University of Maryland Baltimore

Radiation Safety Procedure

Procedure Number: 4.5

Title: Radiation Safety During Y-90 Microsphere Treatment

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Technical Review and Approval:

_____ **Date:**_____
Radiation Safety Officer

Radiation Safety Committee Approval:

_____ **Date:**_____
Chair, Radiation Safety Committee

PROCEDURE 4.5, RADIATION SAFETY DURING Y-90 MICROSPHERE TREATMENT

1.0 Purpose

This procedure provides instructions for ensuring an appropriate level of radiation safety during treatments involving Yttrium-90 (Y-90) microspheres.

2.0 Scope

This procedure applies to all Y-90 microsphere treatments performed at UMMS hospital.

3.0 Procedure

3.1 Training

3.1.1 All personnel providing care for a patient receiving implant therapy shall receive Radiation Safety Training, with refresher training provided at annual intervals [G.42(a)], consistent with Procedure 1.7, *Radiation Safety Training*.

3.1.2 The Radiation Safety Training provided shall include [G.42(b)]:

- The size and appearance of the brachytherapy sources;
- Safe handling and shielding instructions;
- Procedures for patient control;
- Procedures for visitor control;
- Procedures for notification of the Radiation Safety Officer and Authorized User if the patient dies or encounters a medical emergency; and
- The training information required under COMAR Part J.

3.1.3 Radiation Safety shall maintain records of individuals receiving training required by G.42(a), a description of the training (e.g., lesson plan or outline), the date of training, and the name of the individual providing the training for a period of not less than two years following the date of training.

3.1.4 Before being released from inpatient care, the patient shall be provided radiation safety guidance that will support efforts to maintain the radiation dose to household members and the public ALARA [G.43(a)(5)].

3.2 Description of Duties

3.2.1 Interventional Radiologist

- Prepares patient for dose delivery;
- Contacts other team members when patient is prepared;
- Assembles microsphere delivery system;
- Assists in microsphere delivery;
- Assists in disposal of delivery system.

3.2.2 Radiation Oncologist

- Ensures that the delivered dose is that prescribed;
- Ensures delivery system is correctly assembled;
- Delivers microsphere dose.

3.2.3 Medical Physicist

- Calculates the required activity based on the intended dose for specific patient
- Obtains control number from Radiation Safety Office to order radioactive material;
- Orders material from manufacturer;
- Picks up material from Radiation Safety Office;
- Assays material prior to patient delivery;
- Ensures proper radiation monitoring equipment is available;
- Ensures disposal container is available;
- Prepares material for use in delivery system;

- Verifies patient's identification, dose prescription, and check out the quality management form
- Monitors delivery system during dose delivery;
- Determines when maximum dose has been delivered;
- Performs final assay of remaining dose to determine amount delivered to patient;
- Performs assay of patient to determine exposure rate at one meter;
- Returns Receipt, Use, and Disposal form to Radiation Safety Office.

3.2.4 Health Physicist

- Receives and processes radioactive material from manufacturer;
- Ensures all team members wear proper dosimeters;
- Ensures proper shielding and material handling practices are followed;
- Performs surveys of hands, feet, and clothing of all individuals leaving the room;
- Assists in identification and collection of radioactive waste;
- Surveys room for contamination following patient removal;
- Decontaminates contaminated areas;
- Collects and labels all radioactive waste and recovers packaging from source transport;
- Returns waste to designated waste disposal area.

3.3 Radiation Safety During Dose Delivery

3.3.1 All personnel entering the treatment room shall wear protective equiment as needed, including scrubs, or disposable gown, hair net, face mask, gloves, shoe covers, and, during fluroscopy, lead apron.

3.3.2 All personnel participating in dose delivery shall wear personnel dosimeters.

3.3.3 Patient and the floor next to the couch shall be covered with large drapes.

3.3.4 Radioactive wastes shall be disposed in a designated container. Regular waste should not be mixed with radioactive wastes.

3.3.5 No smoking, eating, or drinking shall be permitted in radioactive material handling areas.

3.4 Post Therapy Concerns

3.4.1 Following therapy, exposure rates from the patient will be measured to ensure that they are below 5 mR/h at one meter.

3.4.2 Providing that patients meet this requirement, there are no restrictions to inpatient processing, if such is deemed necessary for patient care. Preference would be given to a private room, if such is available.

3.4.3 Visitors are not restricted, however they should avoid close contact with the patient.

3.4.4 The patient should be provided with instructions regarding additional precautions they should take to reduce exposure to others.

3.5 Radiation Monitoring Instruments

3.5.1 An ion chamber shall be used to perform monitoring during dose delivery and for patient release.

3.5.2 A directional survey meter should be used for monitoring the source vial and lines during dose delivery.

3.5.3 A GM detector shall be used for monitoring of contamination on equipment and personnel. Care must be taken to compensate for interference from background radiation near the patient following dose delivery.

3.6 Emergency Procedures

Should the patient die or undergo a medical emergency following the dose delivery, the RSO and referring physician shall be notified immediately.

3.7 Spill Procedures

3.7.1 Minor Spills

- Notify all individuals in the area that a spill has occurred;
- Prevent the spread of contamination by covering the spill with an absorbent material and controlling the movement of potentially contaminated individuals;
- Clean up the spill using protective clothing and absorbent material; and
- Survey the area and affected individuals with an appropriate contamination monitoring instrument.
- Report the spill to the RSO.

3.7.2 Major Spills

- Evacuate the area. Ensure all individuals leaving the area are monitored for contamination;
- Prevent the spread of contamination by covering the spill with an absorbent material and controlling the movement of potentially contaminated individuals;
- Shield the radiation source, if possible without significantly spreading the contamination of increasing individual doses;
- Secure the room to prevent entry;
- Perform personnel decontamination as necessary;
- Notify the RSO.

4.0 Records and Reports

4.1. Records

4.1.1 Radiation safety records associated with delivery of Y-90 microsphere therapy may include records of material ordering and delivery, personnel training, dose assay and delivery, area and personnel surveys, and spill recovery.

4.1.2 Radiation safety records shall be created and maintained consistent with the requirements of Procedure 1.2, *Radiation Safety Records*.

4.2. Reports

4.2.1 Certain reports may be required in a Y-90 microsphere delivery results in a spill, recordable event, or misadministration.

4.2.2 All required reports shall be prepared and submitted in accordance with Procedure 1.3, *Radiation Safety Reports*.

5.0 References

Code of Maryland Regulation (COMAR) 26.12.01.01
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UMB Radiation Safety Program