AbstractID: 10816 Title: Radiation dose response of plasma cell neoplasms

Purpose: To review the available clinical dose response data for extramedullary plasmacytomas (EMP) and solitary plasmacytomas of the bones (SPB), including standard 12 Gy TBI treatments for multiple myeloma (MM), to compute the expected dose response for plasma cell neoplasms and evaluate differences between EMP and SPB dose response. **Method and Materials:** Articles from 27 published studies on plasmacytomas were analyzed. Local control (LC) was used as the end point. Clinical data are often reported as LC for the median of a dose range – only data from ranges of width ≤10 Gy were used. The maximum likelihood method (ML) was used to estimate the parameters of a tumour control probability (TCP) model based on Poisson statistics, and approximate likelihood confidence regions (CR) were determined. A Monte Carlo experiment (MC) assessed the parameters' uncertainty due to the 10 Gy dose interval. A statistical test based on the ability of the MC distributions of the parameters to discriminate between different kinds of tumors was performed**. Results:** Radiation therapy was used as the sole treatment in more than 70% of the patients and in 8 of the 12 studies selected. Parameters characterizing TCP and 95% confidence intervals from MC are reported, along with graphical representations of the dose response, and 2D MC histograms and the CRs on the parameter space. **Conclusion:** An extensive review of plasmacytoma clinical data was performed. Although the data suffer from a lack of low dose data and are mostly reported within a dose range, this approach is a preliminary assessment of dose response relationship for plasma cell neoplasms. The parameters of the TCP model were determined. Significant difference was seen between EMP and SPB dose response. The models could be used to interpolate clinical data and estimate TCP when assessing new therapies and comparing different treatment planning approaches.