Learning Objectives

2.15.01 List the requirements for responding to major injuries or illnesses in radiological areas.

2.15.02 State the RCT’s responsibility at the scene of a major injury in a radiological area, before, during and after medical personnel have arrived at the scene.

2.15.03 List the requirements for treatment and transport of contaminated injured personnel at your facility.

2.15.04 List the proper steps for the treatment of minor injuries occurring in various radiological areas.

Procedure: ESH-1-09-01 Emergency Response Standard

Introduction

Standard first aid takes priority over contamination controls whenever it is considered to have life-saving value, or is important to the patient for relief of pain or prevention of disability. It is the obligation of all who assist a patient to render such aid within the limits of their training and qualifications.

If possible, avoid direct skin contact with body fluids from the victim; if not possible, wear protective coverings (such as latex exam gloves) and keep your face away from the victim.
Major injuries occurring in radiological areas

I. Identifying A Major Injury

Any of the following situations should be considered to be a major injury (injuries that have the potential to cause loss of life, a disability or serious pain):

• Any head injury (from base of the neck to the top of the head),
• Any penetrating injury (except for a minor puncture wound to an extremity; e.g. a puncture wound to the abdomen would be a major injury but a finger prick would not be one),
• any loss of consciousness,
• any disorientation,
• any convulsion,
• any loss of sensation,
• any loss of motor function,
• limbs at abnormal angles,
• amputations,
• any burn of the face, hands, feet, or genitals (chemical, thermal and/or radiation burns),
• any burn larger than the palm of your hand (chemical, thermal and/or radiation burns),
• any inhalation of any abnormal substance,
• "extensive" bleeding,
• abnormal breathing patterns, and
• anything you are not completely comfortable with.

A. Important Considerations

The radiological control technician (RCT) needs to do and/or be aware of the following.

• If first to arrive on the scene, administer first aid to the injured. As always, first aid should be administered only to the extent that an individual is trained and qualified to do so.

The first consideration is not becoming the second injured person.

• Protect yourself. The first consideration IS NOT becoming the second injured person.
• Get help to the scene. Call 911. If another person is present, stay with the injured person; and have the other person call 911, and return to the scene to report to you and provide assistance.
• The second consideration IS NOT moving the injured person. Moving the patient should be considered prior to first aid only if leaving the person in the
area for a short time would further endanger the injured person’s and the rescuer’s health and safety. The second consideration is not moving the injured person.

- Radiation levels **could** require evacuation to be the first consideration. Consideration must be given to both the injured and the rescuer(s) safety in this instance. If treating the person in the location would expose them or the rescuer(s) to life threatening radiation dose, movement out of the area would then be done first.

- This is a judgement call, depending upon the nature of the injuries, the radiological conditions, the location of the injured, etc. There is no "magic number" for a dose rate that would require immediate movement regardless of the injury.

- In emergency situations involving the saving of a life or the protection of large populations (10 CFR 835.1302), the DOE has issued guidelines for control of emergency exposures. According to these guidelines, the dose limit (whole body) is 25 rems where lower dose limits are not practicable and greater than 25 rems, on a voluntary basis to personnel fully aware of the risks involved.

  Each individual selected shall have received radiological worker training (10 CFR 835.902) and be briefed beforehand on known and anticipated hazards to which the individuals will be subjected. (In situations involving saving a life, the US Navy allows an acute dose to the rescuer of up to 100 rems.)

- Contamination levels would rarely be the cause for immediately evacuating or delaying first aid to a seriously injured person from an area **prior** to first aid.

- The rescuer does not need to put on any special protective equipment to perform a rescue.

  • A contaminated live person is, in every case, preferable to a clean deceased person.

  If the person administering first aid becomes contaminated, remember that the rescuer can be decontaminated much easier than the injured person can be brought back to life if first aid was delayed to enable the rescuer to avoid becoming contaminated.

  • Airborne radioactivity would rarely be the cause for immediately evacuating or delaying first aid to a seriously injured person from an area **prior** to first aid.

  • Remember that a live patient with some internal contamination is always preferable to a deceased person with no internal contamination.
B. Initial assistance, treatment, transport and decontamination.

Assist medical personnel with treatment, transportation, and decontamination. For a seriously injured and contaminated person, the person would be transported by ambulance to the Los Alamos Medical Center (LAMC) decontamination facility. For transport of contaminated person(s), the RCT who spent time with the patient would accompany the injured person in the ambulance. Necessary measures should be taken to reduce or eliminate the spread of contamination on the way. If the patient has gross transferable contamination, consideration should be given to wrapping the injured person in a blanket or sheet to contain the contamination. This should be done by the medical personnel who are trained in handling seriously injured people, with assistance from the RCT.

