

AbstractID: 10346 Title: Estimation of alpha/beta ratio for benign tumor of the brain from clinical data

**Purpose:** To estimate a plausible  $\alpha/\beta$  value for benign tumor of the brain from clinical data. **Materials and Methods:** Forty-five articles published between 1997 and 2008 were selected for the analysis. These included publications on conventional external beam radiotherapy, fractionated stereotactic radiotherapy and stereotactic radiosurgery. Reports on combined radio-chemotherapy were excluded. Three methods for  $\alpha/\beta$  estimation were compared. These included two iso-effect scheme matching, reciprocal iso-effect dose plot and two-step graphical matching. A 5-year tumor control rate (TCR) % was chosen as an end point for the analysis. The  $\alpha/\beta$  values estimated by different methods were tested for their differences by t-test. **Results:** The  $\alpha/\beta$  values obtained from reciprocal iso-effect dose plot, two iso-effect scheme matching and two-step graphical matching were 3.53 Gy (95% CI 2.08-4.98 Gy), 2.71 Gy (95% CI 2.67-2.75 Gy) and 2.67 Gy (95% CI 1.87-3.47 Gy), respectively. Statistical analysis showed no significant difference among  $\alpha/\beta$  values obtained from these methods ( $p \geq 0.14$ ). Noteworthy, plausible estimate of  $\alpha/\beta$  determined by the two iso-effect scheme matching and two-step graphical matching could be obtained only when the size of dose fraction differed by at least a factor of seven folds. **Conclusion:** The average  $\alpha/\beta$  estimate (2.97 Gy, 95% CI 2.42-3.52) for benign brain tumor obtained in this study was in remarkable agreement with the typical value of 2-3 Gy for the late responding tissue.