Colonic stent versus surgery for the management of acute malignant colonic obstruction: a decision analysis

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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 study investigated the cost-effectiveness of two alternative strategies (self-expanding metal stents and surgery) for a patient with metastatic colon cancer presenting with acute, malignant colonic obstruction. The study demonstrated the economic and clinical superiority of self-expanding metal stents over surgery under several different scenarios. Given the limitations relating to the source of the clinical data and the short time horizon, caution is required when interpreting the authors’ conclusions.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The objective of the study was to assess the cost-effectiveness of two alternative strategies for a patient with metastatic colon cancer presenting with acute, malignant colonic obstruction. The strategies considered were self-expanding metal stent (SEMS) versus surgery.

Interventions
The two interventions under examination were emergent colonic stent versus emergent surgical resection followed by diversion.

Location/setting
USA/hospital.

Methods
Analytical approach:
A decision analytic model was developed in order to compare the costs and benefits of the two strategies in a hypothetical 60-year-old patient with symptoms compatible with complete acute colonic obstruction. The time horizon of the analysis was 6 months. The perspective was not explicitly stated, but it appears to have been that of a third-party payer.

Effectiveness data:
A review of the literature was undertaken to identify relevant sources of clinical estimates used to populate the decision model. Search methods, sources searched and other details of the review were described. No randomised controlled trials were available from the literature, and the most recent studies were selected from among those retrieved. Estimates from multiple sources were pooled by calculating weighted means for each parameter. The key clinical estimate was the success rate of the two procedures without complications.

Monetary benefit and utility valuations:
None.

Measure of benefit:
The summary benefit measure was the overall success rate. This was defined as clinical success with no major procedure-related complication and no long-term complications over a 6-month period after the procedure. Mortality was also reported.
Cost data:
A breakdown of the cost categories was not given since aggregate costs were presented for different health conditions included in the model. The costs and quantities were derived from average rates by the Agency for Healthcare Research and Quality Healthcare Cost and Utilization Project (HCUPnet) national online database for 2002. The currency was US dollar ($).

Analysis of uncertainty:
A deterministic sensitivity analysis was undertaken to evaluate the robustness of the model results to variations in model inputs. Model inputs were varied over credible ranges of values. One-, two- and three-way sensitivity analyses were performed. In particular, the value of death was changed to either $50,000 or $250,000 to further validate the model findings.

Results
The average cost per patient was $27,225 with colonic SEMS and $57,398 with emergent surgery.

The success rate was 72% (mortality 0.1%) with colonic SEMS and 67% (mortality 2.5%) with emergent surgery.

Colonic SEMS therefore represented the dominant strategy, because it was both more effective and less expensive than surgery.

The results of the sensitivity analysis showed that the model results were robust to all variations considered using plausible ranges of values. For example, SEMS remained the dominant strategy provided that its immediate complication rate was less than 18%, otherwise surgery became the preferred option.

Authors’ conclusions
The authors concluded that, from the perspective of the US payer, colonic stent insertion was more effective and less expensive than surgery for the treatment of colonic obstruction in patients with metastatic colon cancer.

CRD commentary
Interventions:
The selection of the comparators (i.e. SEMS versus surgery) was appropriate as they are relevant interventions for treating patients with malignant colonic obstruction.

Effectiveness/benefits:
The use of a systematic review of the literature to identify primary studies was appropriate. The review was well reported in terms of the methods and results. Thus, it appears that the most relevant sources of data were selected. However, the lack of randomised controlled trials in the literature, and the inclusion of observational studies, to some extent limit the internal validity of the primary studies. Pooling methods were reported. The authors conducted an extensive sensitivity analysis to address the issue of uncertainty in the clinical estimates.

Costs:
The analysis of the costs was not clearly described and reported. The authors were explicit about the sources of the costs, which reflected a typical US database. However, the perspective was not explicitly stated and a breakdown of the cost categories was not given. This may limit the possibility of replicating the analysis in other settings. The price year was reported. No time adjustment was required given the short time horizon.

Analysis and results:
A synthesis of the costs and benefits was not required given the dominance of SEMS. The authors addressed the issue of uncertainty surrounding some model inputs, which were extensively investigated in the sensitivity analysis. Although the authors concluded that the base-case results were corroborated for plausible changes in model inputs, it would appear that the cost-effectiveness of the two strategies was strongly related to the assumptions made around immediate and long-term complications. The choice of a short time horizon was necessary because of the poor survival of patients with colorectal cancer. However, as the authors acknowledged, a longer time horizon (e.g. 1 year) might have produced more favourable results for the surgical option. A simple schematic of the model was provided. The authors did not
explicitly address the issue of the generalisability of the study results to other settings. The authors noted other
limitations of their analysis, such as the fact that patient preferences were not taken into account.

Concluding remarks:
Overall, the study was well conducted, with extensive reporting of clinical estimates used in the model, although the
economic side of the study was not described in the same detail. However, caution may be required when interpreting
the authors’ conclusions in view of the limitations relating to the source of the clinical data and the short time horizon.

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Bibliographic details
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Other publications of related interest
Baron TH, Dean PA, Yates MR, et al. Expandable metal stents for the treatment of colonic obstruction: techniques and

Carne PW, Frye JN, Robertson GM, Frizelle FA. Stents or open operation for palliation of colorectal cancer: a

preoperative and palliative treatment with self-expanding metallic stents – a preliminary report. Radiology
1998;206:199–204.

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Subject indexing assigned by NLM

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