Health

A revolution in breast cancer therapy

Results out today suggest that TARGIT can limit treatment to just one dose of post-surgery radiation, says ***Marcelle Bernstein***

It was every woman's nightmare. After a routine NHS mammogram in June 2012, I was casually anticipating the usual letter – "... we are pleased to tell you ...". Instead, I got a phone call and an urgent appointment at a London teaching hospital. There, they biopsied my right breast, and six days later I returned for the results. In my late 60s, I was diagnosed with a rare type of invasive breast cancer; thankfully, it had been caught early.

Thankfully, too, I was offered a radical new method of delivering radiotherapy called TARGIT (Targeted Intra-operative radioTherapy). Radiotherapy is usually given after surgery to remove a cancer, to reduce the risk of it returning; but the standard method involves women coming back to hospital after their operation, often on a daily basis for several weeks. By contrast, TARGIT gives women a single dose of radiation at the same time as their surgery. And rather than targeting the whole breast, as in standard radiotherapy, radiation is delivered via a miniature X-ray device, straight into the tissue surrounding the removed tumour.

Results from a major trial of TARGIT are published today in *The Lancet*, and suggest that it could revolutionise breast cancer treatment. The trial followed, for an average of five years, almost 3,500 women aged 45 and over who had early breast cancer, comparing outcomes for those who received TARGIT with women who had standard radiotherapy.

Researchers found that for both groups, the risks of breast cancer recurring or of death from the disease were similar. However, women in the TARGIT group were also far less likely to suffer unpleasant side effects associated with radiotherapy. Most remarkably, deaths from causes other than breast cancer were lower in the TARGIT group – 1.3 per cent compared with 4.4 per cent.

Prof Michael Baum, one of the paper's authors, says the excess deaths in the latter group were "almost certainly" due to the adverse effects of whole-breast radiation. Non-breast cancer deaths were attributable to heart problems and other cancers, including of the lung and oesophagus. "But in the TARGIT group, because local toxicity is lower, deaths from other causes was reduced," he says.

Prof Jayant Vaidya, a fellow member of the team, says: "The most important benefit of TARGIT is that it allows a woman to complete her entire local treatment at the time of her operation, with lower toxicity to the breast, the heart and other organs."

JEFF GILBERT

Marcelle Bernstein and her husband Eric: 'TARGIT meant I could avoid the trauma of weeks of radiotherapy, and I suffered none of the common side effects of standard radiotherapy'

Certainly for me, being offered TARGIT was a godsend. It meant I could avoid the trauma and exhaustion of travelling to hospital daily for weeks of radiotherapy; and I suffered none of the side effects of standard radiotherapy such as local tenderness, swelling, reduced range of movement or change in breast appearance.

However, my route to TARGIT was not simple. The locum consultant breast surgeon I first saw to discuss my biopsy results told me I had invasive mucinous carcinoma, and would need surgery, plus five weeks of daily radiotherapy. This plan changed when I told him I was an Ashkenazi Jew (and therefore at a slightly higher risk of carrying the BRCA1 or BRCA2 genes associated with breast cancer). Without pausing, he said I would need my right breast removed.

I was utterly unprepared – he had previously said the cancer was tiny – but reasoned that I loved life more than my breasts. At this, he made it a double mastectomy. His final words as I left were: "So, can I book you in for the big one?"

The next morning, my husband and I had emerged sufficiently from shock to decide we needed a second opinion. I emailed Prof Baum, the leading surgeon and breast cancer oncologist, now semi-retired, at University College Hospital London, asking his advice. Within hours, the phone rang. Mr (now Professor) Vaidya introduced himself as a breast surgeon who worked with Prof Baum. "You must be worried," he said. "I didn't want to keep you waiting."

It was then I learnt about TARGIT, a technique developed over the past 17 years by Profs Baum and Vaidya, together with Prof Jeffrey Tobias, a clinical oncologist. The team had worked closely with the German medical technology company Carl Zeiss Meditec, which designed the Intrabeam device – "essentially, a sophisticated X-ray source", according to Prof Tobias. Intrabeam consists of a robotic arm and an applicator which, once the tumour has been removed, is inserted through the surgical incision and into the tumour bed, the tissue surrounding the removed cancer. In one blast, the equivalent of five to six weeks of daily radiation is given directly into this tissue, destroying any remaining cancer cells. "TARGIT provides a degree of immediacy and precision unachievable with other methods," says Prof Tobias.

TARGIT also overcomes another disadvantage of standard radiotherapy, where the wound from the incision must first be allowed to heal, leaving time for cancer cells to repopulate. If chemotherapy is used, as is often necessary in more aggressive cancers, radiation may be delayed by six months.

It did not take long for me to be confirmed as a suitable candidate for TARGIT. My cancer was oestrogen receptor positive, so Prof Vaidya started me on the drug letrozole to block hormone production. Genetic testing for the faulty genes had meanwhile come back negative, so fortunately our children – two daughters and a son, all in their 30s – would not be susceptible.

In late August, in a three-hour operation, I had a lumpectomy. While still under general anaesthetic, I also received 30 minutes of TARGIT. I spent one night in hospital, and then I walked away, all treatment completed. There were no weeks of radiotherapy appointments to worry about and no endless hours spent waiting in hospital. I was back at work as a journalist within weeks.

The team is passionate about the value of TARGIT. Their study, set up in 2000, shows the results of one of the biggest international breast cancer trials ever run, with 3,451 women in 33 centres worldwide over 12 years. They also argue that using TARGIT could mean that more women would be able to conserve their breasts. At present, many women who are eligible for a lumpectomy may end up having a full mastectomy (after which no radiotherapy is required), simply because they cannot deal with repeatedly returning to hospital for the therapy.

"Many choose mastectomy just to avoid the current mandatory course of whole-breast radiation after lumpectomy," says Prof Vaidya. "Such women would avoid a mastectomy if they were suitable to have TARGIT."

The new treatment is also less expensive, since Intrabeam emits far less radiation "scatter" than doe standard radiotherapy, so hospitals can install it easily, without creating a protective environment. Although the machines are around £300,000 apiece, running costs are half that o standard breast-radiation treatment "It frees up staff and equipment in hard-pressed radiation departments," says Prof Tobias.

Germany, where the equipment is manufactured, has more than 60 centres equipped with Intrabeam. The US has more than 50. Worldwide, some 8,000 women hav been treated with TARGIT. But the UK – where it all started – has only eight machines, and currently TARGIT is only available here if it is part of a clinical trial; although the new results may change that policy.

Kate Law, director of clinical research at Cancer Research UK, says: "Delivering radiotherapy in a single dose at the time of surgery potentially offers a huge benefit to patients, especially if it means fewe visits to hospital."

TARGIT is not suitable for everyone: most women in the trial had small, early-stage cancers which had not spread to the lymph nodes. As Prof Vaidya points out, suitable patients have to be "selected carefully". He and Prof Tobias are now leading a further trial, called TARGIT-B, which began in June, and is testing suitability of TARGIT for more advanced breast cancers.

As for me, I will take letrozole for five years, with the mildest of side effects – some tiredness and, inexplicably, curly hair. I have check-ups every three months, becoming less frequent over 10 years. Hopefully, I will never need more radiotherapy.

Prof Vaidya insists the possibility of recurrence is remote. "You are 9 to 99 per cent safe," he tells me – and I believe him.

Targit.org.uk

Max Pemberton is away