

AbstractID: 8943 Title: Novel use of polymer gels for internal radionuclide dosimetry of Tc-99m

Introduction: The use of polymer gel dosimeters were investigated as suitable dosimeters for assessing internal radionuclide dosimetry of Tc-99m.

Methods 25-5000 MBq of Tc-99m was introduced by syringe into aqueous PAGAT polymer gel dosimeter mixtures which had been sealed in nitrogen-filled P6 glass vials. After irradiation the polymer gel dosimeters were assessed using optical spectrophotometry and MRI more than 48 hours (8 half-lives) after preparation. The dose delivered to the each P6 vial was calculated empirically and also computed using GATE Monte Carlo software.

Results and Discussion: Spectrophotometry optical density or MRI R2 relation rate versus total activity curves were obtained and used to evaluate the relationship between the amount of gel polymerization and the dose deposited by the radionuclide. A linear dose response was exhibited up to 1000 MBq (corresponding to 20Gy) and was still behaving monotonically at 5000 MBq.

Conclusions: PAGAT polymer gel dosimeters offer the potential to measure radiation dose from Tc-99m three-dimensionally. Further work will extend these techniques to use with I-131, F-18, Y-90 and other particle emitting radionuclides.