Report from a French incident

Accidental exposure of healthcare aide in a radiotherapy department

Description of the incident

A healthcare aide entered a radiotherapy treatment room to recover protective lead alloy shields of patients who had completed their treatment. He entered during the course of the placement of the irradiation beams. The operators having completed the beam placement left the room, closed the door and started the exposure without realizing that a person had remained in the room.

The healthcare aide, on hearing the exposure stopped the device using the emergency stop located near the access door (he had received training on this). The department's radiation physicist was called by the operators to restart the machine (which had stopped abruptly). When opening the door, they realized that this had been caused by healthcare aide who had been locked in the room during an exposure.

The healthcare aide was wearing a film dosimeter, which was developed immediately.

Radiological Consequences

The development of the film revealed no exposure to radiation (<0.2 mSv). A significant factor was the accelerator protection shield (which is removed during patient treatment), which helped to considerably limit the exposure received.

Lessons to be learned from the incident

It is first worth noting the correct actions of the healthcare aide who avoided a more significant dose. This demonstrates the importance of radiation protection and safety procedure training.

In the case of accelerators, there are two essential precautions:

- Do not initiate the emission of a beam in an irradiation room until it has been ensured that (apart from the patient being treated) it has been properly evacuated.
- To shutdown the facility immediately in the event that the above is not met.

In this case, both of these actions could and should have been undertaken by the operators who were able to view the inside of the room on screens on the control console. A proper pre-exposure search of the room can be enforced by the installation of a "search and lock up" system, i.e. in which a series of switches inside the room need to be activated in a pre-determined sequence in order to initiate an exposure.

The position of the emergency stop buttons is also important. In this case, the stop button was located close to the access door. In reaching this button from the back of the irradiator room, the healthcare aide could have been exposed to significant scattered radiation. A second emergency shutdown button, placed at the rear of the room, would have helped avoid this.

Finally, the design of a device allowing for the detection of the presence of one or several people in the local (Entry/exit counter; movement detector) could prevent the launching of the irradiation.