عنوان مقاله:

Implementation of Aperture-Based Complexity Metrics of MLC Opening based on the IMRT Technique for Central Nervous System (CNS) and Breast cases

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خلاصه مقاله:

Introduction: Complexity metrics have been suggested to characterize treatment plans based on machine parameters such as multileaf collimator (MLC) position. Several complexity metrics have been proposed and related to the Intensity-modulated radiation therapy (IMRT) quality assurance results. This study aims to evaluate aperture-based complexity metrics on MLC openings used in clinicaland establish a correlation between plan complexity and the gamma passing rate (GPR) for the IMRT plans.Material and Methods: We implemented the aperture-based complexity metric on MLC openings of the IMRT treatment plan for breast and central nervous system (CNS) cases . The modulation complexity score (MCS), the edge area metric (EAM), the converted area metric (CAM), the circumference/area (CPA), and the ratio monitor unit MU/Gy are evaluated in this study. The complexity score was calculated using Matlab. The MatriXX Evolution was used for dose verification. The dose distribution was analyzed using the OmniPro-I'mRT program and the gamma index was assessed using two criteria: ۳%/۳ mm and ۳%/۲ mm. The correlation between the calculated complexity score and the GPR is analyzed using SPSS.Results: The complexity score calculated by MCS, EAM, CAM, CPA, and MU/Gy shows breast plan is more complex than the CNS plan. The results of the correlation test of the complexity metric and GPR show that only the EAM metric shows a good correlation with GPR for both cases.Conclusion: EAM strongly correlates with the gamma pass rate. The MCS, CAM, CPA, and MU/Gy have a weak correlation with the GPR.

کلمات کلیدی:

Radiotherapy Intensity, Modulated Central Nervous System Radiotherapy Planning