Cost-effectiveness of using recombinant human thyroid-stimulating hormone before radioiodine ablation for thyroid cancer: the Canadian perspective

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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
This study examined the cost-effectiveness of recombinant human thyroid-stimulating hormone (rhTSH) before radioiodine ablation in patients with low-risk thyroid cancer. The authors concluded that, from a societal perspective, rhTSH before radioiodine ablation was a cost-effective strategy compared with endogenous stimulation by the withdrawal or withholding of thyroid hormone resulting in hypothyroidism. The methods were valid and the uncertainty was investigated. The authors’ conclusions appear to be robust.

Type of economic evaluation
Cost-utility analysis

Study objective
This study examined the cost-effectiveness of recombinant human thyroid-stimulating hormone (rhTSH) before radioiodine ablation for the treatment of patients with low-risk thyroid cancer.

Interventions
The interventions were exogenous stimulation, using rhTSH, versus endogenous stimulation by the withdrawal or withholding of thyroid hormone resulting in hypothyroidism. The rhTSH was given daily by intramuscular injection at a dose of 0.9mg, for two days before radioiodine ablation.

Location/setting
Canada/hospital.

Methods
Analytical approach:
The analysis was based on a Markov model with a 17-week time horizon. The authors stated that a societal perspective was adopted.

Effectiveness data:
The bulk of the clinical evidence came from a published pivotal, multicentre, prospective, randomised controlled trial. The remaining evidence was from published literature and the methods of these studies were not reported. The key assumption of the model was the equal success rate (100%) in both treatment arms, which was based on the trial results.

Monetary benefit and utility valuations:
The utility values were derived from Short Form (SF-36) Health Survey data collected in the pivotal trial. These data were converted to utilities using the SF-6D method.

Measure of benefit:
Quality-adjusted life-years (QALYs) were the summary benefit measure.

Cost data:
The economic analysis included the costs of radioiodine ablation, whole-body scan, in-patient stay, visits to a specialist and a general practitioner, TSH measurement, serum thyroglobulin count, thyroglobulin antibody test, productivity losses, and drugs. The costs were from Canadian sources, such as the Ontario Health Insurance Plan and the Ontario
Drug Benefit formulary. A survey of 24 clinicians, treating 1,884 patients in Canada, was undertaken to estimate some of the resource use data. Other data were derived from published studies. The value of productivity lost was estimated from the average Canadian wage, using a friction cost method. All costs were in Canadian dollars (CAD) and referred to 2007 or 2008 prices.

Analysis of uncertainty:
One- and two-way sensitivity analyses were carried out to establish whether the base case findings were robust and to identify the most influential model inputs. Published ranges of values appear to have been used for most inputs. In an alternative scenario, it was assumed that radioiodine ablation was administered to out-patients.

Results
The expected costs were CAD 5,471 with exogenous stimulation and CAD 5,384 with endogenous stimulation. The QALYs were 0.2808 with exogenous and 0.2232 with endogenous stimulation. Resulting in an incremental cost per QALY gained with rhTSH over endogenous stimulation of CAD 1,520.

In the alternative scenario, where ablation was an out-patient procedure, the incremental cost per QALY gained with rhTSH was CAD 13,391.

The sensitivity analysis showed that assumptions on work time lost were the most influential inputs to the model, but the incremental cost per QALY remained below CAD 20,000 and below CAD 25,000 in the two-way analysis.

Authors’ conclusions
The authors concluded that, from a societal perspective, rhTSH before radioiodine ablation was a cost-effective strategy compared with endogenous stimulation by the withdrawal of thyroid hormone resulting in hypothyroidism.

CRD commentary
Interventions:
The selection of the comparators was appropriate as the usual care was compared against the proposed intervention. Dosages were reported and these interventions were likely to be valid in other settings.

Effectiveness/benefits:
Selected sources were used to provide relevant data for the model. In general, a randomised controlled trial is considered to be a valid source for clinical efficacy, given the strengths of its methods, but no information on this trial was provided. The approach used to identify the other published studies and their key features were not reported. The authors justified the exclusion of potential adverse events, as they were assumed to have a negligible impact on a patient's health. Quality of life is an important aspect of health for patients with thyroid cancer and QALYs were an appropriate benefit measure. The use of preferences elicited from patients included in the clinical trial appears to have been appropriate. The authors justified the methods they used to convert the utilities from the SF-36.

Costs:
The economic analysis was extensively described and a justification was provided for the exclusion of some cost items. In general, the categories of costs were consistent with the perspective. Several details of the unit costs and resource use were provided and most of the data were from country-specific sources. The reference years for the economic data were reported. Details of the methods used to estimate the value of absence from work due to disease were given.

Analysis and results:
The costs and benefits of the two strategies were clearly reported. The analytic approach, used to synthesise the economic and clinical consequences of the two interventions, was appropriate and the incremental analysis allowed the identification of the most cost-effective strategy. The authors stated that a probabilistic sensitivity analysis was not carried out because of a lack of published data. A clear description of the model was given. The relatively short time horizon was appropriate as it reflected the period between thyroidectomy and recovery from ablation. Discounting was not required given this short time horizon.

Concluding remarks:
The methods were valid and the uncertainty in the analysis was investigated. The authors’ conclusions appear to be robust.

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