

HOVON Abstract, Clinical

Bianca Hoeben, MD, PhD,

Radiation oncologist, University Medical Center Utrecht and Princess Máxima Center

Title abstract:

Highly conformal radiotherapy techniques for precision targeted total body irradiation during conditioning for allogeneic hematopoietic stem cell transplantation

Introduction:

As a component of myeloablative conditioning before allogeneic hematopoietic stem cell transplantation (HSCT), Total Body Irradiation (TBI) is employed in radiotherapy centers all over the world. In recent and coming years, many centers are changing their TBI technique to a highly conformal technique, providing superior homogeneity and control of the target prescription dose, and more freedom for individualized organ-at-risk sparing or precision targeted dose-escalation. Several matched cohort evaluations in adults and children show a significant toxicity and graft-versus-host disease reduction for conformal TBI as compared to 2D-conventional TBI, with unaltered survival outcomes.

In recent years, more specifically bone-marrow- and/or lymphatics-targeted therapies such as Total Marrow Irradiation (TMI), Total Marrow and Lymphoid Irradiation (TMLI) and Total Lymphoid Irradiation (TLI) are established and researched in several centers - the latter being a non-myeloablative option for immunosuppression during HSCT conditioning. In studies, TMI and TMLI have provided improved relapse-free survival options when compared to historical results for patients who previously could not undergo TBI and had poor outcome with standard HSCT regimens, such as older or frail patients, patients with relapsed or refractory (R / R) hematologic malignancies, or those who have an indication for a second HSCT. Dose escalation with TMI can provide isototoxicity or decreased toxicity with increased survival options for patients <60 years old with R / R disease, compared to standard conditioning regimens. In younger patients in complete remission, TMLI is being investigated as an alternative to TBI, and even as a substitute to chemotherapy during conditioning for HSCT.

Results:

In this overview I give an introduction to the new techniques that are being implemented widely, and a summary of relevant study results.

Conclusion:

New highly conformal radiotherapy techniques show positive treatment effects with regard to TBI, and TMLI and TMLI provide an until recently unmet need for especially R / R populations. Clinical trials to more widely evaluate the first positive outcomes are ongoing.