**Abstract:**

Purpose: This study aimed to assess whether a Monte Carlo (MC)-based algorithm reflects the influence of totally implantable venous access ports (TIVAPs) in external radiation therapy.

Materials and methods: The present study comprised two steps: experimental measurements of depth doses and surface doses with and without TIVAPs and calculation with an MC-based algorithm.

Results: The TIVAP-associated maximum dose reduction compared with the dose at the same depths without TIVAPs was 7.8% at 4 MV, 6.9% at 6 MV, and 5.7% at 10 MV in measurement, and 7.4% at 4 MV, 6.6% at 6 MV, and 5.5% at 10 MV in calculation. Relative surface doses were higher with TIVAPs made of titanium, due to a higher fluence of backscattered electrons from the TIVAPs, than with plastic TIVAPs. There were no significant differences in the relative differences between the measured and calculated doses of the titanium TIVAP group and the plastic TIVAP group at 4 MV ($p = 0.99$), 6 MV ($p = 0.67$), and 10 MV ($p = 0.54$).

Conclusion: TIVAPs caused target dose reductions and dose increase near the TIVAP, especially when made of titanium. The influences are reflected in the MC-based algorithm.

**Reference:**

Takeshita T, Magome T, Watanabe R, Onozawa S, Tsuchiya K, Tago M, Sasaki M. Evaluation of a Monte Carlo-based algorithm for the influence of totally implantable venous access ports in external radiation therapy. Jpn J Radiol. 2020 Nov 2. doi: 10.1007/s11604-020-01062-9. Epub ahead of print. PMID: 33136255.