Early stage breast cancer: costs and quality of life one year after treatment by mastectomy or conservative surgery and radiation therapy

Kenny P, King L M, Shiel A, Seymour J, Hall J, Langlands A, Boyages J

Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

Health technology
The study compared four strategies for the treatment of early stage breast cancer: mastectomy only, mastectomy and chemotherapy, breast conserving surgery and radiotherapy, and breast conserving surgery, radiotherapy and chemotherapy.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
The study sample was drawn from the population of English speaking female patients who received treatment for early stage breast cancer at Westmead Hospital between May 1993 and June 1995. The clinical eligibility/inclusion criteria were: the presence of primary invasive carcinoma of the breast; a tumour size of 4 cm or less; clinical lymph node status of N1 or N0; and no evidence of distant metastasis.

Setting
The setting was secondary care. The economic study was conducted in the Westmead Hospital, Australia.

Dates to which data relate
The effectiveness and resource use data were collected between May 1993 and June 1995. The price year was 1993/1994.

Source of effectiveness data
The effectiveness data were derived from a single study.

Link between effectiveness and cost data
Cost data were prospectively collected alongside the effectiveness data in the same patient sample.

Study sample
No power calculations were reported to determine the sample size required to detect statistically significant differences in outcomes. A total of 414 women were identified as having early stage breast cancer, of whom 17 (4%) were excluded because they were unable to read English. Of 397 eligible patients 329 (83%) agreed to participate, of whom 291 patients returned their QoL questionnaires. These 291 patients had received one of the four breast cancer treatment
strategies: 27 patients (9%) received mastectomy only, 15 patients (5%) received mastectomy and chemotherapy, 210 patients (72%) received breast conserving surgery and radiotherapy, and 39 (14%) breast conserving surgery, radiotherapy and chemotherapy.

**Study design**
The study was a descriptive cohort study carried out in a single centre. The duration of follow-up was 1 year.

**Analysis of effectiveness**
The analysis was based on treatment completers only. The primary health outcome used in the analysis was the subjective QoL of patients. The QoL was measured by a self-completed postal questionnaire that included 98 questions and was grouped to make 17 QoL scales. One of the 17 QoL scales measured global or overall health status, and a further three measured the presence of the symptoms: fatigue, nausea and vomiting. The remaining 13 scales measured: physical functioning (physical activity and self care); emotional functioning (mood); cognitive functioning (concentration and memory); role functioning (ability to work); social functioning (participation in social and family life); anxiety; depression; body image; sexual functioning; relationship with partner (marital relationship); feelings about cancer (emotional reactions to diagnosis and fear of recurrence); coping with cancer (use of coping strategies such as thinking positively); and the importance of breasts (for self-perception of femininity and sexual desirability).

The authors reported differences between the groups in terms of age and menopausal status, (the two groups treated with chemotherapy (mastectomy + chemotherapy and breast conserving surgery + radiotherapy + chemotherapy) were significantly younger than those in the other two groups, (p<0.0001). Consequently, women in these two groups were also significantly more likely to have dependent children (p<0.0001). There were also differences in marital status. The authors reported that age differences were adjusted using covariance analysis.

**Effectiveness results**
The authors reported the results using a graph, and did not report actual numbers.

One year after primary surgery, the two patient groups treated by mastectomy had better physical functioning than the other two groups (p=0.003).

The two patient groups treated by chemotherapy had poorer role functioning than the other two groups, (p=0.002).

The authors reported that age was a significant covariate for global health status and two functional scales; younger women tended to have poorer emotional functioning, (p=0.004), social functioning, (p=0.01) and global health status, (p=0.05). The authors stated that there was a statistically significant interaction between treatment and age in only one functional scale. The older patients in the mastectomy and chemotherapy group had worse physical functioning than the younger patients (p=0.01), but that there was no significant interaction between age and physical functioning in the other treatment groups.

There were no statistically significant differences among the four treatment groups on the QLQ C30 disease symptom scales.

Across the four treatment groups the majority of patients reported very little fatigue, nausea and vomiting, or pain. Age, however, was a significant covariate for pain, with younger women more likely to suffer pain, (p=0.0006).

Two of the six breast cancer specific QoL scales differed between treatment groups. Those patients who had breast conservation reported better body image than those who had mastectomy did, (p=0.0001). The women who had chemotherapy relied to a greater degree on coping strategies than those who did not have chemotherapy, (p=0.008). The authors reported that age was a significant covariate for three breast cancer specific scales. Younger women placed a greater emphasis on their breasts in sexuality and femininity, (p=0.009), had a worse body image, (p=0.01), and scored lower on their feelings about cancer, (p=0.0001).

There were more cases of anxiety and depression in patients treated by mastectomy and chemotherapy, than in the other...
three treatment groups. These differences were not statistically significant after adjustment was made for age.

**Clinical conclusions**
The global health status and QoL scores were generally high for each of the four treatment groups indicating good functioning and overall quality of life. Those women treated by breast conservation reported better body image but worse physical function, compared to those treated with mastectomy. The negative impact of breast cancer and its treatment was greater for younger women across a number of aspects of QoL, irrespective of the treatment strategy/type.

