Evaluating Toxicity of Dose-Escalated Total Marrow Irradiation (TMI) for Relapsed Multiple Myeloma

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Purpose:
Relapsed multiple myeloma (MM) following autologous stem cell transplant (ASCT) has a poor prognosis. Since MM is radiosensitive, we developed a phase I/II dose-escalation protocol for total marrow irradiation (TMI).

Methods:
Patients with relapsed MM following ASCT have been recruited. The entire bony skeleton is targeted to receive the prescribed dose while sparing adjacent normal tissues/organs using an intensity-modulated radiotherapy (IMRT) technique. We started at a dose of 1400cGy/7fr bid/3.5 days and are increasing the total dose by fractions of 200cGy until the maximal tolerated dose is reached.

Results:
Thus far, 11 patients have been treated. Two patients have received 2000cGy/10fr/5days while 3 patients have been treated in each of the following dose cohorts; 1400cGy/7fr/3.5days, 1600cGy/8fr/4days and 1800cGy/9fr/4.5 days. All patients successfully received radiotherapy treatment in the outpatient setting, with engraftment at a median of 12 days. There have not been any treatment-related deaths, and acute toxicity, including mucositis, diarrhea and fatigue, has not been excessive. No severe (>Grade 3) late toxicity beyond 6 months has been observed.

Conclusions:
We have been able to successfully deliver a total dose of up to 2000cGy to the entire bony skeleton with our TMI technique without observing any dose limiting toxicity among the patients.