

## DOSIMETRY OF SMALL AND ELONGATED ELECTRON BEAMS FIELDS FOR PREVENTING ARTERIOVENOUS FISTULA STENOSIS

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**Purpose** : The purpose of this study is to evaluate dose distribution of small and elongated electron beam fields for further reference in arterio-venous fistula treatment. The percent depth dose, isodose curve, and output factor were measured as a function of electron energies and field sizes to provide a practical reference dose system.

**Material and Methods** : According to clinical practices , eight field sizes were measured (including  $2 \times 5$ ,  $3 \times 5$ ,  $4 \times 5$ ,  $5 \times 5$ ,  $2 \times 10$ ,  $3 \times 10$ ,  $4 \times 10$ ,  $5 \times 10$  cm<sup>2</sup>) and energy of 6, 8, 10 MeV generated by SIEMENS KDS-2 Linac were used in this study. The distance from source to surface (SSD) is 100cm. To generate small and elongated field, the electron blocks were used in our study, and percent depth dose, isodose curves, and output factor were also compared with blocks on electron cone and on phantom surface.

**Result and Discussion** : The percent depth dose, isodose curve, and output factor were measured as a function of electron energies and field sizes. The Dmax shifts towards the surface as the electron beam field size reduced. The smaller the field sizes, the greater the surface dose, and the dose fall-off region becomes more gradual. If the mean size of arterio-venous fistula is 1.5 cm in length and 5mm in width, the safe margin should add 8mm more for long and short axis to cover treatment target adequately. The closer between cerrobend blocks and skin, the better the dose distribution will be.

**Conclusion** : The dialysis accesses (arterio-venous fistula) are suitable for electron-beam therapy because of their superficial location. The electron fields for arterio-venous fistula are usually small and elongated, dose distribution are usually unpredictable by conventional calculation table. The study provides a practical reference dose system for small and elongated field size electron beam dose calculation not only for arterio-venous fistula therapy, but also for skin, head and neck area treatment.

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Key words: Electron beam, Arteriovenous fistula, Small and elongated fields