The cost-effectiveness of sentinel node biopsy in patients with intermediate thickness primary cutaneous melanoma

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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.

CRD summary
The objective was to examine the cost-effectiveness of sentinel node biopsy plus wide excision in comparison with wide excision alone in patients with primary melanomas of 1mm or more in thickness. The authors concluded that sentinel node biopsy added to wide excision was a cost-effective strategy from the perspective of the Australian health system. The study was generally well conducted and the authors’ conclusions appear to be robust.

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

Study objective
The objective was to examine the cost-effectiveness of sentinel node biopsy plus wide excision in comparison with wide excision alone in patients with primary melanomas of 1mm or more in thickness.

Interventions
The intervention was sentinel node biopsy performed in the same surgery session as a wide excision of the primary melanoma site.

Location/setting
Australia/hospital.

Methods
Analytical approach:
The analysis was based on a Markov model, with a 20-year time frame, that simulated the natural history of the disease. The authors stated that the perspective of the health system was adopted.

Effectiveness data:
The clinical inputs were derived from selected sources and from a comprehensive literature search in commonly used electronic databases. The selected sources included the Multicentre Selective Lymphadenectomy Trial (MSLT-1), a randomised controlled trial (RCT) that was used to obtain the sentinel node biopsy accuracy, short-term survival, and complications of the interventions, and an official US database that was used to estimate the survival probabilities. Information on the other sources of inputs was not given. The key input to the model was the sentinel node biopsy accuracy.

Monetary benefit and utility valuations:
The utility values were derived from published sources, but their details were not given. The preferences were elicited both from melanoma or other cancer patients and from the general population, depending on the health state.

Measure of benefit:
Quality-adjusted life-years (QALYs) and life-years (LYs) were the summary benefit measures and they were discounted at an annual rate of 5%.

Cost data:
The economic analysis included the cost of melanoma treatment, which consisted of the following items: wide excision,
sentinel node biopsy, follow-up, diagnosis of metastases, complete lymph node dissection, treatment of complications, palliative care, and end-of-life costs. These costs were based on Australian refined diagnosis-related group data and the Australian Medicare benefits schedule. In-patient and out-patient hospital resources were derived from a sample of 40 patients in the MSLT-1 trial. All costs were in Australian dollars (AUD) and the price year was 2007. Future costs were discounted at 5% per annum.

Analysis of uncertainty:
Deterministic one- and two-way sensitivity analyses were carried out on most of the inputs to the model. The ranges of values were from published sources.

Results
The total costs per patient were AUD 24,045 with wide excision plus sentinel node biopsy and AUD 23,182 with wide excision alone. The total LYs were 10.77 with wide excision plus sentinel node biopsy and 10.45 with wide excision alone. The total QALYs were 10.34 with wide excision plus sentinel node biopsy and 9.90 with wide excision alone.

The incremental cost per LY gained with wide excision plus sentinel node biopsy over wide excision was AUD 2,770 and the incremental cost per QALY gained was AUD 1,983.

The sensitivity analysis showed that being older at diagnosis and lower sentinel node positivity were associated with the sentinel node biopsy strategy being less expensive and more effective than wide excision alone. The most influential model inputs were the cost of sentinel node biopsy, the cost of delayed complete lymph node dissection, and the probability of nodal or distant metastases. The base case results were quite robust to changes in all parameters.

Authors’ conclusions
The authors concluded that sentinel node biopsy added to wide excision was a cost-effective strategy compared with wide excision alone from the perspective of the Australian health system.

CRD commentary
Interventions:
The selection of the comparators was appropriate and they were likely to be valid interventions in other settings.

Effectiveness/benefits:
The clinical inputs were derived from multiple sources, which were identified both selectively and through a literature review, the key steps of which were reported in an appendix. Except for a few sources, no information on the methods and other characteristics of the primary studies was provided. The use of a head-to-head RCT for most of the efficacy and safety inputs and of a large database for the long-term survival data appears to have been appropriate and should ensure the validity of these data. Issues that arise from the use of mixed sources, such as heterogeneity of patient samples and interventions, were not investigated. No clear details on the derivation of the utility values were reported. Both the benefit measures used were appropriate, given the impact of the disease on both quality of life and survival.

Costs:
The analysis of costs was consistent with the perspective in terms of both the cost categories and the data sources. The unit costs were not reported, but the key details of resource quantities were given. In general, the analysis was satisfactorily reported and carried out. Alternative cost estimates were investigated in the sensitivity analysis. The price year and discount rate were reported.

Analysis and results:
The analytic approach was appropriate and the costs and benefits and incremental cost-effectiveness ratios were clearly reported. The issue of uncertainty was appropriately investigated and the most influential model inputs were highlighted. Conventional discounting was applied to both the costs and benefits. The time horizon appears to have been appropriate. The authors correctly stated that a limitation of their analysis was the use of constant instead of time-dependent transition probabilities.

Concluding remarks:
The study was generally well conducted and reported and the authors’ conclusions appear to be robust and valid.

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