ID 328

Assessment of Setup-errors in 3D-Conformal Radiotherapy for Head and Neck Cancer Patients using an Electronic Portal Imaging Device

UIU Karunathilaka[1] and V Ramanathan[1#]

[1]Faculty of Allied Health Science, General Sir John Kotelawala Defence University, Ratmalana, Sri Lanka

[#]vijitha.r@kdu.ac.lk

Abstract

The accuracy in radiotherapy is very important since it is irreversible treatment and it partially depends on patient's set up on each fraction of treatment. Developing unique margins by assessing set up errors will provide better treatment. The aim of this study was to evaluate set up errors in three-dimensional conformal radiation therapy for head and neck region using an electronic portal imaging device and to define the Clinical Target Volume (CTV) to Planning Target Volume (PTV) margin in Varian 2300CD unit at Apeksha Hospital, Maharagama, Sri Lanka. Head and neck patients (n=101) immobilized with thermoplastic masks and data were collected from July 2021 to July 2022 for this study. Transitional errors of all directions were collected using 303 pairs of orthogonal portal images to calculate systematic errors and random errors. The margins for CTV to PTV were calculated using three different margins recipes. The calculated population systematic and random errors for the Anteroposterior (AP), Superioinferior (SI) and Mediolateral (ML) directions are 0.13 cm, 0.1 cm, 0.08 cm and 0.22 cm, 0.21 cm, 0.19 cm respectively. All the margins were calculated from the three recipes are less than 0.5 cm. Therefore, this study shows that 0.5 cm margin is safe for head and neck patients who receive treatment from Varian 2300CD unit at Apeksha Hospital. This study recommends to maintain their own CTV to PTV margins by institute to minimize unnecessary radiation dose for surrounding tissues and organs at risk (OARs). In addition, the effectiveness of the immobilization devices should be analyzed during the treatment.

Keywords: *Radiotherapy, PTV, CTV, Three-dimensional conformal radiotherapy, Set-up errors, Electronic portal imaging device*