

ABSTRACT

This study aims to analyze dosimetric parameters in cervical cancer Intensity Modulated Radiation Therapy (IMRT) planning calculated using the Analytical Anisotropic Algorithm (AAA), to validate the calculated dose distribution through Patient Specific Quality Assurance (PSQA) using an Electronic Portal Imaging Device (EPID), and to evaluate the agreement between calculated and measured dose distributions using gamma index analysis. This retrospective study used IMRT treatment plans of cervical cancer patients calculated in the Eclipse Treatment Planning System (TPS) using the AAA algorithm. Dosimetric evaluation was performed using dose volume histogram (DVH) parameters including D95%, D50%, D2%, Conformity Index (CI), and Homogeneity Index (HI) for the Planning Target Volume (PTV), as well as dose evaluation for organs at risk. Dose verification was conducted using EPID with gamma index analysis under absolute criteria of 3%/3 mm and 3%/2 mm. The results showed that the dose distribution in the PTV generally met clinical criteria, with CI values ranging from 0.931–0.999 and HI values ranging from 0.024–0.088, indicating good conformity and homogeneity of dose distribution within the target. PSQA verification results showed that most treatment plans met clinical acceptance criteria, with gamma passing rates for the 3%/3 mm criterion ranging from 87.12%–99.96%, while for the stricter 3%/2 mm criterion the values ranged from 83.68%–99.86%, indicating increased sensitivity in detecting deviations in dose distribution. Overall, the AAA algorithm demonstrated adequate accuracy in cervical cancer IMRT planning, and EPID-based PSQA proved to be an effective pre-treatment dose verification method to ensure agreement between calculated and delivered dose distributions.

Keywords : *cervical cancer, IMRT, Analytical Anisotropic Algorithm, PSQA, gamma index*