

Purpose: Selecting proper settings and prescription in Intraoperative Radiotherapy (IORT) is currently highly dependent on clinical experience. When tumour resection is finished, radiation oncologist (RO) has to decide, depending on patient condition and peroperative findings. Due to the lack of a therapy planning system (TPS), the process of taking into consideration the isodose curves and selecting the best one to match the treatment volume is done in real time without any imaging support. We present our experience with the first IORT virtual simulator prototype named *Radiance* (GMV, Madrid, Spain). **Methods and materials:** The new virtual simulator prototype has been used with computed tomography scans of real patients. The prototype has been evaluated by RO and Medical Physicists (MP) experienced with commercial TPS. Dosimetrical data have been achieved by MP with an Elekta Precise linac arranged for IORT treatments with specific applicators. They consisted on isodoses in water, to get a simple estimation of absorbed dose. Contouring organs and volume at risk, and applicator placing have been performed by RO. A set of clinical cases have been simulated by several RO successfully. **Results:** The feedback provided by the users has lead to several improvements that are included in the current software version. For the first time it has been possible to study anatomical and geometrical treatment scenario before surgery. A better selection of treatment parameters has been possible thanks to isodose superposition. **Conclusions:** The first IORT planning system is under development. Currently, it is possible to assess the anatomical patient data before the procedure. After that, applicator placement and isodose superposition allows a quick evaluation of necessary geometrical setup and electron beam energy. Further research will comprise a multicentric reproducibility trial with development of clinical protocols and dose modelling to achieve accurate dose calculation. Supported by grant PI08/90473. Spanish Government.