Biomarkers in breast cancer

EVALUATION OF BREAST CANCER TEST-TREATMENT STRATEGIES USING DECISION-ANALYTIC MODELING – PRELIMINARY RESULTS FOR THE 21-GENE ASSAY RECURRENCE SCORE

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Objectives: Decision-analytic modeling can be used to evaluate short- and long term benefits, risks, harms and costs of new tests or treatments. At the ONCOTYROL research center, a Breast Cancer Outcomes model was developed to evaluate the cost effectiveness of personalized test-treatment strategies in Austria. The goal was to evaluate the cost effectiveness of the new 21-gene assay (OncotypeDX®) when it is applied in addition to the Adjuvant! Online® (AOL) decision aid to support personalized decisions on adjuvant chemotherapy.

Methods: We developed a computer model to simulate a hypothetical cohort of 50 year old women over a lifetime using a discrete event simulation. The main outcomes were life-years gained, quality-adjusted life-years (QALYs), costs and cost-effectiveness. Based on the new ISPOR-SMDM recommendations, the model was validated. Eight test-treatment strategies were evaluated. Each strategy was defined by 3 letters. The first letter indicates whether patients with a low AOL risk were tested using OncotypeDX® (Y-yes; N-no), the second and the third letters provide this information for AOL intermediate and high-risk patients, respectively. Robustness of the results was tested in a sensitivity analysis. Results were compared to a Canadian analysis by the Toronto Health Economics and Technology Assessment Collaborative (THETA).

Results: Five out of eight strategies were dominated (i.e. more costly and less effective: NNY, NYN, YNN, YNY, YYN). The base-case analysis shows that only the strategies in which OncotypeDX® is provided to patients with an intermediate or high AOL risk (incremental cost-effectiveness ratio (ICER) NYY = 1,600 €/QALY) and where all patients get OncotypeDX® (ICER YYY 15,700 €/QALY) are cost effective. These results are sensitive to changes e.g in the probabilities of distant recurrence and age. The base case analysis was comparable to the THETA results.

Conclusions: We showed that OncotypeDX®, when used in addition to the AOL, is cost effective in two test-treatment strategies (NYY, YYY) in Austria. Our simulation tool provides the flexibility to evaluate combinations of two or more tests that and respective treatment.

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