Prevention of adhesion formation after radical hysterectomy using a sodium hyaluronate-carboxymethylcellulose (HA-CMC) barrier: a cost-effectiveness analysis


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 evaluated the cost-effectiveness of two strategies to manage the risk of adhesion-related morbidity following radical hysterectomy for Stage IB cervical cancer: routine care with no adhesion prevention measures versus a preventive strategy with a hyaluronic acid–carboxymethylcellulose anti-adhesion barrier. It was found that the preventive measure strategy was cost-effective from the perspectives of society and a third-party payer. The authors' conclusions are consistent with the objective of the study, which was adequate in terms of reporting but less clear with respect to the sources used for clinical data.

Type of economic evaluation
Cost-utility analysis

Study objective
The primary objective of the study was to determine the cost-effectiveness of two strategies for managing the risk of adhesion-related morbidity following radical hysterectomy for Stage IB cervical cancer: routine care with no adhesion prevention measures versus a preventive strategy with a hyaluronic acid–carboxymethylcellulose (HA–CMC) anti-adhesion barrier.

Interventions
A preventive strategy using an HA-CMC anti-adhesion barrier was compared with routine care, consisting of no intervention for the prevention of adhesive small bowel obstruction (ASBO), in women undergoing radical hysterectomy and pelvic lymphadenectomy for International Federation of Gynecology and Obstetrics (FIGO) Stage IB cervical cancer.

Location/setting
USA/hospital.

Methods
Analytical approach:
A decision tree model was constructed to simulate the clinical and economic impact of the alternative preventive strategies over a 10-year time horizon using published evidence. The authors stated that the study perspectives were those of society and a third-party payer.

Effectiveness data:
The clinical data came from the published literature, based on a review of studies published in English. The methods and conduct of the review were not reported but phase III trials were used whenever possible. Other data came from phase II trials, case-control studies and case report series. The authors stated that conservative estimates were selected in order to choose base-case estimates from among those available in the literature. The key clinical parameters were incidence of ASBO, ASBO-related postoperative mortality, recurrence of ASBO and efficacy of the adhesion prevention strategy.

Monetary benefit and utility valuations:
Utility estimates were not available from studies on ASBO, and hence were derived from published studies on patients with other diseases such as colitis, Crohn's disease, severe back pain and migraine headache. The instrument used in
these studies to elicit patient preferences was the Quality of Well Being Indices.

Measure of benefit:
The benefit measure was the number of quality-adjusted life-years (QALYs). These were discounted at an annual rate of 3%.

Cost data:
The societal perspective included the costs of hospital services, professional reimbursements for surgeons and anaesthesiologists, lost wages and caregiver support. The perspective of the third-party payer included only the costs of hospital services and professional reimbursements for surgeons and anaesthesiologists. The direct medical costs were derived from the Johns Hopkins Medical Institutions administrative database and other publicly accessible sources such as the Maryland Health Services Cost Review Commission database. Lost wages for patients and caregivers were based on national earning rates. The price year was 2006 and the currency was US dollars ($). The time horizon of the analysis was 10 years and an annual discount rate of 3% was applied.

Analysis of uncertainty:
A deterministic univariate sensitivity analysis was undertaken to determine the robustness of the model results. Model inputs were varied across plausible ranges of values.

Results
From the societal perspective, the expected QALYs and costs were, respectively, 7.901 and $1,932 with the preventive strategy and 7.805 and $3,043 with routine care. Thus, the preventive strategy was dominant over routine care, which was both less effective (-0.096 QALYs) and more expensive ($1,112).

The sensitivity analysis showed that the preventive strategy remained the preferred option until the incidence of ASBO using routine care was ≤ 2.3% (15% in the base-case), or the efficacy of the preventive measure was ≤12.2% (50% in the base-case), or until the cost of the preventive measure exceeded $1,571 ($493 in the base-case).

From the perspective of the third-party payer, the expected QALYs and costs were, respectively, 7.987 and $1,247 with the preventive strategy and 7.970 and $1,629 with routine care. Again, the preventive strategy was dominant over routine care, which was both less effective (-0.0171 QALYs) and more expensive ($383).

The results of the sensitivity analysis were similar to those found when a societal perspective was adopted, and the preventive strategy remained dominant under reasonable assumptions.

Authors’ conclusions
The authors concluded that, even using conservative assumptions, a preventive measure strategy to manage the risk of adhesion-related morbidity following radical hysterectomy for Stage IB cervical cancer was cost-effective, both from the perspective of society as a whole and from a third-party payer perspective in the US setting.

CRD commentary
Interventions:
The interventions under examination were appropriately selected and were relevant in the authors’ setting. No preventive strategy represented the routine approach in several medical centres. Among the available adhesion barriers, the authors selected a specific HA-CMC given its superior performance.

Effectiveness/benefits:
The use of a review of the literature to derive the clinical estimates was appropriate, although the authors did not report details of the methodology used (e.g. inclusion and exclusion criteria). The baseline clinical estimates seem to have been selected arbitrarily from among those available, but wide ranges of values were then tested in the sensitivity analysis. Efficacy rates for the preventive strategy compared with routine care appear to have been derived from randomised trials, but little information on the design and patient characteristics of the individual primary sources was provided. Given the lack of data for patients with ASBO, the quality-of-life estimates required to calculate QALYs were derived using proxies from patients with similar diseases. QALYs are an appropriate benefit measure, given the impact of the...
disease on both quality of life and survival.

Costs:
The use of two perspectives was a positive feature of the study, and it appears that all the relevant costs were included. However a detailed breakdown of cost items was not given for all categories of costs. Some unit costs and resource quantities were not presented separately. This might limit the possibility of replicating the analysis in other settings. The sources of data were typical for the US context. The price year was reported and discounting was appropriately applied in view of the long-term horizon.

Analysis and results:
The costs and benefits were appropriately synthesised, although cost-effectiveness ratios were not calculated given the dominance of one strategy over the other. The issue of uncertainty was clearly addressed and threshold values for key model inputs that determined a change in the preferred strategy were identified. The results of both the base-case and sensitivity analyses were clearly reported, which improves the generalisability of the study results to other settings. In addition, the authors highlighted the strengths and limitations of their analysis.

Concluding remarks:
On the whole, the quality of the study methodology was good, especially in terms of transparent reporting of all model inputs and results. However, the quality of the primary sources used to derive the clinical data was not clear. The conclusions reached by the authors appear appropriate and robust.

Funding
None stated.

Bibliographic details

PubMedID
17097723

DOI
10.1016/j.ygyno.2006.09.029

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Indexing Status
Subject indexing assigned by NLM

MeSH
Carboxymethylcellulose Sodium /administration & dosage; Cost-Benefit Analysis; Decision Support Techniques; Drug Costs; Female; Humans; Hyaluronic Acid /administration & dosage; Hysterectomy /adverse effects /economics; Insurance, Health, Reimbursement; Intestinal Obstruction /etiology /prevention & control; Intestine, Small; Models, Economic; Tissue Adhesions /complications /prevention & control; Uterine Cervical Neoplasms /surgery
AccessionNumber
22007000453

Date bibliographic record published
19/03/2007

Date abstract record published
09/08/2008