Cost-effectiveness analysis of immediate radical cystectomy versus intravesical Bacillus Calmette-Guerin therapy for high-risk, high-grade (T1G3) bladder cancer

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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 immediate radical cystectomy compared with conservative therapy using intravesical Bacillus Calmette-Guerin, in patients with high-risk tumour 1 grade 3 (T1G3) bladder cancer. The authors concluded that immediate cystectomy was cost-effective, except in older patients and in those with more comorbidities. The methods were valid and the authors’ conclusions appear to be robust, but more detail on the data sources would have been useful.

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

Study objective
This study examined the cost-effectiveness of immediate radical cystectomy versus conservative treatment with Bacillus Calmette-Guerin (BCG) within the bladder (intravesical), in patients with high-risk tumour 1 grade 3 (T1G3) bladder cancer.

Interventions
The two interventions were immediate nerve-sparing radical cystectomy with the creation of an ileal neobladder in the normal position compared with conservative therapy of intravesical BCG and a possible delayed cystectomy. Conservative therapy was the usual care and consisted of six weekly instillations (slow infusions) of induction BCG followed by three weekly maintenance instillations at three, six, 12, 18, 24, and 30 months.

Location/setting
Canada/hospital.

Methods
Analytical approach:
The analysis was based on a Markov model with a lifetime horizon. The authors stated that the analysis was from the perspective of the health care payer.

Effectiveness data:
The clinical data were from the published medical literature and the approach used to identify these data sources was not stated. Where possible, the probabilities from multiple studies were aggregated, using the inverse variance model. No information on the design or other characteristics of these studies was provided. A key input to the model was the probability of death after cystectomy.

Monetary benefit and utility valuations:
The utility values were derived from a published study that included patients who had similar health states, but were not suffering from bladder cancer and no other details were given. The disutilities associated with short-term complications were also considered.

Measure of benefit:
Life-years (LYs) and quality-adjusted life-years (QALYs) were the summary benefit measures and were discounted at an annual rate of 3%.
Cost data:
The economic analysis included the costs of cystectomy (procedure and follow-up), procedure-related complications, BCG instillation, and cancer treatment. The costs and quantities were from various sources, including a large tertiary teaching hospital in Toronto, cost studies, the Ontario Schedule of Benefits, the Ontario Drug Benefits Formulary, and the University Health Network out-patient pharmacy. All costs were in Canadian dollars (CAD) and were discounted at an annual rate of 3%. The price year was 2005.

Analysis of uncertainty:
The issue of uncertainty was investigated in a probabilistic sensitivity analysis, with stochastic distributions assigned to the model inputs based on authors' assumptions. A second-order Monte Carlo simulation provided mean health outcomes, costs with 95% credible intervals, and cost-effectiveness acceptability curves. The expected value of perfect information was also calculated and several additional scenarios based on patient subgroups (age and comorbidities) were considered.

Results
Under base case conditions (patients aged 60 years without or with mild comorbidities), the expected costs were CAD 37,600 with immediate cystectomy and CAD 42,400 with conservative therapy and the QALYs were 9.46 with immediate cystectomy and 9.39 with conservative therapy. Immediate cystectomy was dominant, which means it was less expensive and more effective than the alternative. The same conclusion was reached when using LYs as the benefit measure.

In the base case, at a willingness-to-pay of CAD 50,000 per QALY, immediate cystectomy was cost-effective in 67% of simulations. It was dominant in younger patients (under 60 years), but in older patients (over 70 years) and those with more comorbidities, conservative therapy was the preferred strategy (dominant or cost-effective).

At a willingness-to-pay threshold of CAD 50,000 per LY gained the expected value of perfect information was CAD 1,877 per patient and, at a threshold of CAD 50,000 per QALY, it was CAD 28,220 per patient.

Authors' conclusions
The authors concluded that immediate cystectomy was a cost-effective alternative to conservative therapy, except in older patients and in those with more comorbidities.

CRD commentary
Interventions:
The selection of the comparators was appropriate as they were two valid alternative treatments for patients with bladder cancer.

Effectiveness/benefits:
The approach used to identify the relevant sources of data was not described and the characteristics of the data sources were not reported. This lack of information limits the possibility of objectively judging the validity of the clinical estimates, but the data were pooled, where possible, and extensive sensitivity analysis was conducted. Appropriate benefit measures were used and they captured the impact of the disease on survival and quality of life, which are relevant dimensions of health for patients with bladder cancer. No details on the derivation of the utility values were provided and the data were not from patients with bladder cancer because data for these patients had not been published.

Costs:
The reporting of the economic analysis was also limited as only total cost categories were presented and not individual items and resource quantities. The data sources were reported and they reflected the setting. Other aspects of the analysis, such as the price year and use of discounting were reported.

Analysis and results:
The costs and benefits of the two strategies were clearly reported and appropriately synthesised in an incremental analysis, which showed the superior profile of immediate cystectomy over the usual care. Valid methodology was used
to deal with the issue of uncertainty and the results were clearly presented and discussed. Key characteristics of the model were reported. Some simplifying assumptions were required, but the authors provided a justification for their use. They acknowledged some limitations of their analysis, which mainly arose from the lack of data for costs and for the utilities for bladder cancer.

Concluding remarks:
The methods were valid and the authors’ conclusions appear to be robust, but more detail on the data sources would have been useful.

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