3 More is not necessarily better

A popular misconception is that if a treatment is good then more of it must be better. This is simply not true – indeed more can be worse. Finding the 'right' dose – where benefits are high and adverse effects (side-effects) are low – is a challenge common to all treatments. As the dose is increased, beneficial effects reach a plateau, but adverse effects usually increase. So 'more' may decrease the actual benefit, or even cause overall harm.

Diuretics (water tablets) are a good example: in low doses they lower blood pressure and have few adverse effects. A higher dose does not lower blood pressure any further but does lead to unwanted effects, such as excess urination, impotence and increased blood sugar. Similarly, aspirin in low doses – between a quarter and a half of a standard tablet per day – helps to prevent strokes, and with very few adverse effects. However, while several aspirin tablets per day might relieve a headache, they will not prevent any more strokes and will increase the risk of stomach ulcers.

This principle of the 'right dose' extends beyond drug therapy to many other treatments, including surgery.

INTENSIVE TREATMENTS FOR BREAST CANCER

The therapies advocated for breast cancer – so often in the news – provide some especially valuable lessons about the dangers of assuming that more intensive treatments are necessarily beneficial.

WE DO THINGS BECAUSE . . .

'We [doctors] do things, because other doctors do so and we don't want to be different, so we do so; or because we were taught so [by teachers, fellows and residents (junior doctors)]; or because we were forced [by teachers, administrators, regulators, guideline developers] to do so, and think that we must do so; or because patient wants so, and we think we should do so; or because of more incentives [unnecessary tests (especially by procedure oriented physicians) and visits], we think we should do so; or because of the fear [by the legal system, audits] we feel that we should do so [so-called 'covering oneself']; or because we need some time [to let nature take its course], so we do so; finally and more commonly, that we have to do something [justification] and we fail to apply common sense, so we do so.'

Parmar MS. We do things because (rapid response). *BMJ*. Posted 1 March 2004 at www.bmj.com.

Throughout the 20th century and into the 21st, women with breast cancer have both demanded and endured some exceedingly brutal and distressing treatments. Some of these treatments – surgical and medical – far exceeded what was actually required to tackle the disease. But they were also unquestionably popular with some patients as well as their doctors. Patients were convinced that the more radical or toxic the therapy, the more likely the disease would be 'conquered'. It has taken doctors and patients who have been prepared to challenge orthodox views of the condition many years to begin to turn the tide of mistaken belief. They not only had to produce reliable evidence to banish the myth that 'more is better', but also suffer the ridicule of their peers and the resistance of eminent practitioners.

Today, fear, coupled with the belief that more must be better, still drives treatment choices, even when there is no evidence of

DRASTIC TREATMENT IS NOT ALWAYS THE BEST

'It is very easy for those of us treating cancer to imagine that better results are due to a more drastic treatment. Randomized trials comparing drastic treatment with less drastic treatment are vital in order to protect patients from needless risk and the early or late side effects of unnecessarily aggressive treatment. The comparison is ethical because those who are denied possible benefit are also shielded from possible unnecessary harm – and nobody knows which it will turn out to be in the end.'

Brewin T in Rees G, ed. *The friendly professional: selected writings of Thurstan Brewin.* Bognor Regis: Eurocommunica, 1996.

benefit over simpler approaches, and where known harms are considerable, including the possibility of death from the treatment itself. For example, this mindset still prompts some patients and their doctors to opt for 'traditional' mutilating surgery. Others choose high-dose chemotherapy, with its well known unpleasant and painful side-effects, or Herceptin, which can cause serious heart problems (see Chapter 1), even when simpler treatments would be sufficient. How can this be?

Mutilating surgery

Until the middle of the 20th century, surgery was the main treatment for breast cancer. This was based on the belief that the cancer progressed in a slow and orderly manner, first spreading from the tumour in the breast to local lymph nodes, in the armpit, for example. Consequently it was reasoned that the more radical and prompt the surgery for the tumour, the better the chance of halting the spread of the cancer. Treatment was by extensive 'local' surgery – that is, surgery on or near the breast. It may have been called local, but a radical mastectomy was anything but – it involved removing large areas of chest muscle and much lymph node tissue from the armpits as well as the breast itself.

