Radiotherapy is delivered without disturbing the fresh tumour bed. In the TARGIT intraoperative radiotherapy, which employs a very different surgical and radiological technique (the patient cohorts in the ELIOT trial\(^1\) and in the TARGIT-A trial\(^2\) were similar), targeted intraoperative radiotherapy is delivered without disturbing the fresh tumour bed. Immediately after lumpectomy, a spherical applicator is inserted at the site of the excised cancer, and a carefully placed purse-string suture gently wraps the soft pliable tumour bed around it. Targeted intraoperative radiotherapy is thus delivered to well-vascularised and undamaged tissue (figure). Radiotherapy delivery takes 20–40 min, allowing time for normal tissue repair.

Unlike the results of the ELIOT study, the long-term breast cancer outcomes (median 9 years, maximum 19 years follow-up) of TARGIT-IORT were similar to the outcomes of whole-breast irradiation.\(^3,5\) Importantly, most patients in the TARGIT-A trial who had high-risk features (including 78% of patients with grade 3 tumours, 82% of patients with oestrogen receptor-negative tumours, and 63% of patients with node-positive tumours) did not receive supplemental external beam radiotherapy after targeted intraoperative radiotherapy.\(^3,5\) With effective local control, breast cancer mortality with targeted intraoperative radiotherapy is no different from whole-breast irradiation (as shown by the superimposed Kaplan-Meier survival curves), and the reduction in non-breast cancer mortality is substantial: HR 0.59 (95% CI 0.40–0.86; p=0.005), 41% relative risk reduction, and 4.4% in absolute risk reduction (from 9.85% to 5.41% at 12 years).\(^3,5\)

There are many other benefits to targeted intraoperative radiotherapy. Notably, unlike electron intraoperative radiotherapy, it does not require linear accelerator-style radiation protection. Targeted intraoperative radiotherapy can be done in a standard surgical theatre,\(^3,5\) has lower toxicity, improved quality of life, superior cosmetic outcomes, and lower health-care costs than whole-breast radiotherapy.\(^3,5\)

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References


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Figures: Contrast techniques of TARGIT-IORT during lumpectomy for breast cancer versus ELIOT (ELIOT=electron intraoperative radiotherapy. TARGIT-IORT=targeted intraoperative radiotherapy.)