

## عنوان مقاله:

An Investigation of the Dose Distribution from LDR Ir-192 Wires in the Triangular Implants of the Paris System using Polymer Gel Dosimetry

## محل انتشار:

مجله فیزیک پزشکی ایران، دوره 7، شماره 4 (سال: 1389)

تعداد صفحات اصل مقاله: 12

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## خلاصه مقاله:

Introduction: Polymer gels are modern dosimeters providing three dimensional dose distributions. These dosimeters can be used in brachytherapy in which the tumor dimension is relatively small and the dose gradient is high. In this study, the ability of the MAGICA polymer gel was investigated for assessing the absolute dose values as well as the dose distribution of low dose rate (LDR) Ir-192 wires in interstitial brachytherapy based in triangular implants of the Paris system. Material and Methods: A suitable phantom was made from Perspex. Glass tubes were used as the external tubes for holding the Ir-192 wires in the phantom. The MAGICA polymer gel was made and placed in the phantom. The phantom and the calibration tubes were irradiated using LDR Ir-192 wires and a Co-60 teletherapy unit respectively. They were subsequently imaged using an MRI scanner. The R2 ( $=1/T2$ ) maps were extracted from several sequential T2-weighted MRI images. The dose values resulting from the polymer gel measurements at the reference points were compared with those from the common calculation method at the same points. In addition, the isodose curves resulting from gel dosimetry were compared with those from a brachytherapy treatment planning system (Flexiplan). Results: The average of the dose values measured with the gel at the reference points was 62.75% higher than those calculated at the same points. Investigating the isodose curves revealed that the maximum distance to agreement (DTAmax) between the isodoses resulting from the gel and those obtained from the treatment planning system was less than 3 mm at different dose levels. Discussion and Conclusion: Although the MAGICA gel indicates a higher absolute dose value than those calculated commonly, it can give the relative dose values accurately. Therefore, it can be recommended to be used for the assessment of dose distributions for the treatment of tissues as well as quality control of the treatment planning systems.

## کلمات کلیدی:

Brachytherapy, MAGICA, Normoxic Polymer Gel, Paris System, Polymer Gel Dosimetry, Interstitial

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