Abstract

Introduction: Monte Carlo simulation is gradually being introduced for clinical dose computation in the quest to improve the accuracy of predicting the dose distribution to a medium from a given beam setup. Dosimetric measurement is used to verify the accuracy of the calculated dose distribution before the beam setup can be employed for therapeutic purpose. It is thus important to investigate the accuracy and time requirement of this dose calculation algorithm currently in use in the institution under different conditions. **Methods:** Dose calculations were made with a Monaco® Treatment Planning System which runs a Monte Carlo dose computation algorithm. Calculation times were investigated as functions of field sizes and chosen calculation uncertainty. Film measurements were made for each calculated dose distribution and both dose distributions were compared using OmniPro I'mRT software, which employs the gamma evaluation criteria for comparing two dose distributions. **Results:** Calculation time increased with increase in field size and with reduction in the calculation variance. The calculated dose distribution also concords more with the measured at small field sizes than at larger field sizes. At calculation uncertainty of 2% and gamma evaluation criteria of 3% and 3 mm for the dose difference and distance to agreement values respectively, 67% calculated dose distribution passed the gamma analysis (gamma index > 95 %). The values are better with decrease in the chosen calculation uncertainty or relaxing the pass criteria. **Conclusion:** Calculation time as a function of variance appears to increase exponentially with decreasing variance and there appears to be little gain to use variance value lower than 1 % because the required increase in the computation time is not justified by the marginal improvement in the result.