

The Fletcher Suit Delclos (FSD) colpostats employed in intracavitary brachytherapy (ICB) for cervical cancer contain shielding segments to reduce dose to bladder and rectum. Many treatment planning systems (TPS) do not include the shielding segments and other colpostat structures in the dose calculation. Instead, TPSs calculate dose by summing the dose from the individual sources and ignore colpostat structures such as the shielding segments. The goal of this work was to calculate the dose distribution with Monte Carlo around a Selectron® FSD colpostat and verify these calculations with Radiochromic film (RCF) and MAGIC gel dosimetry. Monte Carlo calculations were performed with MCNPX 2.5.c for a single Selectron® FSD colpostat with and without shielding segments. RCF measurements were performed in a plane parallel to and displaced laterally 1.25 cm from the long axis of the colpostat. MAGIC gel measurements were performed in a PMMA phantom. RCF and MAGIC gel were irradiated concurrently with four 33.01 U Cs-137 pellets for a period of 24 hours. Results indicated that MCNPX calculated dose to within $\pm 2\%$ or 2mm for 98% of points compared with RCF measurements and to within $\pm 3\%$ or 3mm for 98% of points compared with MAGIC gel measurements. It is concluded that MCNPX 2.5.c can calculate dose accurately in the presence of the colpostat shielding segments, that RCF and MAGIC gel can demonstrate the effect of colpostat shielding segments on the dose distribution, and the colpostat shielding segments reduce the dose by as much as 50%.