Treatment and triage in radiation mass casualties
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Abstract

Introduction: The effective medical sorting of mass casualties (triage) and their subsequent treatment after a nuclear event have been considered extremely difficult or even impossible. In the case of a major exchange of strategic nuclear weapons (500-5,000 MT), the triage of casualties using the remaining resources would certainly be futile and frustrating. Without transportation and tertiary medical-care facilities, the only benefit would be to identify persons who are capable of combat. Even the minimally injured casualty may receive little (if any) meaningful attention in such a situation.

However, if a nuclear event occurs, it is more likely to take place on a limited scale rather than as a strategic weapons exchange. After a smaller-scale tactical detonation (0.1-2.0 kt) or a nuclear detonation by terrorists, hundreds or a few thousand casualties are more probable than millions or billions. Considerable medical resources may be intact and available for treating many of them. This chapter presents plans for the management of large numbers of casualties suffering either radiation injury alone or conventional trauma combined with radiation injury.

Materials and methods: This paper is a review article based on data which is searched in the internet and laboratory studies and journals.

Results: The degree of injury of a radiation casualty can be categorized by the symptoms of exposure. Casualties can be rapidly sorted on the basis of unlikely, probable, or severe radiation symptoms. This rapid sorting of victims allows the conventional traumatic injuries to receive appropriate attention. Lymphocyte counts are the most necessary laboratory procedure in the first hours and days after exposure. Information from currently available physical dosimeters is of limited value and cannot be relied on entirely in making triage decisions.

Triage is greatly complicated if the patient has suffered combined injuries. A shift in priority to the expectant category is likely for a radiation casualty who requires more than one surgical procedure or who has received a surface burn of more than 10%.

In the first hours after radiation injury, the priority will be to treat the injuries that require immediate attention. Candidates for surgery must be carefully chosen. Only radiation victims who can be attended to within 36 hours and whose condition does not call for multiple procedures should go to surgery.

Decontamination of surface radionuclides is nearly always a second priority after the initial resuscitative support, and can be effectively done with lavage before surgery. Chelation therapy for internal radionuclide contamination can be safely accomplished with the experimental agent DTPA, but the effectiveness of this therapy with mass casualties remains uncertain.
The use of antiemetics and antidiarrheals may contribute significantly to patient comfort. Unfortunately, in effective doses, the currently available agents have major side effects that impair the patient’s performance.

The prevention of infection and the appropriate use of antibiotics are important in the first few weeks after exposure. Within the first 7-10 days, selective gut decontamination should be used before leukopenia and sepsis occur. Two to 3 weeks later, if infection is indicated by fever and leukopenia, parenteral antibiotics should be initiated. To help prevent infection with new organisms, environmental control measures should be instituted as soon as possible.

Supportive therapy with blood components has been shown to be extremely effective in combating hemorrhage and anemia following combined injury. However, granulocyte transfusions and bone-marrow transplants as currently used appear to be of little help. A combination of simple supportive measures, including fluids, electrolytes, antibiotics, adequate nutrition, and platelet transfusions, can significantly reduce mortality, as shown by studies of animal re-search models.

Conclusion: Effective triage will permit the use of limited resources to improve the greatest number of radiation casualties. Survival after either radiation injury alone or combined injury can be greatly enhanced by the application of currently available treatments.

**Keywords:** triage, radiation, mass casualties