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Emergency Medical Response

On-scene (Pre-hospital Level) Emergency Medical Response

Lecture
Introduction

- Basics principles of medical handling of exposed persons can be divided into:
  - General methods of handling
  - Specific methods due to specificity of the possible health effects of radiation and contamination

- Medical handling:
  - On-site
  - Of-site
Content

- Emergency medical response as a part of the overall response organization
- Role and tasks of the Emergency Medical Responders on scene
- Basic steps for contaminated casualty handling
- Basic steps in decontamination
- Summary
**Generic Response Organisation**

- **RESPONSE INITIATOR**
  First official being informed of an emergency with authority to initiate a response plan

- **FIRST RESPONDER**
  First person or team to arrive at the scene of an accident with an official role to play in the accident response

- **EMERGENCY MANAGER**
  Appointed official in charge of overall emergency response

- **ON-SCENE CONTROLLER**
  Usually senior member of First Responder team

- **RADIOLOGICAL ASSESSOR**
  Usually senior member of a radiological assessment team sent to the scene of an accident

- **Facility responder**

- **Fire service**

- **Police**

- **Emergency medical responder**
General Rules to On-site Management of Radiation Injuries

- Perform medical triage of injured victims
- Give conventional first aid
- Perform radiological triage of injured victims
- Manage personal contamination
- Manage radiation injuries
Role and Tasks
Accept Your Role, Protect Yourself

- Implement Procedure C4 (IAEA-TECDOC-1162)
- Step 1
  - If you are first at the scene assume the role of the On-scene Controller until relieved
  - If not, get briefing by the On-scene Controller
- Step 2:
  - If you have personal dosimeters wear them
  - Wear protective clothing as required
Role and Tasks
Search and Rescue

• Step 3
  ▪ Perform search and rescue for injured persons as soon as possible
  ▪ Assess and treat life-threatening injuries immediately
  ▪ Perform routine emergency care during extrication procedures
Role and Tasks
Search and Rescue

• Step 3 (cont’d)
  ▪ Remove injured persons from the hazard area as soon as possible
  ▪ If necessary, request additional medical help
Role and Tasks
Radiological Triage

● **Step 4**
  - Perform radiological triage and isolate contaminated person(s)
  - Remove all contaminated clothing unless medically contraindicated
  - Isolate (bag and secure) clothing, shoes, and personal belongings
Role and Tasks
Radiological Triage

- **Step 4 (cont’d)**
  - Cover wounds with sterile dressings and prepare injured persons for transport to the hospital
  - Transport in a manner suitable to prevent further contamination of the patient, the ambulance, and attending personnel
Role and Tasks
Establish Contacts

- **Step 5**
  - Establish contact with the police to obtain names and addresses of the involved population for further interview(s)

- **Step 6**
  - Inform the receiving hospital about the nature of the conventional injuries and any known or suspected exposure or contamination with radioactive materials
  - Identify the radioactive materials if known, if not, request help from Radiological Assessor
Role and Tasks

Checking contamination

- **Step 7**
  - Perform personal and equipment contamination check using procedures in IAEA-TECDOC-1092 or request assistance from the Radiological Assessor
  - When the medical conditions do not require urgent hospitalisation DO NOT leave the scene of an accident without being checked for possible personal contamination
Role and Tasks
Checking contamination

- **Step 7 (cont’d)**
  - **DO NOT** take any equipment out of the scene area prior to being checked for possible contamination
  - If you have to leave the scene urgently then contamination control procedures should be performed as soon as reasonable
Life Saving and First Aid
Other Response Teams

- If persons involved in the accident appear to be injured, use standard methods for medical first aid

**DO NOT DELAY LIFE SAVING ACTIONS DUE TO THE PRESENCE OF RADIATION!**

- Remove the injured persons from the hazard area as soon as possible
- Notify Emergency Medical Responders and inform them that the victim may be contaminated with radioactive material
Radioactive Contamination

- Radioactive contamination – radioactive materials (gases, liquids, solids) released into the environment
  - Contamination of environment
  - Contamination of objects
  - Contamination of people – personal contamination
- Personal contamination can be
  - External
  - Internal
  - Combined
Contamination of the Victims

General Consideration

- Severe external contamination unlikely in the public
- Slight contamination may be widespread
- Fear of contamination could be widespread even more
- Most people are less contaminated than they fear
Radiological Triage
Frisking Technique
Radiological Survey of the Injured Person on the Stretcher
Operational Intervention Levels

Skin and Clothing

<table>
<thead>
<tr>
<th>Contaminant</th>
<th>OIL [Bq/cm²]</th>
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<tbody>
<tr>
<td>General beta/gamma emitters</td>
<td>4.0</td>
</tr>
<tr>
<td>Less toxic alpha emitters</td>
<td></td>
</tr>
<tr>
<td>More toxic alpha emitters</td>
<td>0.4</td>
</tr>
</tbody>
</table>

Trying to measure these levels will take several minutes with a typical hand held probe. In case of urgency multiply the levels by a factor of 10 backing this up by instructions to change clothing for known clean kit followed by hand washing and washing of hair.
Decontamination Procedures

- Life saving measures first
- Use warm water, soap, or ordinary detergent, soft brush, plastic sheet, tape towel, sheet
- Remove entire clothing and place in plastic bag
- Identify contaminated areas, mark clearly, and cover until decontamination takes place
- Start decontamination from the wound, when present, and move on to the highest contaminated areas
Medical management
Contaminated Victims

- In all cases and at any step of medical aid, the first priority in the care of the patients is to attend to the most severe life-threatening injuries.

- Perform decontamination after stabilization
  - The presence of potential radioactive contamination should not deter the nature or rapidity of medical care.

- All clothing should be removed using contamination control techniques.
Routes of Contamination
Skin

- Skin may become contaminated if in contact with radioactive aerosols, liquids, or contaminated surfaces

- Beta-emitting radionuclides are the most hazardous for skin and can cause serious burns of the skin and underlying tissues
Skin Decontamination

- **Purpose**
  - To decrease the risk of skin beta burns, to lower the risk of internal contamination of the victim and to reduce the chance of further contamination

- **General rule**
  - Decontamination should be done by washing with cleaning solutions but not to the extent that the skin is further damaged or abraded
Skin Decontamination (1)

- After the person’s clothing is removed, washing the person with detergent and water is 95% percent effective.
- Keep in mind that the stratum corneum of the epithelium is replaced every 12-15 days. Thus, contamination that is not removed and is not absorbed by the body will be sloughed within a few days.
- If contamination is not removed by washing, wrap the contaminated area and, over time, sweating will decrease contamination.
Local Contamination

- Cover uncontaminated area with plastic sheet and tape edges
- Soak, gently scrub with soap, and rinse thoroughly
  - Repeat the cycle and observe changes in activity
  - One cycle should not last longer than about 2-3 min
  - Avoid vigorous scrubbing
  - A stable isotope solution may facilitate the process
Summary

• This lecture presented materials about on-scene emergency medical response
• The main points important to note are:
  - First aid is an important task for Emergency Responders on the scene of the accident
  - Tasks of Emergency Medical Responders should be coordinated with tasks of other responders
  - Contaminated casualty handling – way to decrease the contamination of victims and to prevent the spread of contamination
• Comments are welcomed
Where to Get More Information
