

AbstractID: 9153 Title: Commissioning of the commercial planning system for the electron arc treatment

Purpose: Most commercial radiation treatment planning systems do not provide the planning mode for the electron arc treatment which most linear accelerators have. We have commissioned a new exclusive physics machine for pseudo electron arc planning and checked the validity with phantom measurements.

Method and Materials: With an electron arc aperture tray under Varian 21-EX, minimum beam data including depth doses, lateral profiles and output factors were measured and transferred into a Pinnacle³ for commissioning. An acrylic cylindrical phantom wrapped with 1 cm-thick bolus was used for planning and measurement. Multiple static beams with 5 degrees interval were adopted for the pseudo arc planning and delivered via dynamic electron arc mode of the Varian linac. For the evaluation of the pseudo arc planning, measurements were made with MOSFET detectors placed at five different points beneath the bolus and on the surface.

Results: Pinnacle³ was commissioned successfully for the electron arc treatments with a fixed field of $6 \times 25 \text{ cm}^2$ on the Varian 21-EX. The extended distance from the beam-shaping-edge of the electron arc aperture to the surface makes the beam characteristics totally different from those for the usual electron beams. The MOSFET measurements agreed with the calculation to within 5% except the ends of the arc where 16.5% of discrepancy was obtained.

Conclusion: Without the electron arc planning function, multiple static beams can be exploited successfully for the electron arc treatment on the commercial planning system. However, a new physics machine for the exclusive electron arc therapy should be commissioned because of the totally different characteristics of the electron beam for arc therapy. In-vivo dosimetry is a necessity for the plan evaluation.