A sociodemographic and economic comparison of breast reconstruction, mastectomy, and conservative surgery

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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
Breast-conserving surgery (BCS), mastectomy, and mastectomy plus reconstructive surgery for women with local and regional staged breast cancer.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
Women under 64 years of age with non-metastatic breast cancer.

Setting
Hospital. The economic analysis was carried out in Virginia, USA.

Dates to which data relate
Effectiveness data were based on two studies published in 1990 and 1991. Cost analysis was based on data collated during the period between 1989 and 1991. All costs were presented in 1992 prices.

Source of effectiveness data
The evidence for final outcomes was derived from assumptions made by the authors based on the literature.

Methods used to derive estimates of effectiveness
The authors made some assumptions regarding the clinical outcome of the treatment modalities based on the published literature, the details of which were not given. Logistic regression analyses comparing various treatment strategies were performed to identify the clinical and sociodemographic factors influencing the therapeutic alternatives.

Estimates of effectiveness and key assumptions
The authors reported that outcomes do not vary between the options of BCS or mastectomy with or without reconstruction and that quality of life data also fail to favour one procedure over another. Therefore, from the clinical perspective, all the procedures have similar survival rates.

In the regression analysis, the study sample was a cohort of 592 breast cancer patients: 156 in the lumpectomy+radiation group, 341 in the mastectomy group and 95 in the mastectomy+reconstruction group. Data were
obtained from the Virginia Cancer Registry and a health insurance company in Virginia. 703 cases were excluded from analysis because there were claim inconsistencies involving diagnosis date, race or payment. Of the 741 remaining cases, mastectomy plus radiation cases were excluded in order to permit a more accurate cost comparison. The data were searched for all treatment and reconstruction procedures occurring between 45 days pre-diagnosis to 745 days after the diagnosis of breast cancer. The duration of follow-up for breast reconstruction was variable and was dependent on the proximity of the procedure to the time of breast cancer diagnosis. Cancer registry data were collected prospectively by trained registrars using forms and criteria from the American College of Surgeons Commission on Cancer.

The study showed that age and clinical variables such as tumour size and nodal status are the pre-dominant factors driving the choice of breast reconstruction in a cohort of women defined by their commercial insurance plan.

**Measure of benefits used in the economic analysis**
Since the effectiveness analysis assumed no difference in benefits or effectiveness between the treatment modalities, the economic analysis was based on difference in costs only.

**Direct costs**
Costs were not discounted. Quantities were not reported separately from the costs. Costs were based on claims data from a Health Insurance company. Cost data were collected from the date of cancer diagnosis, rather than from the date of breast reconstruction. Cost analyses were performed by summing all claims paid between 45 days pre-diagnosis and 745 days after the date of diagnosis. Costs were cash transactions after any negotiated discounts, co-payments and deductibles. Costs of secondary reconstruction procedures were included in the economic analysis. 1992 price data were used.

**Statistical analysis of costs**
The z test was used to test 2-year and 3-year median costs between comparison samples.

**Indirect Costs**
Not included.

**Currency**
US dollars ($).

**Sensitivity analysis**
No sensitivity analysis was performed.

**Estimated benefits used in the economic analysis**
Not applicable.

**Cost results**
The two-year median costs were as follows:

- BCS, $21,582;
- mastectomy only, $16,122;
- mastectomy+reconstruction, $25,769;
delayed reconstruction, $31,047;  
immediate reconstruction, $23,392;  
implant reconstruction, $24,085; and  
flap reconstruction, $31,794.

The three-year median costs were:

- BCS, $23,476;  
- mastectomy only, $18,141;  
- mastectomy+reconstruction, $29,144;  
- delayed reconstruction, $33,446;  
- immediate reconstruction, $24,656;  
- implant reconstruction, $24,890; and  
- flap reconstruction, $35,366.

Mastectomy was at least $5,400 less expensive than BCS or any reconstruction procedure, (p<.001). A breast implant added about $8,000 and a flap reconstruction $15,700 to the cost of a mastectomy measured 2 years from diagnosis. Costs between years 2 and 3 increased 3% for the implant and 11% for the flap reconstruction. Costs for BCS and mastectomy increased 12% and 9%, respectively, over the same period. Performing immediate breast reconstruction is $8,800 less expensive than delayed treatment and is statistically significant by the 3-year time point. The difference between immediate reconstruction and BCS was less than $2,000 and not statistically significant.

**Synthesis of costs and benefits**

Costs and benefits were not combined since, with the assumption of equal effectiveness, the economic analysis was focussed on cost analysis only.

**Authors’ conclusions**

Age was the driving force in reconstruction decisions. Clinical factors such as tumour size and nodal status were more important for the choice between BCS and mastectomy. There are significant cost differences between the various procedures. For a similar cosmetic outcome, BCS is less expensive than breast reconstruction. When reconstruction is required, a simultaneous procedure is less expensive.

**CRD COMMENTARY - Selection of comparators**

A justification was given for the choice of the comparator (mastectomy); at the beginning of the 1990s it remained the most common approach to primary therapy. You, as a database user, should consider whether this is a widely used health technology in the context in question.

**Validity of estimate of measure of benefit**

The internal validity of the effectiveness results cannot be objectively assessed due to lack of adequate information regarding the sources on which the authors based their assumption of equal effectiveness. The study was a cost-minimisation analysis.

**Validity of estimate of costs**

Resource quantities were not reported separately from prices. The authors stated that a limitation of the cost analysis
was the inability to apportion costs between primary treatment, reconstruction, follow-up, cancer recurrence, or an illness unrelated to cancer.

Other issues
The authors' conclusion is justified given the uncertainties in the data. As the authors noted, these results only reflect the delivery of care to one-third of women less than age 65 years in one state in the USA. The cost and patterns of care do not reflect other areas where variations have already been documented. Appropriate comparisons were made with other studies. The authors indicated that the interval since the data were collated has been distinguished by important surgical innovations in breast cancer therapy, specifically the endorsement of BCS.

Implications of the study
The surgeon should carefully elicit the preferences of the patient so that a social factor such as increasing age does not exert a subtle influence against breast preservation or reconstruction.

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