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خلاصه مقاله:

Introduction: The gamma index is a known parameter for radiotherapy dose verification. Many free and commercial programs have been written for the calculation of this index. However, the verification of the results has been overlooked in many of the programs. The present study tested the validity of three gamma index calculator programs. Material and Methods: The gamma indices for three measured and calculated dose distribution pairs presented in Low et al., Medical Physics, (1998) were calculated using three programs to compare with the results of the published paper. They included an executable program working in Gnuplot software environment (i.e., Gamma_index.exe), simple implementation of the formulas by MATrix LABoratory (MATLAB) software (i.e., Simple m-file), and CalcGamma MATLAB-based program distributed at GitHub website (i.e., Geurts). The resulted gamma distributions were compared with the three figures of the study by Low et al. Results: According to the results, it was observed that neither Gamma_index.exe nor Simple m-file calculated gamma indices was valid, with up to 31% difference in pass rates. On the other hand, Geurts showed fairly good agreement with the gamma indices presented in Low et al. paper. Conclusion: Use of gamma index calculator programs, such as Gamma_index.exe should strongly be prohibited without verification. Furthermore, the implementation of the gamma index formulas without enough preprocessing of the data results in invalid values. Geurts is a reliable program that can be used in its current form or it can be changed to stand-alone executable software for the use in studies and clinics.

کلمات کلیدی:

Gamma index, Radiotherapy, Dose Distribution Verification