Economic evaluation of anastrozole versus tamoxifen for early stage breast cancer in Singapore

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Record Status
This is an economic evaluation that meets the criteria for inclusion on NHS EED.

CRD summary
The study estimated the cost-effectiveness postmenopausal women with early stage breast cancer. The authors concluded that, although anastrozole had a higher drug acquisition cost, it was cost-effective for treating early stage breast cancer in Singapore based on effectiveness and utility data. The quality of the study methodology was good, with methods and results reported in detail. Given the scope of the study, the authors' conclusions appear to be appropriate.

Type of economic evaluation
Cost-effectiveness analysis, cost-utility analysis

Study objective
The study estimated the cost-effectiveness of anastrozole versus tamoxifen in postmenopausal women with hormone receptor (HR)-positive early stage breast cancer.

Interventions
The two treatments compared were endocrine therapy using tamoxifen and the third-generation aromatase inhibitor anastrozole.

Location/setting
Singapore/Inpatient secondary care.

Methods
Analytical approach:
The analysis was based on a Markov model using a hypothetical cohort of 1,000 postmenopausal women (mean age 64 years) postmenopausal women with HR-positive early stage breast cancer who had completed primary therapy. The time horizon of the study was the lifetime of the patient. The authors reported that a societal perspective was used, but stated that only direct medical costs were included.

Effectiveness data:
Clinical and effectiveness data came from previously published studies. The main measures of effectiveness used were disease-free survival, recurrence rates, and occurrence of adverse events. These data came from the Arimidex, Tamoxifen, Alone or in Combination (ATAC) large randomised controlled trial (Cuzick 2010, see Other Publications of Related Interest) which had median follow-up of 10-years.

Monetary benefit and utility valuations:
Utility estimates for each health state in the model were elicited through an interview of 20 experienced oncology nurses (from the National Cancer Centre in Singapore), where each nurse rated patients using the Visual Analogue Scale (VAS).

Measure of benefit:
Life-years and quality-adjusted life-years (QALYs) were the summary benefit measures. Future benefits were discounted using an annual rate of 3%.

Cost data:
The direct costs included: trial medications; other medications; doctor consultations; laboratory tests and scans; treatment of recurrences; and treatment of adverse events, including endometrial cancer, ischaemic events, spine...
fractures and venous thromboembolic events. Resource use came from a retrospective review of the medical records of postmenopausal HR-positive early stage breast cancer patients treated at the Singapore National Cancer Centre with anastrozole or tamoxifen adjuvant therapy from 2001 to 2009. Costs were obtained from the financial department of the Singapore National Cancer Centre and another hospital. All costs were inflated to 2010 prices using the healthcare component of the consumer price index. Future costs were discounted using an annual rate of 3%. Costs were reported in Singapore dollars (SGD).

Analysis of uncertainty:
One-way and multi-way sensitivity analyses were conducted by varying the values of key parameters including the recurrence rates, adverse event rates, treatment costs, utility scores, and discount rates.

Results
For tamoxifen, the average life-years gained per patient were 12.873, the average QALYs gained per patient were 8.101, and the average cost per patient was SGD 19,402.

For anastrozole, the average life-years gained per patient 12.958, the average QALYs gained per patient were 8.255, and the average cost per patient was SGD 36,999.

Costs and benefits were combined using an incremental cost-effectiveness ratio (the additional cost per life-year gained) and an incremental cost-utility ratio (the additional cost per QALY gained). When anastrozole was compared to tamoxifen, the additional cost per life-year gained was SGD 207,402, and the addition cost per QALY gained was SGD 114,061.

Results of the sensitivity analyses showed that the incremental cost-utility ratio was most affected by the recurrence rate with anastrozole.

Authors’ conclusions
The authors concluded that, although anastrozole had a higher drug acquisition cost, it was cost-effective for treating postmenopausal early stage breast cancer at a willingness to pay threshold of between one and three times the per capita gross domestic product of Singapore (reported as between SGD 59,813 to SGD 179,439 in 2010).

CRD commentary
Interventions:
The interventions were described, but no dosage information was given. The rationale for their selection was clear and they appear to have been appropriate. They are likely to be relevant treatment options in other settings.

Effectiveness/benefits:
The effectiveness estimates mainly came from a completed treatment trial (ATAC), augmented by data from published studies. No systematic search was reported, so it was not possible to determine if all the relevant evidence was considered for inclusion. It was likely that the effectiveness results were internally valid, given that the main measures of effectiveness came from a large, published, randomised controlled trial with a long follow-up period. QALYs were a validated benefit measure and could be compared with the benefits of other health care interventions. Details of the methods and population from which utility estimates were obtained were adequately reported.

Costs:
Although societal perspective was adopted, the authors also explicitly stated that only the direct medical costs were included in the analyses. The justification provided for the exclusion of indirect costs (such as productivity losses) was that the average age of patients considered was 64 years. In effect, a healthcare system perspective was adopted; For this perspective it would appear that all main relevant costs were included. The authors adequately reported the methodology used to obtain resource use and unit costs. The price year, time horizon, discount rate used and currency details were all explicitly reported.

Analysis and results:
Details of the model used were sufficiently reported, including a diagram. The incremental analysis was appropriate for determining the cost-effectiveness of anastrozole compared with tamoxifen. The results clearly presented. Uncertainty
in the results was tested using one-way and multi-way sensitivity analyses. However, a probabilistic sensitivity analysis would have more thoroughly evaluated the overall model uncertainty. As a main limitation to their study, the authors reported that costs came from a retrospective review of medical records in one institution, which might not be representative general practice in Singapore.

Concluding remarks:
The quality of the study methodology was good, with methods and results reported in detail. Given the scope of the study, the authors’ conclusions appear to be appropriate.

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Bibliographic details

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Other publications of related interest

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