Tamoxifen for the primary prevention of breast cancer: New life for an old drug

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Introduction

Breast cancer has a large burden in Australia: breast cancer where it affects 1 in 8 women by their 85th birthday. Tamoxifen has been used for estrogen receptor-positive breast cancer and has a well established efficacy and tolerability profile. There have been 4 pivotal randomised controlled trials proving tamoxifen is more effective than watchful waiting in preventing breast cancer.2,4,6,8 Tamoxifen is now available for the primary prevention of breast cancer in women with an increased risk of breast cancer in many countries including the US, UK, New Zealand and Australia.

At the time of the analysis the cost-effectiveness of tamoxifen for this indication had not been proven in Australia.26

Methods

• A literature review was undertaken to capture all published evaluations of tamoxifen used for primary prevention. Key articles were assessed and used to inform the model design and structure.

• A comprehensive meta-analysis of the 4 trials found the risk of breast cancer was significantly reduced (Hazard Ratio = 0.62, 95% CI 0.65-0.69) in women at moderate to high risk of breast cancer who received one tablet of tamoxifen 20mg daily for 5 years vs placebo (Figure 1).26


• Transitional adverse events for endometrial cancer, venous thrombotic events and catearchas were also modelled

A subtree of the economic model is shown in Figure 2: The model was validated by comparing the model performance with other published evaluations of tamoxifen for the primary prevention of breast cancer and expert clinical advice.2,8,10

• Univariate and multivariate sensitivity analyses were undertaken including varying the baseline incidence of breast cancer and duration of treatment benefit.

Result

• Previous economic evaluations, which were identified and assessed from the systematic literature search, showed tamoxifen to be associated with a cost per QALY between AUS$40,000 and AUS$100,000.

• This model demonstrates that, at the current PBS price, tamoxifen dominates the current practice in Australia of watchful waiting for the primary prevention of breast cancer. (Table 1)

• Dominance was maintained in all sensitivity analyses. As expected, the result is most sensitive to utility scores associated with breast cancer health states and the cost of treating a patient for breast cancer. (Figure 3)

Discussion

• Tamoxifen provides a cost-effective option for women at moderate to high risk of breast cancer. In fact, at the current PBS price, tamoxifen dominates the current watchful waiting approach. Data from this model indicate the benefits of preventing a case of breast cancer outweigh the potential risks of tamoxifen therapy.

• This model was submitted to the Pharmaceutical Benefits Advisory Committee of Australia and subsequently tamoxifen has been recommended for PBS listing.26

References


Figure 1: Reduction in breast cancer by trial

Table 1: Results of economic evaluation

Figure 2: Branch structure of economic model

Figure 3: Cost-effectiveness plane

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