Cost-utility analysis of contaminated appendectomy wounds
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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.

Health technology
Primary closure (PC) and delayed primary closure (DPC) versus secondary closure (SC) in open wound management for contaminated right lower quadrant incisions.

Type of intervention
Treatment.

Economic study type
Cost-utility analysis.

Study population
A hypothetical cohort of male and female patients with contaminated wounds due to perforated or gangrenous appendicitis. No further details were given.

Setting
Hospital. The economic study was carried out in Minnesota, USA.

Dates to which data relate
The main effectiveness data were obtained from previously published studies. Resource and cost data were mainly taken from 1978-93 sources. The price year (for the compensation factor as the ratio of total hospital costs to total hospital charges) was 1993.

Source of effectiveness data
The estimates for wound infection rate in PC and DPC, probability of initial success with DPC, probability of successful outpatient treatment of a wound infection and utility to wound treatment were derived from reviews of previously published studies and authors' assumptions.

Modelling
A decision tree model was used to compare the cost utility of PC, DPC and SC open wound management.

Outcomes assessed in the review
The outcomes assessed were wound infection rate in PC and DPC, probability of initial success with DPC and the probability of successful outpatient treatment of a wound infection.

Study designs and other criteria for inclusion in the review
The studies included in the review met the following criteria: perforated appendix or gangrenous appendicitis, use of perioperative antibiotics active against aerobic and anaerobic bacteria and data stratified by wound management, operative findings and infection rate.

Sources searched to identify primary studies
MEDLINE was searched.

Criteria used to ensure the validity of primary studies
Not stated.

Methods used to judge relevance and validity, and for extracting data
Not stated.

Number of primary studies included
10 primary studies were included in the review.

Methods of combining primary studies
Weighting of data.

Investigation of differences between primary studies
Not stated.

Results of the review
The wound infection rate in PC wound management was 13% (range: 1% to 32%). The wound infection rate when DPC was used was 15%, (range: 0% to 54%). The probability of initial success with DPC was 85% (range: 75% to 90%). The probability of successful outpatient treatment of a wound infection ranged from 50% and 100%.

Methods used to derive estimates of effectiveness
Authors’ assumptions about effectiveness were also used.

Estimates of effectiveness and key assumptions
The utility of a PC wound treatment was 1. Utility for inpatient treatment of an open wound, an infected wound or both was 0.6 and for outpatient treatment the utility was 0.7. Authors’ assumptions were also used to average the probability of initial success with DPC (85%) based on reports in the literature.

Measure of benefits used in the economic analysis
The outcome measure used in the economic analysis was ultimate utility. Ultimate utility for each management strategy was derived by multiplying the relative frequency of each branch by its utility and adding branch utilities expressed as 1 quality-adjusted life year (QALY). Patients’ values were used to assess the health states.

Direct costs
Hospital stay, medication, supplies and home health visit costs were included in the analysis. The quantities were not reported separately from the prices. The quantity/cost boundary adopted was the hospital. Discounting was not applied due to the short period of follow-up. The price year was 1993.
Statistical analysis of costs
Not undertaken.

Currency
US dollars ($).

Sensitivity analysis
One-way and two-way sensitivity analyses were carried out on the PC infection rate and on PC and DPC infection rates, respectively.

Estimated benefits used in the economic analysis
The ultimate utility was 0.99 for PC, 0.98 for DPC and 0.94 for SC.

Cost results
The costs were $2,680 for SC, $2,877 for DPC and $3,813 for SC.

Synthesis of costs and benefits
The cost saving per Quality-adjusted Life Year (QALY) with DPC over SC was $22,340 (with a required population size of 24 patients). The cost saving per QALY with PC over DPC was $22,635 (with a required population size of 115 patients). An incremental analysis was performed. Incremental savings were $936 for DPC over SC and $197 for PC over DPC. The incremental utility was 0.04 for DPC over SC and 0.01 for PC over DPC. The one-way sensitivity analysis revealed that PC and DPC were of equivalent cost-utility at a PC infection rate of 0.27. The two-way sensitivity analysis revealed that at the highest infection rate of 0.32, PC is superior to DPC and SC even with successful outpatient management of all wounds.

Authors’ conclusions
PC is shown to be the favoured method of management for contaminated right lower quadrant incisions with a primary infection rate less than 0.27.

CRD COMMENTARY - Selection of comparators
The reason for the choice of comparator is clear. PC and DPC are widely used wound treatments for contaminated right lower quadrant incisions.

Validity of estimate of measure of benefit
The estimate of measure of benefit used in the economic analysis is likely to be internally valid and a systematic review of the literature was undertaken in determining baseline probabilities. Within the limitations of a modeled solution, the data have not been used selectively.

Validity of estimate of costs
Resource quantities were not reported separately from the prices. Adequate details of the methods of quantity/cost estimation were given. Important cost items do not appear to have been omitted.

Other issues
The authors’ conclusions are likely to be justified given the uncertainties in the data. The issue of generalisability to
other settings/countries was not addressed. However, appropriate comparisons were made with other studies, particularly in relation to money spent per QALYs gained. The authors noted that the model did not incorporate multiple medical problems, use of corticosteroids, diabetes, obesity or inadequate nutritional status which influence the risk for wound complications.

Implications of the study
More research is required to analyse the effect of multiple medical problems, use of corticosteroids, diabetes, obesity or inadequate nutritional status on risk for wound complications.

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