Survey the injured person(s). This should include the clothing, exposed skin, any wounds, items that may have caused the wounds and associated bandages. If the injured is in an area with high radiation levels, the RCT must be able to provide an estimated dose equivalent to medical personnel. Even if the levels are not high enough to warrant immediate evacuation, the total dose to the injured individual(s) may dictate what medical treatment is given (though this situation is unlikely during the first few hours after the injury). This would require a knowledge of the radiation dose rates in the area and determination (or estimate) of the length of time that the person was exposed to these levels. (The other steps take priority over this one.)

- At LAMC, provide support to medical personnel until other help arrives. ESH-1, 4, and/or 12 personnel will come to assist and provide support for contamination control, bioassay, dosimetry, disposal of contaminated wastes, etc.

- Some typical problems and concerns arise in hospital situations. For instance, the RCT may need to instruct the hospital X-ray technicians in ways to minimize potential contamination. One approach is to cover the parts of the X-ray machine that can be covered and laying down floor protection before bringing a portable X-ray machine into a hospital room. Another approach, is to keep the X-ray machine in a clean buffer area on the other side of the Contamination Area and bring the patient up to the X-ray machine but kept within the Contamination Area.

- Waste materials, contaminated materials, radioactive materials or hot particles, etc. removed from the patient may begin to pose a radiation hazard of their own if allowed to concentrate or remain in the immediate vicinity of the patient and treatment personnel. Accumulating radioactive material in the treatment area can also cause problems with monitoring for dose rates and contamination levels because of the increased background in the area.
C. Interface of RCT and Medical Personnel

At the scene as well as at LAMC, the medical person in charge has final authority concerning all decisions, after consideration of recommendations from the RCT. After the initial response and the administering of first aid, the primary duty of the RCT will be dealing with radiological concerns. The primary concern of medical personnel will be the patient's medical condition and treatment. These two concerns must be balanced against one another, keeping the best interest of the patient in mind.

D. Requirements for the Treatment and Transport of Contaminated Personnel

For a seriously injured and contaminated person, the person would be transported by ambulance to the Los Alamos Medical Center (LAMC) decontamination facility for treatment and decontamination. If time allows, the ambulance and gurney should be prepared by covering the gurney and the inside of the ambulance with plastic sheeting.

II Minor Injuries Occurring in Radiological Areas

A. Important Considerations

The radiological control technician needs to do the following (more detailed information in responding to minor injuries is provided in ESH-1 Procedure ESH-1-09-02, "Responding to Suspect Internal Intake"):

Render first aid as needed and qualified.

Survey for contamination. The survey should include clothing, exposed skin, and items that may have caused the wound. ESH-4 should be notified so they can monitor any wounds and associated bandages for contamination, including alpha emitters if applicable. ESH-4 is responsible for determining if wounds are contaminated and to then advise medical personnel.

Keep exposure and contamination ALARA during the response.

Decontaminate, according to ESH-1 procedure ESH-1-09-05, "Responding to External Personnel Contamination."

Inform medical of the facts regarding the injured (person's name; your observations concerning the person's condition; and location and degree of contamination) so that appropriate treatment may be administered.
2.15 – RADIOLOGICAL CONSIDERATIONS FOR FIRST AID  

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- Get the injured person to medical aid.

- If the injury is minor and the person is not contaminated, the RCT should escort the injured person to the nearest First Aid Station for treatment.

- If the injury is minor and the person is contaminated, the affected area should be covered, and he or she should be escorted by an RCT to the nearest personnel decon room or emergency decon station. Medical assistance should be requested at that location.

B. Interface of RCT and Medical Personnel

In cases of minor injuries, the primary concern will normally be the removal of contamination and preventing the spread of it. If medical personnel are called, they need to concur that the injury is minor.

C. Requirements for the Treatment and Transport of Contaminated Personnel

If the injured person needs to be transported to the Occupational Medicine (ESH-2) Facility, ESH-2 medical personnel need to be called to let them know that the injured person is on their way to the facility; transport needs to be done in a government vehicle; and the person needs to be escorted.

Summary

It is imperative that the RCT be prepared to respond in the case of injuries or illnesses occurring in radiological areas. In the event of major injuries involving radiation and/or contamination, first aid and life saving measures will normally take precedence, even at the expense of routine contamination control measures. In cases of minor injuries, the primary concern will normally be the removal of contamination and preventing the spread of it.