

6. Mrs Brown is being treated with High Dose Rate (HDR) brachytherapy Ir192 implant to the cervix, using an automatic afterloading technique. On completion of the treatment episode the independent radiation monitor is reporting higher than expected radiation activity in the room, although the HDR console reports that the radioactive source has been retracted.

Consider the three following scenarios:

You should consider that 3 scenarios are offered because they require different approaches to different problems. Your answers are almost copies and you haven't highlighted the differences.

Scenario 1 - The active source pellet is lodged within the applicator inside the patient.

The imperative for this scenario is to separate the patient & source ASAP

Scenario 2 - The active source pellet is stuck in the transfer tube between the patient and the HDR unit.

The imperative for this scenario is to secure the people and then secure the source

Scenario 3 - The active source pellet escaped the tube, through a crack and is lying on the floor.

The imperative for this scenario is to secure the source then track the fault

For each of the three scenarios:

- List the resources you expect to have available (personnel and equipment) to deal with this situation.
- What needs to be done immediately, in the short term and in the long term?
- Who needs to perform each of these action items?

I would suggest that you start with a brief statement that says that *"all procedures in the case of a radiation accident will be aimed at reducing exposure through use of Time, Distance and Shielding, and that it is imperative that the spilled radioactivity be confined"*.

Scenario 1

Personnel expect available, include Radiation oncologist, physicist and nursing staff. Equipment required, include suture cutters, long forceps, radiation measuring device (survey meter), lead lined container, personnel monitor and stop watch.

This section which you repeat might cause you to think of a different approach to answering the question. If you state that IN ALL CASES your equipment and involved personnel are identical you have gained 3x the marks for one paragraph.

Immediately

Physicist needs to enter room. Check if radiation activity in room. If there is still radiation activity, the physicist will, initially try to retract source via machine, if unsuccessful, then enter room and manually attempt to retract radioactive source into the afterloader. If radioactivity is still detected, the physicist will contact the radiation oncologist. The radiation oncologist will attend immediately. Using equipment, remove applicator from the patient, and place contents into lead lined container. During this time, all personnel should be wearing monitors to monitor radiation received. Stop watch should also be used to monitor how long each radiation worker is in the room for.

Patient and all personnel to all then leave the room. Physicist would need to check there is no radiation activity from patient. Lead doors should be sealed.

Long term, will need to check HDR afterloader, why radioactive source lodged within applicator. Why HDR console reported radioactive source retracted when it was still lodged within patient. Manufacturer will need to be contacted to investigate why this has occurred.

Scenario 2

Personnel expect available, include Radiation oncologist, physicist and nursing staff. Equipment required, include suture cutters, long forceps, radiation measuring device (survey meter), lead lined container, personnel monitor and stop watch.

Immediately

Physicist needs to enter room. Check if radiation activity in room. If there is still radiation activity, the physicist will, manually attempt to retract radioactive source into the machine. With survey meter, confirm that source pellet is stuck in transfer tube. Radiation oncologist to remove applicator and place all contents in lead container. If possible a closed system should be maintained, and transfer tube should not be cut.

Long term, will need to check HDR afterloader, why radioactive source was stuck in transfer tube. Why HDR console reported radioactive source retracted when it was still in transfer tube.

Scenario 3

Personnel expect available, include Radiation oncologist, physicist and nursing staff. Equipment required, include, long forceps, radiation measuring device and lead lined container.

Immediately

Physicist needs to enter room. Check if radiation activity in room. Confirm source is on the floor. If the source can be easily seen and easily retrieved, it should be picked up with long forceps and placed in lead lined container. (this is extremely difficult due to size of source)

If unable to retrieve source immediately, patient [**Should the patient be moved first laast or at all?**] and all staff to exit room as soon as possible. Lead doors are closed, room sealed.

Long term

HDR manufactor needs to be contacted. HDR room needs to remain sealed till the manufactor's trained personnel arrive to retrieve source.

I would really like to know how the source:

- a. broke off the guide wire**
- b. pierced the applicator/transfer tubes**

to end up on the ground.