

عنوان مقاله:

Dosimetric investigation of esophageal stents carrying I-125 seeds for the treatment of advanced esophageal cancer

محل انتشار:

فصلنامه فیزیک و مهندسی پرتو، دوره 2، شماره 1 (سال: 1400)

تعداد صفحات اصل مقاله: 7

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خلاصه مقاله:

Radioactive stents loaded with I-125 seeds have been widely used for the treatment of advanced esophageal cancer. Understanding the dose distribution of such stents before the clinical use is essential. This study provides a dosimetric investigation of I-125 seed-loaded stents based on the seed's arrangement and activity. A cylindrical water equivalent phantom with an esophageal stent loaded with I-125 seeds, were employed. The seeds arrangements were determined based on the distance between the centers of two adjacent seeds (z) along the stent length. EBT3 films as well as Geant4 Monte Carlo toolkit were used to obtain the dose distribution around the stent. By modeling the MIRD phantom, the dose delivered to the related organs at risk was calculated. The appropriate dose distribution is achieved for $z=15$ mm, in which the absorbed dose at a depth of 5 mm reaches about 45% of the absorbed dose near the stent surface, thereby the therapeutic dose is delivered to the reference points. Both arrangements ($z=15$ and 20 mm) seemed to be clinically eligible and their utilization depends on the patient and the hospital facilities. Using .esophageal stents with $z>20$ mm is not recommended due to the presence of cold spots in the dose distribution

کلمات کلیدی:

Esophageal Cancer, Radioactive stent, Brachytherapy, Dosimetry, Monte Carlo

لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/1150874>

