Report from a French incident

Contamination of a nuclear medicine technician with Technetium-99

Description of the incident

A technician was contaminated during the preparation of a syringe containing 925 MBq (25 mCi) of Tc-99m for a patient in the "hot" laboratory of a nuclear medicine department.

While attempting to disconnect the needle from the syringe, the technician dropped the latter on the preparation trolley. The impact caused splashes of Tc-99m on the technician's face, eyes and clothes as well as on the floor and trolley.

An occupational health nurse was immediately alerted, who suggested that the technician take a shower as soon as possible.

The technician would not normally have been working that day, but was in the department to assist an overworked colleague. Because of this, during the incident, she was wearing only a protective smock over her street clothes.

After her shower, the technician first put on her contaminated clothes. She then changed into clean work clothes that were brought to her. However, she kept her jewelry on which was contaminated by the splashes.

On the advice of the regulatory authorities, the contaminated clothing was deposited in the radioactive waste store and the technician was invited to undergo further checks as quickly as possible given the short half-life of Tc-99m (6 hours).

The floor of the "hot" laboratory, the trolley and affected furniture was decontaminated without any great difficulty.

Radiological consequences

Whole body (gamma) counting performed on the technician, four hours after the incident, showed some residual contamination (1.6 MBq) both internally and externally. This result was obtained after having removed all the contaminated clothing, underwear and jewelry.

Given the half life of Tc-99m, the maximum residual contamination is estimated to be 2.5 MBq. If it is pessimistically assumed to have been all internally incorporated, this represents a little less than 1/500th (0.2%) of the Annual Limit on Intake.

The measurement was repeated the day after the incident and showed an internal contamination level of 31 kBq, and some residual contamination of the hands.

In the most extreme scenario (an intake equivalent to the entire contents of the syringe (925 MBq)), the corresponding estimated dose would be 15 mSv, almost equal to the annual dose limit for workers of 20 mSv.

Lessons to be learned from the incident

Workplace pressures must not allow proper laboratory procedures to be overlooked. In this case these procedures forbid working in street clothes and the wearing of jewelry during the handling of unsealed radioactive materials. The same procedures require gloves to be worn. It is also noted that protective eyewear would have avoided splashes in the eyes.

A change of work clothing and underwear should be available in the event of contamination of a member of staff.