THE CLASSICAL (HALSTED) RADICAL MASTECTOMY

The radical mastectomy, devised in the late 19th century by William Halsted, was the most commonly performed operation for breast cancer until the third quarter of the 20th century. As well as removing all of the breast, the surgeon cut away the pectoralis major muscle covering the chest wall. The smaller pectoralis minor muscle was also removed to allow the surgeon easier access to the armpit (axilla) to clear out the lymph nodes and surrounding fat.

EXTENDED RADICAL MASTECTOMIES

The belief that 'more is better' led radical surgeons to carry out even more extensive operations, in which chains of lymph nodes under the collarbone and the internal mammary nodes under the breastbone were also removed. To get at the internal mammary nodes several ribs were removed and the breastbone was split with a chisel. Not content with that, some surgeons went so far as to remove the arm on the affected side and cut out various glands throughout the body (adrenals, pituitary, ovaries) to suppress the production of hormones that were believed to 'fuel' the spread of the tumour.

If a woman survived such operations she was left with a severely mutilated ribcage, which was difficult to conceal under any clothing. If surgery had been carried out on the left side, only a thin layer of skin remained to cover the heart.

Adapted from Lerner BH, *The breast cancer wars: hope, fear and the pursuit of a cure in twentieth-century America.* New York; Oxford University Press, 2003.

Nevertheless, some thoughtful breast cancer specialists noted that these increasingly mutilating operations did not seem to be having any impact on death rates from breast cancer. So, they

put forward a different theory – that breast cancer, rather than spreading from the breast through the nearby lymph nodes, was in fact a systemic (that is, widespread) disease from the outset. In other words, they reasoned that cancer cells must already be present elsewhere in the body at the time the breast lump was detected (see below). If so, they suggested, removal of the tumour with an adequate margin of normal tissue, plus a course of local radiotherapy, would be both kinder to the woman and might be as effective as radical surgery. The introduction of 'systemic therapies' at about this time – that is, treatments that would deal with production or development of cancer cells elsewhere in the body – was also based on this new theory of breast cancer spread.

As a direct result of this new way of thinking, doctors advocated more limited surgery known as lumpectomy – that is, removal of the tumour and a margin of surrounding normal tissue. Lumpectomy was followed by radiotherapy, and in some women by chemotherapy. But supporters of lumpectomy encountered huge resistance to comparing the new approach with radical surgery. Some doctors believed very firmly in one or other approach and patients clamoured for one or other treatment. The result was a prolonged delay in producing the crucial evidence about the merits and harms of the proposed new treatment compared with the old.

Nevertheless, despite these difficulties, the surgical excesses were eventually challenged, both by surgeons who were unwilling to continue in the face of questionable benefits for their patients, and by outspoken women who were unwilling to undergo mutilating operations.

In the mid-1950s, George Crile, an American surgeon, led the way by going public with his concerns about the 'more is better' approach. Believing that there was no other tactic to stir doctors into thinking critically, Crile appealed to them in an article in the popular *Life* magazine.[1] He hit the right note: the debate within the medical profession was now out in the open rather than confined to academic circles. Then another US surgeon, Bernard Fisher, working together with colleagues in other specialties, devised a series of rigorous experiments to study the biology of cancer. Their results suggested that cancer cells could indeed

travel widely through the bloodstream, even before the primary cancer was discovered. So, aggressive surgery made little sense if the cancer was already present elsewhere in the body.

