blood as needed and administration of hematopoietic growth factors. The value of bone marrow transplantation in this situation is questionable. None of the bone marrow transplantations that were performed among the victims of the nuclear reactor accident in Chernobyl proved successful. Bone marrow transplantation could be considered for casualties with whole-body exposure to 6–10 Gy when the hematopoietic syndrome is dominant and the bone marrow is less likely to recover with time, although the efficacy of this treatment has not been proved. Another major component of the treatment of ARS is the provision of partial or total parenteral nutrition to bypass the damaged gastrointestinal system. For blast and thermal injuries, standard therapy for trauma is given. Psychological support is essential in many cases. A treatment algorithm is outlined in **Fig. 263e-1**.

MEDICAL MANAGEMENT OF RADIATION BIOTERRORISM

Victims of radiation bioterrorism can suffer from conventional thermal or blast injuries, exposure to radiation, and contamination by radioactive materials. Many will have combinations of the above, which can cause higher morbidity and mortality rates than each exposure would alone. The number of casualties will be a major factor in determining the response of the medical system to an act of radiation bioterrorism. If only a few persons are affected, no significant changes and adaptations of the system are needed to treat the victims. If a terror attack results in dozens of casualties or more, however, an organized disaster plan at the local and state levels must be invoked to deal with the crisis properly. Useful U.S. planning documents that include many universal planning concepts can be found at *http://www.remm.nlm.gov/remm_Preplanning.htm*. Ideally, medical personnel will have had a prior assignment and training and be prepared to function in a scenario with which they are familiar. Stockpiles of specific equipment and medications should be obtained ahead of time and stored safely (see the Centers for Disease Control and Prevention Web site at *http://www.bt.cdc.gov/stockpile/*). One of the goals of terrorist attackers is to overwhelm medical facilities and minimize the salvage of casualties. Initial management consists of *primary triage and transportation* of the wounded to medical facilities for treatment. The rationale behind triage is to sort patients into classes according to the severity of injury for the purpose of expediting clinical care and maximizing the use of the available clinical services and facilities. Triage requires determination of the level of emergency care needed. The higher the number and broader the range of casualties, the more complex and difficult triage becomes. The mildly wounded and victims of contamination only can be sent to evacuation, registration (with disaster response teams), and decontamination/treatment centers. **Figure 263e-2** illustrates an evacuation scheme after a radiologic event causing multiple casualties. The goal of such an algorithm is to treat all possible victims of exposure and minor injury outside of the hospital setting. This approach prevents hospitals from being directly overwhelmed and enhances treatment for persons who are severely wounded. Emergency treatment should be administered initially for conventional injuries such as wounds, trauma, and thermal or chemical burns. Individuals with such injuries should be stabilized, if possible, and immediately transported to a medical facility. Removing clothing and wrapping the victim in clean blankets or nylon sheets reduce both the exposure of the patient and the contamination risk to the staff. Less severely injured victims should undergo preliminary decontamination before or during evacuation to a hospital.

One must remember that radionuclide contamination of the skin commonly is not an acute life-threatening situation for the patient or for the personnel who care for the patient. Only powerful gamma emitters are likely to cause real damage from contamination. It is important to emphasize that exposure to a radiation field alone does not necessarily create any contamination. The exposed person, if not contaminated, is not radioactive and does not directly emit any radiation.

To protect the staff, protective gear (gowns, gloves, masks, and caps) should be used. Protective masks with filters and chemically protective overgarments provide excellent protection from contamination. Waterproof shoe covers are also important. Remaining in the contaminated area and dealing with life-saving procedures should take place according to the "ALARA" principle: *a*s *l*ow *a*s *r*easonably *a*chievable. It is better to send many people to do the job for short exposure times than to send a few people for longer periods.

Decontamination of victims should take place in the field before their arrival at medical facilities, but radiologic decontamination should never interfere with medical care. Removal of outer clothing and shoes usually reduces a patient's contamination by 80–90%. Contaminated clothes should be carefully removed by rolling them over themselves, placed in marked plastic bags, and removed to a predefined area for contaminated clothes and equipment. A radiation detector should then be used to check for the presence of any residual radiologic contamination on the patient's body. To prevent internalization of the radioactive materials, one should cover open wounds before decontamination. Showering or washing of the entire skin and hair is very important and should be done as soon as possible. The skin should then be dried and reassessed for residual contamination until no radiation is found.

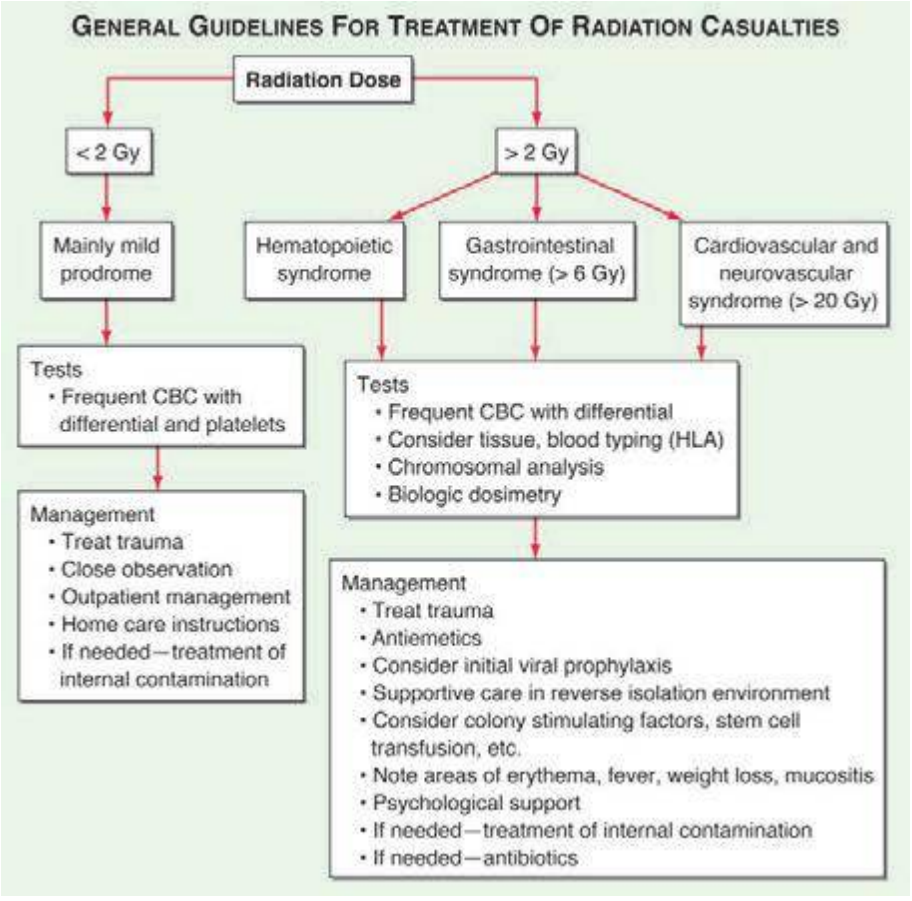

FIGURE 263e-1 General guidelines for treatment of radiation casualties. CBC, complete blood count.