RADIATION DOSE VERIFICATION AND RADIOBIOLOGICAL REVIEW OF CARCINOMA CERVIX IN AMERSHAM BRACHYTHERAPY MANUAL AFTERLOADING SYSTEM

A PROJECT REPORT PRESENTED

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ABSTRACT

Radiation dose verification and radiobiological review of carcinoma cervix in Amersham brachytherapy manual afterloading system.

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Intracavitory brachytherapy is a widely accepted radiation treatment modality for a treatment of carcinoma cervix. Though LDR-continuos brachytherapy, like the Amersham Brachytherapy System, could meet clinical targets radiobiologically, due to financial and logistical reasons brachytherapy trend has been towards HDR. This report tries to give a brief account of radiobiological review of LDR to HDR which is based on linear quadratic model, with the aid of clinical investigations of patients follow-up data carried out by various research groups in deferent parts in the world.

In vivo dose estimation of radiological reference points and of important clinical structures adjoining to tumour site is not an easy task in the treatment of cervix cancer.

Reproducing the same set up in tissue equivalent phantom and dose verification by implanted radiation detector is a well established method.

In this study white wax phantom as well as water phantom with LiF thermolumenescence dosemeters (TLDS) were used. Reconstruction of sources were done by means of orthogonal radiographs, in turn, used them for manual dose calculation of same reference points.

Reference point dose values which were obtained by TLD dose verification, manual calculation and manufacturer data were finally compared with each other
Linear attenuation coefficient of white wax against Cs-137, from HVL measurement, is $0.078cm^{-1}$ point dose rate values are within 7% variation with each other. (In white wax phantom, water phantom, manual calculation, manufacture data). Radiological parameters of white wax such as mass attenuation, energy absorption, density are closely comparable to water at 0.662 MeV.

According to the results white wax behave similar fashion as water at 0.662 MeV. This is advantageous since white wax is a solid at room temperature. Also it has a low melting point as well as good chemical stability.