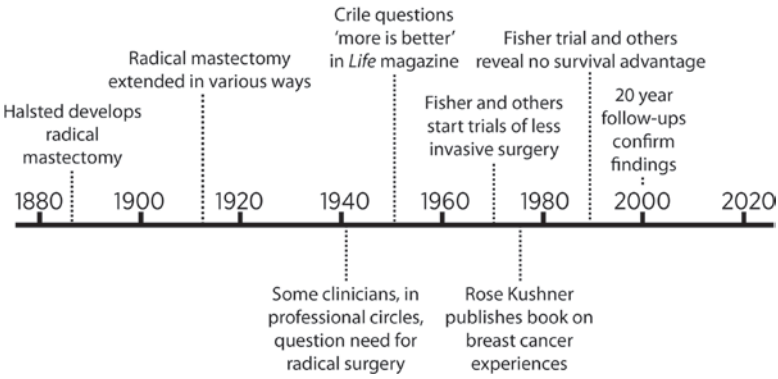
Whereas Crile had used his clinical judgment to advocate and employ less radical local therapies, Fisher and a growing group of researchers collaborated in a more formal and rigorous approach. They sought to prove or disprove the value of radical surgery by the best-known unbiased (fair) method – randomized trials (see Chapter 6). They reasoned that by doing such studies the medical community and the general public might be convinced one way or the other. In 1971, the outspoken Fisher also declared that surgeons had an ethical and moral responsibility to test their theories by conducting such trials. And certainly, the 20-year follow-up of Fisher's trials showed that – as measured by the risk of early death – no advantage could be demonstrated for radical mastectomy compared with lumpectomy followed by radiation therapy.[2]

RANDOM ALLOCATION – A SIMPLE EXPLANATION

'Randomisation is to minimise bias and ensure that the patients in each treatment group are as similar as possible in all known and unknown factors. This will ensure that any differences found between the groups in the outcome(s) of interest are due to differences in treatment effect and not differences between the patients receiving each of the treatments.

It removes the chance that a clinician will consciously or unconsciously allocate one treatment to a particular type of patient and the other treatment to another type, or that a certain kind of patient will choose one treatment whilst another kind will choose the other.'

Harrison J. Presentation to Consumers' Advisory Group for Clinical Trials, 1995.



Challenging the 'more is better' approach in breast cancer surgery.

Randomized trials (see Chapter 6) were also done by researchers in other countries comparing breast-conserving therapy with radical mastectomy, for example by Hedley Atkins and colleagues in the UK in the early 1960s and later by Veronesi and colleagues in Italy. The overall picture confirmed Fisher's results: that there was no evidence that radical mastectomy led to longer survival, even after 20 years of follow-up.[3] Other randomized trials, in Sweden and Italy as well as the UK and the USA, were done to compare many other forms of treatment – for example, radiation therapy after surgery compared with surgery alone, and short-term compared with long-term chemotherapies.

Overall, results from these early trials and from detailed laboratory studies supported the theory that breast cancer was indeed a systemic disease, with cancer cells spreading via the bloodstream before a breast lump was detectable.[4] Worldwide, more and more doctors became convinced by the mounting evidence that radical surgery was doing more harm than good. And in the last decades of the 20th century attitudes of patients and the public began changing too. Spearheaded by the work of patient activists such as Rose Kushner (see Chapter 11) in the USA and elsewhere, better informed patient groups came together from around the globe to challenge the 'more is better' approach to surgery and the medical paternalism that often went with it.

This widespread activity of both patients and health

professionals effectively challenged the surgical excesses of the past almost everywhere. Incredibly, however, there are still some reports of unnecessary and mutilating breast surgery being done – for example, in 2003, over 150 radical breast operations were carried out in Japan.[5]

By 1985, the sheer volume of breast cancer trials on all aspects of treatment made it very difficult for people to keep sufficiently up to date with the results. To address this problem, Richard Peto and his colleagues in Oxford drew together all the trial findings in the first of a series of systematic reviews (see Chapter 8) of all the information about all of the women who had participated in the many studies.[6] Systematic reviews of treatments for breast cancer are now updated and published regularly.[7, 8]

