

Heart-Sparing Breast Radiotherapy at Cancer Centre London

Dr Anna Kirby

Radiotherapy is a highly effective treatment for patients with breast cancer and, in combination with surgery, improves both local control and survival.

Breast cancer survival rates continue to improve due to the combination of improved detection, better surgery, more accurate radiotherapy, and more targeted drugs. Given that many patients now live for several decades beyond their breast cancer treatment, it is predicted that, by 2040, there will be over 1.7million breast cancer survivors in the UK alone.

Recent work in breast radiotherapy has focussed on ensuring that these long-term survivors of breast cancer remain as healthy as possible, in particular by reducing the long-term cardiovascular side-effects of radiotherapy for breast cancer. In essence, this is achieved by reducing radiotherapy doses to the heart. One very simple way of doing so is to ask women to hold their breath for up to 20 seconds during treatment.

This moves the heart backwards, inwards and downwards away from the radiotherapy field, thereby minimising the radiation dose to the heart and in turn reducing the risk of radiation-induced heart disease to around 0.1% at 20 years after radiotherapy.



Using the new Elekta Versa Radiotherapy machine at Cancer Centre London, patients are helped to hold their breath using a norkel-type piece of equipment known as the Active-Breathing-Controlled (or ABC) device.

Modifications of the ABC-breath-hold technique developed at Cancer Centre London give more control to patients during breath-holding thereby improving patient comfort and satisfaction and were awarded the Laing-Buisson award for Innovation in Information Technology in 2015.

Another feature of the Elekta Versa Radiotherapy Machine is its ability to shape dose more closely around breast and lymph node tissues. By combining this so-called arc therapy technique with the ABC-breath-holding, the doses to heart tissue even in women requiring radiotherapy to the lymph nodes behind the sternum can be treated successfully with minimal dose to heart and to lungs.

The arc therapy techniques are also quick to deliver such that patients can complete even a complex locoregional radiotherapy treatment in just over a minute i.e. three to four breath-holds. This also means that women need to spend less time in the radiotherapy department (no more than 10-15 minutes in total) such that they can carry on with their lives around treatment.

Most patients are fine to drive to and from their radiotherapy treatment and many women, depending on their line of work and overall treatment pathway, continue to work during their treatment reflecting a combination of technical advances together with gentler (but still highly effective) treatment regimens (delivered over a three-week rather than the old five-week duration).



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The arc therapy techniques available on the Elekta Versa machine can also be applied to the treatment of small areas of metastatic disease in the bone, lung, liver or brain (known as oligometastatic disease) to very high doses of radiation (stereotactic radiotherapy). Recent work suggests that this stereotactic radiotherapy can achieve long-term local control of oligometastatic disease.

IT IS HOPED THAT, IN SOME PATIENTS, THIS MAY ALSO IMPACT ON SURVIVAL AND THIS IS BEING TESTED IN A FORTHCOMING NATIONAL CLINICAL TRIAL.

In summary, in the fifteen years since I started as a senior house officer in breast oncology, radiotherapy treatment for breast cancer has become more accurate, more focussed, gentler on normal tissues (including skin, heart and lung), and faster to deliver. The state-of-the-art radiotherapy facilities at Cancer Centre London allow us to offer radiotherapy of the highest quality, individualised to each patient's needs, and delivered locally.

It is a pleasure to be a part of the team and I look forward to what the technical developments of the next fifteen years will bring to our patients.



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