

Toxins

1.3.7.2 Effects of radiation exposure



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Types of radiation

- Non-ionizing-Cause excitement of atoms/molecules
 - Radio/microwave, invisible and visible spectrum light
- Ionizing radiation-removes electrons breaks bonds
 - Alpha, beta, gamma and X-ray
 - Causes gross surface and subsurface damage(DNA)
 - Impairs ability to repair those injuries
 - Greatest effect on rapidly dividing, renewing tissue



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Means of Exposure

- Contamination
 - Radioactive materials on outside of person
 - Removed with clothing and washing
- Ingestion
 - MOST dangerous
 - Radioactive materials concentrated by tissues
- Irradiation
 - Radiation passing through body



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Radiation burns

- Burn is not perceived by patient at time of occurrence (think sunburn)
- Damages ability of cells to regenerate
- Takes weeks/months to be manifest



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Acute Radiation Sickness(Stages)

- Prodromal Stage
 - N/V, anorexia, diarrhea if severe
- Latent Stage
 - Duration is dose dependent (hrs-wks)
- Manifest Illness Stage
 - ARS syndromes
- Recovery or death



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ARS Syndromes

- Bone marrow syndrome(hematopoietic)
 - Infection and hemorrhage
- Gastrointestinal syndrome
 - Infection, dehydration, electrolyte abnormalities
- Cardiovascular/CNS syndrome
 - ALOC, ataxia, sz
 - Cardiovascular collapse

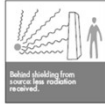


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Irradiation Protection Principles

- Time - Minimize time spent near radioactive source
 - Linearly cumulative (5 hrs with 1 or 1 hr with 5)
- Distance – inverse square law
 - Exposure decreases as square of distance (test)
 - 1000mrem/hr is 2.5mrem at 20 ft (1000/400)
- Shielding - Place physical shields around source
 - Alpha rays stopped by paper/clothing/skin
 - Beta blocked by FF turnout gear
 - Gamma : good luck



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Radiation Management Principles

- Radioactive contamination is not immediately dangerous to life/health. Use airborne and infection control practices. Little risk unless inhaled or ingested.
- Do not withhold treatment for decontamination. Conventional injuries are greater acute hazard than radiation exposure and contamination
- Special skills are not required to manage radioactive patient. Need radiation detection devices but decon is clothing removal and soap and water



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Decontamination

- Avoid spread
- HAZMAT expertise with CBRNE
- Care prior to decontamination should be limited



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Radiation Exposure Therapy

- Potassium Iodide
 - Internal contamination thyroid protection
- Prussian Blue
 - Internal contamination of Cesium and Thallium
 - Prevents radioactive absorption
- Diethylenetriamine pentaacetate (DTPA)
 - Increases clearance of radioactive plutonium, americium and curium
 - IV administration within 24 hours of exposure
- Neupogen
 - Treat radiation caused neutropenia



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Conclusion

- Radiation Bad
- Time, Distance and Shielding
- Decontamination important
- Treatments limited



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