Screening for breast cancer: time for a rethink

At the risk of making myself very unpopular I wish to expose some of the myths and misconceptions that surround screening for breast cancer. I speak with the authority as one of the architects of the NHS Breast Screening Programme in the UK.

In 1987, while serving as professor of surgery at Kings College School of Medicine and Dentistry in London, I was given the task of implementing the recommendations of the Forrest report for London and the south east of England (Forrest, 1986). We were given 12 months to complete the task. We opened our doors on time and on budget in 1988. I therefore had a huge intellectual investment in the future success of the NHS Breast Screening Programme.

How was it therefore that, in good faith, I swung from zealot to sceptic in this enterprise? I think there may have been three reasons for my conversion. First I was a breast surgeon and therefore quick to pick up on the distress of the symptomless women discovered to be harbouring multi-centric duct carcinoma in situ and then offered a mastectomy for this 'early stage' disease they had never heard of. Second, unlike most of those responsible for the national screening programmes, I was not a public health doctor or epidemiologist, who looked upon breast cancer screening through the prism of communicable disease, sanitation or lifestyle campaigns. Third as a clinical scientist, responsible for multicentre clinical trials of breast cancer therapy, I had learnt the hard way that as the data fail to corroborate your pet hypothesis, you reject the latter in favour of the former: 'If the landscape fails to resemble the map you're using the wrong map'.

NHS Breast Screening Programme 23 years on

Now although many might challenge the precise numbers involved, the following points describe where I think we have arrived after 23 years in the life of the NHS Breast Screening Programme.

The NHS Breast Screening Programme was predicated on the results of randomized controlled trials that were published before 1987 and started in the late 1960s and early 1970s. In retrospect some of these trials were of very poor quality. With mature follow up, and careful attention to biases, a relative risk reduction in breast cancer-specific mortality is now estimated as about 15% rather than the 25–30% described in the Forrest report (U.S. Preventive Services Task Force, 2002; Gøtzsche and Nielsen, 2011).

In absolute terms therefore the numbers needed to screen over 10 years to prevent one breast cancer death is of the order of 1:2000 (Welch, 2010). Anything better than this depends on ignoring some of the obvious biases in the trials, mathematical manipulation of the data (modelling) that may be based on false assumptions or worst of all based on those self-selected women who accept the invitation to screen ('selection bias').

Along the way the estimates of harm have increased. At the outset the hazards of over-diagnosis were ignored, then as the rate of screen-detected duct carcinoma in situ shot up it was still judged to be worth the cost. Now we recognize that the over-diagnosis also includes invasive cancers that are not predestined to threaten a woman's life, and this is a problem. The extent of over-diagnosis is debatable but I personally agree that if you include duct carcinoma in situ and invasive cancer it amounts to between five and ten cases treated unnecessarily for every breast cancer death avoided (Jørgensen and Gøtzsche, 2009). As a result of this, although the mastectomy rate for the screen-detected cancers may fall relative to clinically detected disease, the mastectomy rate among the whole screened population rises compared to an unscreened population (Suhrke et al, 2011).

Furthermore in spite of the wonderful advances we have made in imaging technology and treatment in the last 20 years there has been only one new trial reported for screening and that was the trial for patients under 50 years of age that supported the about 15% estimate in relative risk reduction for cause-specific mortality (Moss et al, 2006). In other words we are using state of the art imaging and modern therapy to service a programme based on data that are >20 years old. It is also worth re-iterating at this juncture that improvement in the treatment of symptomatic patients since the mid-1980s leaves a much narrower window of opportunity for screening. Finally we should remember that screening has so far failed to demonstrate an impact on all-cause mortality. That might be because only one in 25 women are predetermined to die of breast cancer so we are in danger in losing sight of the more important killers such as cardiovascular disease in our obsessive focus on one disease.

The future of breast screening

So where do we go from here? To close the programme is politically unacceptable and akin to throwing the baby out with the bathwater. To deny there is a problem, like many of the screening zealots, is frankly irresponsible.

Even as I write the director of cancer services in the UK ('the cancer Tsar'), Professor Sir Michael Richards, has called for an independent review of the whole subject (Richards, 2011). I therefore want to make a practical proposition for research and development that would make more efficient use of scarce resources that I will refer to as risk assessment/risk management.

The beauty of risk assessment/risk management is that it provides a platform for the management of all women in an attempt to reduce all-cause mortality as well as mortality from breast cancer where mammographic screening is one component of an integrated programme. At the same time we can exploit the existing infrastructure of the NHS Breast Screening Programme rather than simply close it down.

The first step is to set up a facility nationwide for risk assessment using one of the modern computer programmes. Women would then be offered (not compelled to accept) this service. Initially a practice nurse could administer this questionnaire but it would be quite easy to transfer this to a web-based programme for the computer-literate members of the community to administer themselves. From the read-out an initial triage could be agreed. Those at the most extreme end of the risk spectrum, say with a relative risk of >8.0, could be invited to a clinical genetics consultation. At the other extreme those with a relative risk of say <2.0 might be reassured and given lifestyle advice on diet, alcohol, tobacco and exercise that might not only impact on the risk of breast cancer but also on the more important risks of cardiovascular disease. (Please note that these risk ratios are for illustration only.) Those in between could then be invited to a special clinic for the second step. If after a further more detailed assessment, they remain with a relative risk between 2.0 and 8.0, they would be offered screening.

Conclusions

Just as I was about to put this editorial to bed a new publication appeared in the *BMJ* entitled 'Possible net harms of breast cancer screening: updated modelling of Forrest report' (Raftery and Chorozoglou, 2011). In this article the authors reworked the assumptions of the Forrest report based on the new data acquired since the NHS Breast Screening Programme was established and concluded that, in terms of quality-adjusted life years, the harms probably outweighed the benefits. To carry on regardless, in my opinion, is simply a political expedient, but to do so without offering women informed choice is frankly unethical. **BJHM**

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Welch HG (2010) Screening mammography - A long run for a short slide? *N Engl J Med* **363**: 13

Further reading

Welch H (2004) *Should I be tested for cancer? Maybe not and here's why.* University of California Press, Berkeley

KEY POINTS

- The NHS Breast Screening Programme has been in place for more than 20 years and was predicated on assumptions based on results of clinical trials that started 30–40 years ago.
- With a more mature follow up of those studies the initial estimate of benefit, in terms of a relative risk reduction in cause-specific mortality, have been halved.
- In absolute terms the number needed to screen for 10 years to avoid one breast cancer death is now estimated at 2000. At the same time no effect has been documented on all-cause mortality.
- Along the way, time trends in the incidence of breast cancer and the rate of mastectomy in countries initiating screening programmes have suggested a high rate of over-diagnosis leading to an increase in the mastectomy rate among screened populations.
- A recent re-examination of the original assumptions leading to the establishment of the NHS Breast Screening Programme enshrined in the Forrest report suggested that screening probably does more harm than good in terms of quality-adjusted life years.
- The cancer Tsar, Mike Richards, has set up an independent review of the programme.
- I recommend that the infrastructure of the NHS Breast Screening Programme should be protected but the current programme should be completely overhauled in order to implement a risk-adjusted approach.