

AbstractID: 1811 Title: Total marrow and total lymphatic irradiation with helical

tomotherapy

Despite using a relatively low dose, total body irradiation (TBI) is accompanied by many acute and late complications. The acute effects necessitate hospitalizing the patient for treatment. The late effects can include pneumonitis, liver complications, cataract formation, neurocognitive deficits, second cancers, etc. Using helical tomotherapy (HT), it is possible to deliver equally effective doses to the marrow and lymphatics while sparing *all* at-risk normal organs to a significant degree. Two types of treatment have been designed, total marrow irradiation (TMI) and total lymphatic irradiation (TLI). Whereas with TBI all normal organs receive the TBI dose, except specifically blocked organs such as the lungs, with TMI or TLI, the dose distribution can be manipulated so that for all organs at risk about 50% of the organ volume receives less than 50% of the target dose. By putting greater weight on the avoidance of specific organs, greater sparing is possible. Treatments designed thus far have used slice thicknesses of 11, 25, and 50 mm and a pitch of 0.5. (The nomenclature is the same as that for helical CT.) These treatments can be delivered in approximately the same time as a TBI treatment. With HT, the instantaneous dose rate is higher, but low dose rates are not needed for organ sparing in fractionated regimens. Circulating cells will be treated effectively using current chemotherapeutics designed specifically for that purpose. Using variable slice thickness treatments, a more efficient combination of minimal treatment time and maximum organ sparing may be achieved.