

Hospital Preparations for Receiving Contaminated Patients

ARRIVAL AND INITIAL ASSESSMENT

When a hospital emergency room receives notification of a radiological incident, they should immediately initiate their hazardous material response plan. Since the entrance used for contaminated patients may not be the usual emergency room entrance, the ambulance personnel must be informed of the proper entrance. It is useful for security personnel to be stationed at appropriate locations to provide directions for ambulance drivers and to limit access to essential personnel. Preparation for arrival of a contaminated patient should include:

- Notification of all Services Involved
- Preparation of a Decontamination Area
- Suiting up of the Decontamination Team

The emergency physician-in-charge or an emergency department nurse should meet the ambulance upon arrival and assess the condition of the patients as well as the degree of contamination. **Personnel should keep in mind that the actual contamination will not be life threatening.** A radiological assessment should include both a dose rate survey and a contamination survey. After the initial assessment, the patient should be moved to either the decontamination area or the emergency room.

Any victim of a hazardous materials incident must be considered to be contaminated until demonstrated otherwise. Therefore, the route from the emergency entrance to the decontamination area may also become contaminated and all access to that area should be limited to response personnel. Ideally, this area (including hallways) should be protected with plastic or paper sheeting to reduce the spread of contamination. This barrier should be taped securely to the floor and identified with barrier rope. If the patient's injuries are not too serious to allow transfer, wrap the contaminated patient in clean sheets, blankets, or plastic and transfer the patient to a clean stretcher, taking care not to spread contamination or create airborne contamination. To help prevent unnecessary contamination, all nonessential and non-disposable equipment should be removed from the decontamination area. It may also be necessary to modify the ventilation system to reduce the spread of contamination due to air movement. When possible, a "clean" member of the staff should stand on the "clean side" of the area to hand in supplies and receive medical specimens.

It must be noted that radioactive contamination (whether internal or external) is never immediately life threatening and therefore, a radiological assessment or decontamination should never take precedence over significant medical conditions.

PATIENT DECONTAMINATION

Medical personnel must first address life-threatening issues and then decontamination and supportive measures. Once life-threatening matters have been addressed, emergency department personnel can direct attention to thorough decontamination, secondary patient assessment, and identification of materials involved. It is important to remember that appropriate personal protective clothing should be worn until the area has been properly surveyed and found free of contamination.

The essential requirements for any decontamination task are:

- A safe area to place a patient while undergoing decontamination.
- A method for washing or removing contaminants off a patient.
- A means of containing the rinsate.
- Adequate protection for personnel handling the patient.
- Disposable or cleanable medical equipment to treat the patient.

IMBEDDED RADIOACTIVE FRAGMENTS

Patients with large amounts of radioactive material imbedded in a wound warrant special attention because activated metal can contain radionuclides with very high specific activities and there may be a significant exposure hazard to treatment personnel. Dose equivalent rates from such fragments may be as high as 100 rem/hr (1 Sv/hr) very close to the object. Surgery to remove highly *radioactive fragments* may be indicated to avoid large exposures.

Aggressive surgery such as amputations or extensive exploration *should not* be undertaken to eliminate *radioactive contamination*. The surgical damage will generally far exceed any potential decrease in lifetime radiological exposure risk.

OVERALL TREATMENT OBJECTIVES

The general objectives in approximate order of importance for the management of contaminated, injured patients are as follows:

1. First aid and resuscitation.
2. Medical stabilization.
3. Definitive treatment of serious injuries.
4. Prevention/minimization of internal contamination.
5. Assessment of external contamination and decontamination.
6. Containment of the contamination to the treatment area and prevention of contamination of other personnel.
7. Minimization of external radiation to treatment personnel.
8. Treatment of other minor injuries.
9. Assessment of internal contamination.
10. Treatment of internal contamination (this could be concurrent with many of the above).
11. Assessment of local radiation injuries/radiation burns.
12. Careful long-term follow-up of patients with significant whole-body irradiation or internal contamination.
13. Careful counseling of patient and family members about expected long term effects and risks.

PSYCHOLOGICAL NEEDS

The psychological needs of the patient are all too often forgotten in the emergency management of such patients. Certainly, the emergency room is a strange enough environment for most patients. This feeling, coupled with the appearance of unsure medical staff suited up in personal protective equipment clothing is even more unsettling to the patient who may have an exaggerated fear of radiation. A calm and reassuring attitude is essential for the care of both the patient and family. Careful discussion with the patient about the early and long-term effects of the radiation can be as important as any other aspect of the treatment. This discussion should include the reassurance that the radiation exposure or contamination of the patient will not necessarily be a hazard to friends or family members. If temporary precautions involving contact with the patient are recommended, these should be discussed.

ADDITIONAL RESOURCES

There are a number of useful texts that describe in detail the treatment of patients who have received large absorbed doses of ionizing radiation (AFRRI, 1999; Brown *et al.*, 1989; MacVittie *et al.*, 1996; Mettler and Upton, 1995). Current medical advice for the treatment of radiation casualties can be obtained from two organizations within the United States. The first is the Radiation Emergency assistance Center/Training Site, Sponsored by the U.S. Department of Energy (DOE), and managed under the Oak Ridge Institute for Science and Education. The second is the Medical Radiobiology Advisory Team, sponsored by the U.S. Department of Defense (DOD) and managed by AFRRI. Contact information for these two organizations is provided below.

Radiation Emergency Assistance Center/Training Site (REACT/TS)
Oak Ridge Institute for Science and Education
PO Box 117, MS 39
Oak Ridge, TN 37831-0117
(865) 576-1005

Medical Radiobiology Advisory Team (MRAT)
Armed Forces Radiobiology Research Institute
National Naval Medical Center
8901 Wisconsin Avenue, Building 42
Bethesda, MD 20889-5603
(301) 295-0316

Sources

NCRP Report No. 138
U.S. Department of Health and Human Services
Managing Hazardous Materials Incidents Volume II
Hospital Emergency Departments
A Planning Guide for the Management of Contaminated Patients