Economic Evaluation of Genomic Test-Directed Chemotherapy after Lymph-Node Positive, Oestrogen-Receptor Positive Early Breast Cancer

Peter S Hall[1,2], Christopher McCabe[2], Rob Stein[4], David Cameron[3]

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1. Academic Unit of Health Economics, Leeds Institute of Health Sciences, University of Leeds, UK.
2. Section of Oncology and Clinical Research, Leeds Institute of Molecular Medicine, University of Leeds, UK.
3. Edinburgh Cancer Research Centre, University of Edinburgh, UK.
4. Department of Oncology, UCL Hospitals NHS Foundation Trust & University College London, UK.

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Abstract

Background

Multi-parameter genomic tests may identify patients with early breast cancer who derive little benefit from adjuvant chemotherapy. They offer the potential to spare patients morbidity from unnecessary chemotherapy and reduce costs. Costs of the test must, however, be balanced against the health benefits and costs savings produced. This economic evaluation compares test-directed chemotherapy with chemotherapy for all eligible patients with lymph node positive, oestrogen receptor positive early breast cancer, using the Oncotype-DX 21-gene assay.

Methods

A cost-effectiveness analysis was performed using a probabilistic decision model to calculate expected costs and benefits over the lifetime of a cohort of women with average clinical characteristics. Recurrence rates for test- selected risk-groups were based on the SWOG-8814 trial. The primary outcome was cost per quality adjusted life year (QALY). The perspective adopted for the analysis was the UK NHS.

Findings

The expected cost-effectiveness of test-directed therapy using Oncotype DX is £5921 per QALY with 18 as cut-off between high and low recurrence-scores. The probability that this is cost-effective is 61% at a willingness-to-pay threshold of £30,000 per QALY. Results are sensitive to the recurrence rate, long-term anthracycline-related cardiac toxicity, quality of life, test cost and the time-horizon considered. The priority for further research is the recurrence rates in subgroups selected by Oncotype DX or alternative tests.

Interpretation

There is substantial uncertainty regarding the cost-effectiveness of test-directed chemotherapy. There is a high societal value in further research to reduce this uncertainty. Priorities for research to inform cost-effectiveness based decision making have been identified.