Cs sources used in -137Dosimetric characteristic of :Title 8128 :AbstractID
afterloading Selectron system by Monte Carlo method

Introduction: In brachytherapy, for effective treatment planning it is necessary to know the accurate source dosimetric information such as air kerma strength, exposure rate constant, dose rate constant and redial dose distribution. Usual method to determine these factors is TLD dosimetry but now a day more accurate method is the Monte Carlo simulation method, which have widely used in determining of Brachytherapy sources dosimetric factors**.** The aim of this research is determining of dose distribution of ^{137}Cs sources configuration used in interacavitary LDR Selectron brachytherapy by Monte Carlo simulation method.

Materials and Methods: Simulation has been performed for ^{137}Cs stainless-steel encapsulated source in 2.5 mm in diameter. Six different combinations of ^{137}Cs sources were simulated and each combination was put into different applicator. MCNP4C (Monte Carlo N-Particle version 4C) was used for Monte Carlo simulation. Cylindrical layer tally volumes were used to score dose (using the MCNP *f4 tally) radially outward from sources. MCNP tally f6 was used to score kerma in air. Cutoff energy for electrons and photon were taken at 10 KeV to reduce variation. The number of history was taken 1 million for calculating air kerma strength and exposure rate constant and 0.1 million for calculating dose rate constant and redial dose distribution.

Results and conclusion: Maximum air kerma strength is obtained for the combination with fourteen active sources and found to be 919.3 μGym^2h^{-1} while its minimum value was 133.9 μGym^2h^{-1} for the case with two active sources. Maximum and minimum dose rate constant of 3.3 $cGyh^{-1}mCi^{-1}$ and 2.05 $cGyh^{-1}mCi^{-1}$ obtained for the combination with two and eight or fourteen active sources, respectively.

Key Words: ^{137}Cs, Brachytherapy, Redial dose; Dose rate constant, Monte Carlo simulation