**Measure of benefits used in the economic analysis**
No summary measure of health benefit was used in the economic analysis, and the outcomes were reported in a disaggregated way, and as such this was a cost-consequences analysis.

**Direct costs**
The authors reported direct costs only. These included the average cost of treatment for each treatment group of surgery, radiotherapy, chemotherapy, hormone therapy, counselling, investigations and consultations. The authors stated that the cost of surgery for mastectomy and breast conservation was calculated on the basis of an average cost for each surgical operation, and average cost per day for each hospital admission. Further admissions to Westmead hospital for reasons other than breast surgery were costed using Australian diagnosis group (AN-DRG) costs. The cost of investigations and consultations were based on fees obtained from the Commonwealth Medical Benefits Schedule. The estimates of radiotherapy costs were based on the results of a published study. The estimates of the average costs of chemotherapy were calculated by multiplying the average cost per episode of chemotherapy treatment by the number of chemotherapy treatments for each patient. Discounting was not carried out because of the short time frame of the study (1-year). The price year was 1993/1994.

**Statistical analysis of costs**
No statistical analysis of costs was reported.

**Indirect Costs**
Indirect costs were not included in the analysis.

**Currency**
Australian dollars (Aus$). No conversion rate was reported.

**Sensitivity analysis**
No sensitivity analysis was reported.

**Estimated benefits used in the economic analysis**
See effectiveness results above.

**Cost results**
The average total cost of treatment in each of the four treatment groups were as follows: mastectomy only = Aus$4,506; mastectomy and chemotherapy = Aus$5,695; breast conserving surgery and radiotherapy = Aus$8,505; breast conserving surgery, radiotherapy and chemotherapy = Aus$9,571.
Synthesis of costs and benefits
No synthesis of costs and benefits was conducted and no incremental analysis was reported.

Authors’ conclusions
The authors concluded that, whilst the study shows that breast conservation is more expensive than mastectomy, the QoL results highlight the importance of patient participation in treatment decisions. This is because the QoL results differed significantly between groups. The global health status and QoL scores were generally high for each of the four treatment groups indicating good functioning and overall quality of life. However, those women treated by breast conservation reported better body image but worse physical function, compared with those treated with mastectomy, whilst, the negative impact of breast cancer and its treatment was greater for younger women across a number of aspects of QoL, irrespective of the treatment strategy/type.

CRD COMMENTARY - Selection of comparators
The authors reported that mastectomy and breast conservation were the current alternatives for the treatment of early stage breast cancer in their setting. You, as a user of the database should decide if these treatment options represent current practice in your own setting.

Validity of estimate of measure of effectiveness
The evaluation used a cohort design. This may increase the potential for bias if the allocation of patients to therapy is determined by demographic or clinical characteristics, which may themselves influence the outcome. The authors stated that it is important to recognise that many of the women in the study chose their own treatment, and consequently this may well have influenced their self-reported QoL. The authors noted that menopausal status, and therefore age, was a determinant in the allocation of patients to chemotherapy. These factors may have affected response to treatment and perception of outcomes. However, the authors did control for age in the analysis. The study sample was largely representative of the study population, but was restricted to women who could read English, suggesting there may be cultural or educational differences between the study sample and the general population of women who may be eligible for treatment. This may affect the expectations of treatment and the perceptions of outcome.

The authors noted that the ability of the study to detect statistically significant differences between treatment groups might be of reduced power because of the low mastectomy rate in the cohort. The authors did not report any calculations to indicate the power of the study to detect statistically significant differences. The patient groups were shown to differ at baseline, and this was controlled for in the analysis of data.

Validity of estimate of measure of benefit
The authors did not derive a summary measure of health benefit. The study was therefore a cost-consequences analysis.

Validity of estimate of costs
All categories of cost relevant to the perspective adopted (the healthcare system) were included in the analysis. Although some costs such as the costs of psychological/psychiatric services were not included in the analysis, the authors reported that the expected costs of these services would have been minimal in any case and thus they can be considered as unlikely to affect the authors’ conclusions. The authors did not report costs and resource use separately. Resource use was estimated from actual data collected for the study participants. Unit costs were collected from local and national cost or fee schedules and published studies. No sensitivity or statistical analysis of costs was performed. No currency conversions were reported. Since all cost were incurred over a one-year time period, discounting was unnecessary.

Other issues
The authors made appropriate comparisons of their findings with those from other studies and the issue of generalisability to other settings was addressed. The authors reported a number of limitations to their study discussed...
above. One of these was that the costs of breast reconstruction following mastectomy were not estimated, because the available data suggested that breast reconstruction is not a commonly used procedure in Australia. However, the authors stated that evidence from the USA suggests that, when the costs of breast reconstruction are considered, breast conservation may save costs.

Implications of the study
The study shows that, whilst breast conservation is more expensive than breast mastectomy, the QoL results emphasise the importance of patient participation in treatment decisions, as the aspects of life affected will be valued differently between individuals at different life stages.

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