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Review

Should patients with early breast cancer still be offered the choice of breast conserving surgery or mastectomy?

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Abstract

Breast conserving therapy (BCT) for breast cancer aims to achieve long-term local disease control with reduced local morbidity. BCT has similar long-term survival outcomes to mastectomy in patients with early breast cancer and recent studies have reported similar rates of recurrence compared with mastectomy. An increasing number of studies have shown improved overall survival among women treated with BCT regardless of cancer phenotype compared with mastectomy. Despite BCT being at least equivalent in outcome to mastectomy many women with small breast cancers continue to be treated by mastectomy and several studies in the last decade have shown a trend of increasing numbers of unilateral and bilateral mastectomies. The advent of increasingly effective neoadjuvant treatment has allowed even more women to have breast conservation. Not only has neoadjuvant therapy been shown to increase the rates of BCT, it does so without increasing in breast recurrence rates. Patients who are suitable for BCT should be advised that BCT is the best treatment option for them. They should be informed that not only does it confer at least equivalent survival and local recurrence rates but that compared with mastectomy it has the advantages of less complications, better quality of life and many less operations if reconstructive surgery is performed. It may no longer be appropriate to offer women suitable for BCT the choice of mastectomy or BCT.

Keywords: Breast; Cancer; Mastectomy; Breast conserving surgery

Introduction

Breast conserving therapy (BCT) consists of breast conserving surgery and whole breast radiotherapy and aims to achieve long-term local disease control with minimum local morbidity. Almost two thirds of screen detected cancers and the majority of women presenting to symptomatic breast clinics have early breast cancers that are suitable for BCT. There are a number of advantages of BCT for women with early breast cancer who do not have a genetic mutation predisposing to breast cancer. For the majority BCT produces an acceptable cosmetic result[1] and is associated with lower levels of psychological morbidity, notably less anxiety and depression and improved body image, sexuality and self-esteem, compared with mastectomy.[2,3]

Two systematic reviews performed many years ago showed equivalence in terms of disease outcome for BCT and mastectomy.[4,5] Local control is important and has an influence on overall survival with local failure being a risk factor for the development of metastatic disease.[6,7] An initial review of 6 randomised trials noted similar rates of local recurrence comparing BCT and mastectomy and even in 1997 it was evident to the authors that "particularly for node-positive patients, BCT may confer a relative survival advantage over mastectomy. In particular, mastectomy without adjuvant radiation appears to be inferior to BCT for node-positive patients".[5] A subsequent analysis did report a higher locoregional recurrence rate for BCT in 4 of the 6 trials.[8] Local recurrence rates following BCT have fallen over time as a result of better imaging, more attention to margins, and more effective and longer durations of systemic therapy so that although local recurrence was at one time considered more common after BCT than

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mastectomy, this no longer appears true.[9] Current practice is to aim for at least microscopically disease-free margins. There is ongoing debate about how much breast tissue should be removed and what constitutes a clear margin. A meta-analysis of 33 studies showed that positive margins conferred an odds ratio of ipsilateral breast tumour recurrence of 2.44 and close margins had an odd ratio of 1.74, which were both significant compared to negative margins.[10] When looking at different threshold for negative margins 1 mm was as good as wider margins. The data on >0 mm were insufficient and there were minimal data on this margin included in the meta-analysis.[10] For this reason the most commonly used negative margin in the UK is 1 mm. What is clear from the meta-analysis is that wider margins will not reduce local recurrence but wider margins impact negatively on cosmetic outcome.