Bone marrow transplantation

However, the demise of mutilating surgery did not spell the end of the 'more is better' mindset – far from it. During the last two decades of the 20th century, a new treatment approach, involving high-dose chemotherapy followed by bone marrow transplantation or 'stem cell rescue', was introduced. A report in the *New York Times* in 1999 summed up the reasoning behind this approach:

> 'Doctors remove some bone marrow or red blood cells from the patient, then load her with huge amounts of toxic drugs, quantities that destroy the bone marrow. The hope is that the high doses will eliminate the cancer and that the saved bone marrow, when returned to the body, will grow back quickly enough so that the patient does not die from infection. A version of the procedure, using donations of bone marrow, had long been established as effective for blood cancer, but solely because the cancer was in the marrow that was being replaced. The use of the treatment for breast cancer involved a completely different – and untested – reasoning.'[9]

In the USA especially, thousands of desperate women pressed for this very unpleasant treatment from doctors and hospitals, even though as many as five out of 100 patients died from the

treatment. Many thousands of dollars were spent, including some from the patients' own pockets. Eventually, some patients were reimbursed by their health insurance companies, who caved in to pressure to do so, despite the lack of evidence that the treatment was useful. Many hospitals and clinics became rich on the proceeds. In 1998, one hospital corporation made $128 million, largely from its cancer centres providing bone marrow transplants. For US doctors it was a lucrative source of income and prestige and it provided a rich field for producing publications. Insistent patient demand fuelled the market. Competition from private US hospitals to provide the treatments was intense, with cut-price offers advertised. In the 1990s, even US academic medical centres trying to recruit patients for clinical trials were offering this treatment. These questionable programmes had become a 'cash cow' for the cancer services.

Unrestricted access to such unproven treatments had another serious downside: there were not enough patients available to

THE STRUGGLE FOR UNBIASED EVIDENCE

Researchers expected it would take about three years to enrol about 1,000 women in the two studies. Instead it took seven years . . . That is not so surprising . . . Patients in the clinical trials must sign a consent form spelling out their grim prognosis and stating that there is no evidence that bone marrow transplants are any better than standard therapies. To enter the trial, you have to face these realities, which is never easy. But if the patient has a transplant outside a trial with a control group of patients, known as a randomized trial, enthusiastic doctors may tell her that a transplant could save her life. Although patients have a right to the truth, they understandably are not going to go to doctors who take away hope.

Adapted from Kolata G, Eichenwald K. Health business thrives on unproven treatment, leaving science behind. *New York Times Special Report*, 2 October 1999.

take part in trials comparing these treatments with standard therapies. As a result it took far longer than anticipated to get reliable answers.

But despite the difficulties of obtaining unbiased evidence in the face of such pressures, some clinical trials were carried out and other evidence reviewed critically. And by 2004, a systematic review of the accumulated results of conventional chemotherapy compared with high-dose chemotherapy followed by bone marrow transplantation, as a general treatment for breast cancer, failed to reveal any convincing evidence that it was useful.[10, 11]

DARE TO THINK ABOUT DOING LESS

So, more is not always better – and this message remains important. Today, in women with metastatic (widespread) breast cancer, there is considerable enthusiasm for treatments such as Herceptin (see above and Chapter 1). Yet, at best, Herceptin offers these patients a small chance of a longer life – measured sometimes only in days or weeks – at the expense of serious side-effects, or sometimes even death from the treatment itself.[12,13] This tendency to over-treat is also evident at the other end of the breast cancer spectrum. For example, excessive and often unnecessary treatments have been used in women with pre-cancerous conditions such as ductal carcinoma in situ (DCIS) detected by breast screening (see Chapter 4), when DCIS might never go on to cause a woman a problem in her lifetime if left untreated. Meanwhile, the need for routine surgery to remove lymph nodes in the armpit, which risks unpleasant complications affecting the arm such as lymphoedema (see Chapter 5), is being increasingly challenged, since its addition to other treatments does not seem to improve survival.[14]

KEY POINT

- More intensive treatment is not necessarily beneficial, and can sometimes do more harm than good