



Contingency Planning for Triage, Supportive Care and Transplantation

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The multiorgan injury and myelosuppression accompanying partial body irradiation or marrow toxic exposure can lead to rapid or more slowly evolving life-threatening manifestations of the acute radiation syndrome (ARS). Experience in assessing and managing patients with severe myelosuppression as well as those suffering the cutaneous, mucosal and epithelial injury from chemotherapy and radiation is reminiscent of the care required for patients with acute leukemia or other malignancies undergoing hematopoietic cell transplantation (HCT). Comprehension of the biology of radiation injury, application of estimates of clinical dosimetry and rapid and reproducible determination of the multiorgan consequences of radiation exposure require preplanned education, assessment tools and a therapeutic algorithm. Patients with estimated partial body radiation exposure > 4 Gy may have profound myelosuppression and might benefit from consideration of allogeneic HCT. Many centers on multiple continents have contemplated these concerns and in the U.S., the Radiation Injury Treatment Network (RITN) sponsored by the National Marrow Donor Program (NMDP) and American Society for Blood and Marrow Transplantation (ASBMT) has established coordinated multicenter protocols for evaluation, triage, treatment and as needed, transplantation for marrow injured radiation exposed victims. Victims of total or partial body radiation may have intense myelosuppression but variable and unpredictable immunocompetence. Plans for their support with allogeneic HCT must include additional immunosuppressive therapy to ensure satisfactory engraftment as well as prevent the consequences of graft vs. host disease. This scenario resembles transplant approaches using reduced intensity or nonmyeloablative conditioning, now widely used for older or otherwise compromised cancer patients. Insights gained from this experience can directly inform plans for developing and implementing allogeneic transplantation for radiation victims. In conjunction with detailed protocol outlines the Network has conducted communication drills to assess transplant center capacity, educational seminars to enhance knowledge of these contingency plans in both transplant and evaluation centers and has worked to ensure preparedness amongst those best suited to manage neutropenic myelosuppressed irradiated patients. In addition, coordinated prospective data collection mechanisms have been established to learn from each experience, to formally evaluate Network and individual center performance and to revise protocols as contingencies arise. Radiation and marrow toxic emergencies may seem unlikely but the acknowledged best approach is preparedness, education and contingency planning to improve the evaluation and care of patients experiencing marrow toxic radiation. Education and preparedness are our best defense.