O-24

Monte Carlo Based Planning System for a Beam Spoiler

한림의대 방사선 종양학과

강세권 · 조병철 · 박희철 · 배훈식

For the treatment of superficial tumors like squamous cell carcinoma of the head and neck, 6 MV photon beam is not appropriate and a spoiler is widely used to increase dose in the buildup region, while preserving the skin sparing effect. However, commercially available treatment planning systems assume a normal unspoiled beam, thereby cannot predict the buildup dose with spoiler accurately. We aimed to implement a Monte Carlo (MC) based planning system to apply it to the radiation treatment of head and neck. Lucite with thickness of 10-mm was used for the beam spoiler with Siemens Primus 6 MV photon beam. BEAM/DOSXYZ MC system was employed to model the linac and the spoiler. To verify the calculation accuracy of MC simulations, the percent depth doses (PDDs) and profiles with and without spoiler were measured using a parallel-plate chamber. For the MC based planning, we adopted a hybrid interface system between Pinnacle (Philips, USA) and BEAM/DOSXYZ to support treatment parameters of Siemens linac and the spoiler. The measurements of PDDs and profiles agreed with the corresponding MC simulations within 2% (1SD), which demonstrate the reliability of our MC simulations. The spoiler generated electrons make a contribution to the absorbed dose up to depth of 2cm, which shows that the dominant source of increased dose from spoiler system is the contaminating electrons created by the spoiler. The whole procedures necessary for MC based treatment planning were performed seamlessly between Pinnacle and BEAM/DOSXYZ system. This ability helps to increase the clinical efficiency of the spoiler technique. In conclusion, we implemented a MC based treatment planning system for a 6 MV photon beam with a spoiler. We demonstrate sophisticated MC technique makes it possible to predict dose distributions around buildup region accurately.