

> Experience feedback

Focus on an event notified to ASN through vigie-radiotherapie.fr

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Jammed source in high-dose-rate brachytherapy

When carrying out high-dose-rate brachytherapy using a source afterloader, the source should retract automatically at the end of treatment to return to the storage position.

A centre that had to cope with the source jammed at the end of a high-dose-rate brachytherapy session shares its analysis and its tips to avoid this type of incident.

> The significant event in brief

Female patient receiving a high-dose-rate (HDR) gynaecological brachytherapy using a source afterloader that had been in use in the department for about 8 months.

At the end of a session, the source afterloader entered alarm status and the iridium-192 source did not return automatically into its container in the storage position.

The emergency stop control was activated 2 times, but the source remained jammed at the junction between the afterloader and the transfer catheter.

The patient underwent emergency evacuation from the bunker after manual withdrawal of the afterloader containing the radioactive source.

It is estimated that the source was jammed in that position for about 3 minutes.

No clinical consequences are expected for the patient.

Two radiographers were exposed to doses not exceeding the regulatory limit values.

This afterloader was withdrawn from service for 3 weeks to analyse the causes of the event and replace certain of the afterloader components.



with the participation of HAS, l'IRSN et l'ANSM

> Analysis of causes

Technical Factors

Having contributed to the jamming of the source:

- > Machining defect on bore at junction between the transfer catheter and the applicator
- > Curve of the transfer catheter (potentially aggravated by a movement of the patient)

Having contributed to the difficulty in managing the jammed source:

- > Inappropriate positioning of emergency container
- > Dimensions of leaded receptacle not suitable for containing a gynaecological applicator

Organisational Factors

Having contributed to the difficulty in managing the jammed source:

- > Insufficient training of the professionals in the management of emergency situations (theory training only, manufacturer's manual displayed but not applied, source retraction handle not used, manual withdrawal of applicator considered to be faster)
- > Insufficient training in the use of the source afterloader (excessive bending of catheter)

> Useful actions identified to avoid this error occurring

The solutions presented below are those applied by the centre that had to manage the event. They have no constraining value and must only be applied if they seem appropriate and suited to the organisation of a department.

- 1. The equipment**
 - Change of transfer catheters, of the vaginal cylinder and change of source
 - Installation of a lead shielding enabling the jammed source to be positioned with the gynaecological applicator in case of emergency
 - Acquisition of a contention system for patient set-up that reduces the risk of bending the transfer catheter and ensures easier access for making the connection between the transfer catheter and the applicator
 - Double verification of the transfer catheters by the manufacturer during fabrication and by the centre on delivery
- 2. The brachytherapy team**
 - Updating of the emergency procedure taking into account the type of applicator concerned and organisation of manual withdrawal of the applicator
 - Practical training in the emergency procedure (simulation of source jamming outside the afterloader) and withdrawal of an applicator for all the personnel that might have to intervene (radiographers, physicists, radiation oncologists)
 - Contact made with the manufacturer to determine the possibility of providing training at each reloading (3 times per year): as tests are carried out with a dummy source, the procedure can be taken through to completion (i.e. use of the handle and manual retraction of the cable)
 - Integration of the management of a jammed source situation in the assessment of risks and the working practices analysis in brachytherapy for the personnel concerned
- 3. The manufacturer**
 - Analysis of the elements of the afterloader concerned by the incident
 - Modification of the transfer catheter manufacturing process and manufacturing inspection process