra weight on your shoulders; too small and you won't be fully protected. It might be worth enquiring whether you can have lighter material at the back than the front to save some weight e.g. 0.35 front and 0.25mmPb at the back. Something which supports your back like a belt or back saver vest is also recommended. For additional comfort, ensure you remove your garments between cases.

2. Should radiation protection be first taught at the university level? Not sure about medicine, but as a radiographer, I don't remember covering much while at university.

- Dr Bella: I think a small module at university does no harm, but for sure, like any other teaching such as aseptic technique in foundation, radiation should be there too.
- Agree with Dr Bella, but also the field is constantly changing and gaining more information. It would be an advantage to start early.

3. Dr Bella - so I agree with your thoughts on training materials - maybe something for BSIR to address? Get Ian et al. on board? Could it be done as part of FRCR and general update training for IR's?

- Dr Bella: I think teaching is there but needs updating, and once clinical, it should be addressed. If you see a trainee do a wrong puncture, you take time to address it. The same should apply when you see them without a thyroid shield for example. And yes, BSIR and FRCR are good places to start.

-A number of sites also incorporate “Radiation Protection” into their checklist at the start of each procedure. This should be stressed and make sure everyone has adequate cover for their protection.

4. What glove thickness is best to use to protect my hands without limiting movement?

- The RR1 gloves give better dexterity than RR2, but the crux is to try a pair or two and see which you find most comfortable and you can wear consistently to reduce your dose.
- A number of consultants prefer the RR1 range due to thickness comparable to normal surgical gloves; however, we do have a number of Interventional Radiologists who use RR2 gloves (thicker) and are able to manipulate wires etc with ease.

5. Regarding University education for radiographers, one constraint is that they don't do much IR, so not exposed to the practicalities of FGI RP. Do you think the Schools would be receptive to such training? Agree that much is very high level and generic.

- Dr Bella: Yes, they can do a combined session. We had vet students in with us, why not some sessions for radiographers and radiologists. They will be working together, so why not study some sessions together.

6. Can you control the production and spread of scatter radiation?

- Dr Bella: New kit generally is always better; newer CT scanners vs old reduces the amount of radiation and thus less scatter. Using new protocols and software packages also help; anything reducing the actual radiation helps.
- To add to this, you sometimes can't control factors like the patient's size (larger patients produce more scatter), and sometimes the operator will want more images. Using appropriate protection and taking a step back from the tube can help as factors that you can control.
- From a radiographer point of view, using collimation when screening and moving the image intensifier closer to the patient's body can help to reduce scatter further.
- Avoiding steeper angulations of the C-arm where possible, can also reduce scatter. LAO positioning is associated with increased scatter vs RAO. There are also marked increases in scatter moving from a 30° angulation to 60°.

7. Eric - Are the doses to the brain chronic or acute?

- Eric: Chronic doses

8. What are your views on Protective caps trapping scatter radiation within the brain?

- Eric: RADPAD® products are non-lead and do not reflect radiation but rather absorb it. Some lead products have been shown to trap and reflect radiation, but RADPAD® caps do not. The best practice is the use of a RADPAD® shield on the patient to stop the scatter radiation before it reaches the operators face/brain.

9. Of the three cardinal rules of radiation protection (time, distance, and shielding) from ionizing radiation, which do you see as the most important to you?

- Eric: Shielding, simple.
- It is the factor of all three which you have most control over. Some procedures become more complex and therefore cannot be limited by time. Distance isn't always possible depending on the procedure and needing to be near the patient. Implementing effective shielding and planning ahead with positioning of the shielding is so important.

10. Eric- Do you guys have experience with RADPAD®? Is it easy to use? I'm sceptical about doses to the patient.

- Eric: Very easy to use. Place it on the patient, over the drape, in front of the operator, as close to the fluoro site as possible without covering the fluoro site.
- RADPAD® is very easy to use, and there are reps available to support positioning. To simplify positioning, all you need to think about is the following: Place the RADPAD® between the operator and where you are screening and as close to the fluoro site as possible. Because they are sterile and on top of the drape, you can move them if required during the procedure.

11. What tests are there to see levels of radiation within an operating room?

- Eric: Our team carries radiation dosimeters to measure scatter radiation levels in real-time and as well to demonstrate the efficacy of RADPAD® shielding.
- Your medical physics teams will measure doses using film/dosimeter badges at various intervals to ensure you are all working within guidelines. If you don't have a dosimeter, there is probably a reason for this and tests have been conducted. If you do have any concerns about levels within the operating room, it is best to speak to your local RPS or RPA, typically based within medical physics.

12. I've previously been told that I don't need radiation protection if I am more than 2m away from C - arm. Is this true?

- Dr Bella: No way! If you are in the room, you wear it.
- Eric: The Inverse Square law states that 3 meters are a 'safe' distance for fluoro exposure. Still, practice shows that radiation reaches all corners of the room, especially during CINE and DSA imaging.

- If you have the appropriate equipment in your department to reduce doses e.g. aprons, why not wear one anyway. Is it worth the risk of ignoring all shielding?

13. At university, I was only really taught to wear a lead coat if in the room. The rest was just physics. Not much precisely about protection. How can I better protect/educate myself?

- Eric: [This link](#) and [this post](#) has a lot of articles and studies on radiation and protection.

14. You talk about wearing shin guards for additional protection. What are your views on humeral shields for the left arm when standing close to the C-arm?

- Eric: If you have protection available, why not wear it. Your left side is closer to the tube, therefore, increased exposure to radiation. A humeral shield will only reduce the dose. Try the RADPAD® 9800-O ORANGE Radiation Protection Sleeve.
- Humeral shields can also be attached with velcro or stitched to your vests/garments. Have a look on the [APC website](#) at [Xenolite Humeral Shield](#) to see how this could work for you.

15. I am an anaesthesiologist and work close to the source of radiation all day. What steps should I take to protect myself better?

- Eric: Try using a table skirt at the head of the table, and a RADPAD® on the patient. Consume antioxidants as often as possible and use gloves for anything close to the beam.
- I would also ask yourself; do you need to be sitting right up close to the patient for the entire case? Does the machine stretch to allow you to take a couple of steps back and slide a mobile shield in between you and the C-arm?
- Education is key too. Reps are available to come and educate you on positioning and what else you can use, specific to your room.

16. I have a curvier figure, and I worry that garments don't cover me adequately to provide adequate protection. What should I be doing to ensure I'm best protected?

- Eric: Focus on stopping radiation at the source with shields on the patient, skirts on the tables, and rolling shields wherever they can be placed.
- Also, make sure that there are no gaps in your lead and that they fit correctly. As long as you are fully covered, you should be protected.
- If there are not enough of the correct size of garments within your department, it may be worth speaking to your line manager to highlight this. It is important that all staff wear the correct size, whether petite or curvier figure. If you wear something too small, you won't be protected. Something too big and that's a lot of extra weight on your shoulders. Make sure you get the size that is right for you and don't be ashamed about it either; your safety is top priority!