Medical decision analysis for the management of unifocal, flat, low-grade dysplasia in ulcerative colitis

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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 compare the cost-effectiveness of immediate colectomy against that of enhanced colonoscopic surveillance, for the management of low-grade dysplasia in 45-year-old ulcerative colitis patients who had recently been diagnosed with dysplasia. The authors concluded that immediate colectomy was less expensive and produced slightly more quality-adjusted life-years than enhanced surveillance. The study was well conducted and well reported and the conclusions reached by the authors appear to be appropriate.

Type of economic evaluation
Cost-utility analysis

Study objective
The objective was to compare the cost-effectiveness of immediate colectomy versus enhanced colonoscopic surveillance for the management of low-grade dysplasia, in 45-year-old ulcerative colitis patients, who had recently been diagnosed with dysplasia.

Interventions
An immediate colectomy, with a two-stage ileal pouch anal anastomosis, was compared with enhanced surveillance by colonoscopy at three, six, and 12 months, and then annually.

Location/setting
USA/hospital.

Methods
Analytical approach:
A Markov model was used to synthesise the data from the literature and to simulate a patient's health from diagnosis of low-grade dysplasia to death. Each cycle of the model lasted for three months and the time horizon was lifetime. The authors stated that the perspective was societal.

Effectiveness data:
The estimates of the sensitivity and specificity of colonoscopy for the detection of low-grade dysplasia, the complications from ileal pouch anal anastomosis, the proportion of patients after anastomosis who required supportive care, and the positive predictive value for colonoscopy were from published literature. Cohort studies provided the estimates of the incidence rate for high-grade dysplasia or cancer in patients with low-grade dysplasia. The stage-specific cancer mortality was estimated from the Surveillance, Epidemiology and End Results database. The distribution of cancer stage, in patients who developed cancer, and the distribution of high-grade dysplasia, in patients who had progressed to advanced neoplasia, were estimated from observational studies of surveillance for low-grade dysplasia.

Monetary benefit and utility valuations:
The health utilities, for the various health states in the Markov model, were based on relevant literature.

Measure of benefit:
The measure of benefit was quality-adjusted life-years (QALYs) and these benefits were discounted at 3% per annum.
Cost data:
The cost categories were those of the direct cost of medical care. The costs of colectomy, small-bowel obstruction, and pouch failure were derived from the Nationwide Inpatient Sample (NIS) database. Physician fees, ostomy supplies, ostomy nurse time, colonoscopy, and associated pathology expenses were estimated using reimbursement schedules from the Centres for Medicare and Medicaid Services. The drug costs, such as those of oral mesalazine, were estimated from the 2005 Red Book. All costs were reported in US dollars ($) at 2005 prices and were discounted at 3% per annum.

Analysis of uncertainty:
A probabilistic sensitivity analysis was performed to assess whether the results were robust. This involved 1,000 simulations of the data and the results were displayed in a scatter plot. Univariate sensitivity analysis was also performed, on each model variable, which was varied to its lower and upper limits.

Results
Immediate colectomy resulted in 20.1 QALYs compared with 19.9 QALYs for enhanced surveillance. The average total cost, over a lifetime, was $75,900 with immediate colectomy, compared with $83,900 with enhanced surveillance.

Immediate colectomy resulted in an average net gain of 0.2 QALYs, compared with enhanced surveillance, and a lower net average cost difference of $13,300 per patient. Immediate colectomy was dominant over enhanced surveillance, as it was more effective and less costly.

Both univariate sensitivity analysis and probabilistic sensitivity analysis showed that the dominance of immediate colectomy over enhanced surveillance was robust to variations in nearly all the model variables. The exceptions were the distribution of advanced neoplasia and the incidence of cancer with no dysplasia, but even at the minimum values for these variables, the incremental cost-effectiveness ratio for enhanced surveillance over colectomy remained over $100,000 per QALY.

A threshold analysis showed that the utility for the health state after colectomy would have to decrease to 0.77 for enhanced surveillance to be favoured over immediate colectomy, with an incremental cost-effectiveness ratio of $50,000 per QALY.

Authors’ conclusions
Immediate colectomy was less expensive and produced slightly more QALYs than enhanced surveillance. Further research was required to clarify the discrepancy between the agreed recommendations for colectomy and the conservative practices of gastroenterologists.

CRD commentary
Interventions:
Both the comparators and the study population were well described. All relevant comparators appear to have been included.

Effectiveness/benefits:
The methods used to identify the data for the model were not reported, but the data inputs were clearly presented in a table, along with each data source. It is difficult to ascertain if the best available evidence was used. The source of the utilities and the instrument used to estimate them were clearly reported. The evidence used to derive the QALYs was appropriate.

Costs:
The costs were relevant to the perspective, but indirect costs were not included. The impact of not including them, on the results for a societal perspective, is unclear. The cost estimates were appropriately from the study setting. Limited information was reported for resource use and this might restrict the generalisability of the costing. A charge-to-cost ratio for each hospital was used to estimate the total costs, further details of these ratios were not provided, but the method was appropriate for making the charges reflect the true costs. The price year and the use of discounting were clearly reported.
Analysis and results:
The methods were well reported and the results were fully and clearly presented. The impact of uncertainty was appropriately investigated. The authors appropriately highlighted the limitations of their study, such as that there were no data on the health preferences for colectomy, from the perspective of preoperative patients.

Concluding remarks:
The methods were good and the authors provided a transparent analysis. The methods and results of the study were both well reported and the conclusions reached by the authors appear to be appropriate.

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