The rates of in breast tumour recurrence are now very similar to the rates of local recurrence seen after mastectomy alone even in young women.[11] Although young age at diagnosis is associated with increased rates of in breast tumour events in part because young women have higher grade and triple negative cancers these same women and cancer types are associated with an increased rate of recurrence after mastectomy. A recent review showed equivalence between BCT and mastectomy in local regional control in young women.[11]

The decision to have mastectomy has been based first on the belief that mastectomy decreases local recurrence rates compared with BCT and second because of the fear of annual mammograms and recall for further treatment. Given that recurrence rates are the same, recall rates after BCT are now very low and with newer studies showing improved survival for BCT the aim of this review is to detail what is known about the outcomes of these two surgical approaches and to answer the question, whether there is any specific group of women where BCT is not a better option than mastectomy?

Comparing survival with BCT and mastectomy

Although randomised controlled trials comparing BCT with mastectomy performed many years ago for early stage breast cancer showed equivalence in overall survival,[12–17] and recurrence rates after BCT have fallen dramatically since these randomised trials both for mastectomy and in particular for BCT,[9] there continues to be a high and increasing mastectomy rate.[18] One potential reason for this increase has been the increasing use of MRI,[19,20] although, in the USA there are other reasons why there has also been an increase in mastectomies for both women with invasive and *in situ* disease.[18] One reason for this increase is improvements in reconstructive techniques, and a reported reduction in anxiety of long term follow-up after mastectomy because of a perceived lower rate of recurrence and the avoidance of follow up mammography. The evidence of higher local recurrence rates following BCT in patients with certain tumour phenotypes has added to this.[21,22] Recurrence rates in these women are however also increased to a similar degree after mastectomy.[23] Using tumour phenotype to decide surgery is not therefore supported by evidence.

A number of recent studies have cast doubt on the equivalence in outcomes of mastectomy and BCT and have raised the issue of whether women with early breast cancer suitable for BCT should any longer be offered the choice of mastectomy or BCT. A series of studies from various different countries have reported outcomes related to the type of surgery performed including breast cancer specific and overall survival in women with stage I–II breast cancer. The aim of these studies was to determine the influence of surgery type on long-term outcomes for early stage disease.[24] One large cohort study from California consisted of 112,154 women, of whom 61,771 (55%) were treated by BCT and 50,383 (45%) by mastectomy without radiation. At a median follow up time of 110.6 months, women undergoing BCT had a significantly improved overall (HR = 0.81, 95% CI 0.80–0.83) and breast cancer disease specific survival (HR = 0.85, 95% CI 0.78–0.91) when compared to women treated with mastectomy. The disease specific survival benefit for BCT compared to mastectomy was somewhat greater among women age ≥50 with HR-positive disease (HR = 0.86, 95% CI 0.82–0.91) than among women age <50 with HR-negative disease (HR = 0.88, 95% CI 0.79–0.98); although the benefit of BCT was significant in all ages and subgroups analysed. This study concluded that in patients with early stage breast cancer, BCT resulted in significantly improved disease specific survival compared with mastectomy. These data provide confidence that BCT is an effective alternative to mastectomy for early stage disease regardless of age, HR status and cancer phenotype.[24] The better outcomes for BCT persisted after adjusting for tumour grade, proportion of positive nodes, race, socioeconomic status, tumour size, age at diagnosis, and year of diagnosis.[24] A number of other recent studies have provided supportive evidence of better outcomes for BCT compared to mastectomy. In a population based study from the Netherlands, in women treated between 2006 and 2012, BCT conferred a survival advantage in a group of 173,797 patients compared with mastectomy following correction for stage, age, and adjuvant therapies (HR 0.87 95% CI 0.81–0.93 $p < .001$).[25] A further study conducted in Norway included 9547 women aged 50–69 years diagnosed with primary invasive breast cancer without distant metastasis, who underwent either BCT or mastectomy between 2005 and 2011. Women treated with BCT had more favourable tumour characteristics compared to women treated with mastectomy. Adjusted analyses revealed a 1.7 (95% CI 1.3–2.4) greater risk of breast cancer death amongst women who underwent mastectomy compared with BCT.[26] This study showed a better survival from BCT in screen detected, interval and symptomatic cancers. A second Norwegian study of 13,015

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