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Radiotherapy during lumpectomy (TARGIT-IORT): The least disruptive treatment for breast cancer patients, which can improve their length and quality of life

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Breast cancer patients with early disease have traditionally had just two options lumpectomy (breast conservation), which invariably has to be followed by whole breast radiotherapy, or a mastectomy.

Unfortunately, for some patients, there hasn't really been a choice since postoperative radiotherapy requires repeated daily hospital visits for up to six weeks. Furthermore, whole breast radiotherapy is invariably accompanied by scattered irradiation of nearby vital organs (e.g. heart, lung) which can lead to heart attacks and cancer formation

We invented a new way to give radiotherapy during the lumpectomy operation and tested in a large international randomised TARGIT-A trial. reported risk-adapted targeted intraoperative radiotherapy (TARGIT-IORT) during lumpectomy for breast cancer to be as effective as whole-breast external beam radiotherapy (EBRT).

Methods: 2298 women ≥ 45 years, invasive ductal carcinoma ≤ 3.5 cm, cN0–N1) were randomised in 32 centres in 10 countries in the United Kingdom, Europe, Australia, the United States, and Canada, to the EBRT arm, which consisted of a standard daily fractionated course (three to six weeks) of whole breast radiotherapy, or the TARGIT-IORT arm. TARGIT-IORT was given immediately after lumpectomy under the same anaesthetic and was the only radiotherapy for most patients (around 80%). TARGIT-IORT was supplemented by EBRT when postoperative histopathology found unsuspected higher risk factors (around 20% of patients). We also performed subgroup analyses

Results: With long term follow-up (median 8.6 years, maximum 18.90 years) no statistically significant difference was found for local recurrence-free survival (hazard ratio 1.13, 95% confidence interval 0.91 to 1.41, $P=0.28$), mastectomy-free survival (0.96, 0.78 to 1.19, $P=0.74$), distant disease-free survival (0.88, 0.69 to 1.12, $P=0.30$), overall survival (0.82, 0.63 to 1.05, $P=0.13$), and breast cancer mortality (1.12, 0.78 to 1.60, $P=0.54$).

Mortality from other causes was significantly lower (0.59, 0.40 to 0.86, $P=0.005$).

Local recurrence-free survival was no different between TARGIT-IORT and EBRT, in every tumour subgroup. Unlike in the EBRT arm, local recurrence in the TARGIT-IORT arm was not a predictor of a higher risk of distant relapse or death. Our new predictive tool for recommending supplemental EBRT after TARGIT-IORT is at <https://targetit.org.uk/addrtr>.

Overall survival at 12-years was significantly improved from 84.9% to 89.3% (mortality reduced by 28% in relative terms, 4.5% in absolute terms) in the large number ($n=1797$) of patients who had grade 1 or grade 2 cancers.

Conclusion: For patients with early breast cancer, risk adapted immediate single dose TARGIT-IORT during lumpectomy is an effective alternative to EBRT, with comparable long-term efficacy for cancer.

Recent Publications

1. Vaidya JS, Vaidya UJ, Baum M, Bulsara M, Joseph D, Tobias JS, et al. Global adoption of single-shot targeted intraoperative radiotherapy (TARGIT-IORT) to improve breast cancer treatment – better for patients, better for health care systems. UCL preprint 2021. <https://discovery.ucl.ac.uk/id/eprint/10121050/>
2. Vaidya JS, Bulsara M, Sperk E, Massarut S, Douek M, Alvarado M, et al. TARGIT-IORT during lumpectomy for breast cancer - better for patients than other PBI approaches. *Int j of radiation oncol, biol, physics* 2021. [https://www.redjournal.org/article/S0360-3016\(21\)00199-1/pdf](https://www.redjournal.org/article/S0360-3016(21)00199-1/pdf)
3. Vaidya JS, Bulsara M, Baum M, Wenz F, Massarut S, Pigorsch S, et al. New clinical and biological insights from the international TARGIT- A randomised trial of targeted intraoperative radiotherapy during lumpectomy for breast cancer. *British journal of cancer* 2021;125(3):380-89. <https://www.nature.com/articles/s41416-021-01440-8.pdf>

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Biography

Vaidya is a Professor of Surgery and Oncology at University College London specialising in the diagnosis and treatment of diseases of the breast. Professor Jayant Vaidya conducts ground-breaking research in breast cancer surgery, radiotherapy and oncology. He is a world-renowned

control, lower non-breast cancer mortality and significantly improved overall survival in those with grade 1 or 2 cancers who form the majority of cases. This is in addition to the obvious benefit of finishing the radiotherapy during the lumpectomy operation, greatly reducing hospital visits, reduced pain and improved cosmetic outcome and quality of life.

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