Assessing the most clinically and cost effective method of closing skin following surgery

Hargreaves J

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 assessed the costs and effectiveness of six methods of wound closure following routine surgery. The author concluded that increasing the use of topical skin adhesive and short-term absorbable sutures could produce considerable cost savings for the NHS, with similar safety and effectiveness. There were several limitations to the analyses, and the methods and results were not clearly reported. The author's conclusions should be considered with caution.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The aim was to assess the costs and effectiveness of various techniques for skin closure following surgery. For the costs, surgical patients excluded those with traumatic wounds treated in accident and emergency, those where complications occurred that prolonged surgery or hospital stay, and those with type 1 diabetes, on steroids, undergoing cardiac surgery, or closed with sterile skin strips. For effectiveness, the surgical patients varied based on the published source studies.

Interventions
The interventions were topical skin adhesive; short-term, medium-term, and long-term absorbable sutures; non-absorbable sutures; and staples. These six methods were compared with no focus on any particular one.

Location/setting
UK/secondary care.

Methods
Analytical approach:
A decision-tree model was used to synthesise the primary patient-level cost data, for each treatment method. A narrative synthesis of the relevant published studies of effectiveness, by treatment comparison, was reported. The authors stated that they took a NHS perspective.

Effectiveness data:
The primary clinical outcome was surgical site infections, with secondary outcomes of wound dehiscence, cosmetic appearance, and patient satisfaction. A literature review of randomised controlled trials was undertaken to identify the evidence. Pooling of the results of these trials was not possible due to considerable heterogeneity between them and they were combined narratively.

Monetary benefit and utility valuations:
None.

Measure of benefit:
There was no summary measure of benefit.

Cost data:
The direct medical costs for the wound closure methods included equipment, staff, and pharmaceuticals. The time from surgical closure to skin closure and no further health care intervention was recorded for each patient. A questionnaire was developed and 4,964 questionnaires were analysed. These were completed by theatre nurses, ward nurses, out-patient nurses, practice nurses, and community nurses. Sample size calculations were performed. The unit costs were
from various sources including the Unit Costs of Health and Social Care for staff costs, NHS logistics for hospital equipment, and drug tariffs for primary care. All costs were reported in UK pounds sterling (£) for the price year 2006.

Analysis of uncertainty:
A one-way sensitivity analysis was undertaken assuming a 2.5% increase in staff salaries and equipment. The results were presented narratively.

Results
The average cost per closure was £24.61 for non-absorbable, £6.42 for short-term absorbable, £15.84 for medium-term absorbable, and £1.35 for long-term absorbable sutures, £6.76 for staples, and £1.63 for topical skin adhesive. Topical skin adhesive was less costly than staples and non-absorbable sutures due to the staff time required to remove them.

The infection rates, dehiscence rates, cosmetic appearance, and patient satisfaction were generally similar for topical skin adhesive and sutures.

Results from the one-way sensitivity analysis showed that higher salaries changed the average cost per patient across all strategies negligibly from £56.61 to £57.70.

Authors' conclusions
The author concluded that topical skin adhesives and short-term absorbable sutures were as effective and safe as non-absorbable sutures or staples, in routine surgery. Increasing their use could produce considerable cost savings for the NHS.

CRD commentary
Interventions:
The six methods were briefly described without highlighting the main differences or advantages of each suture type. These options might be available and readily interchangeable in other settings.

Effectiveness/benefits:
Some features of a systematic review were reported, such as the databases searched and some restrictions. The results of the trials were not quantified, but were described in general terms. The details of their quality, methods, and internal validity of the data were not reported. The author did not explicitly state the main measure of benefit, but this appears to have been surgical site infections. Failure of wound closure and adverse reactions to topical methods were not discussed.

Costs:
The perspective was stated and the key direct resources for wound closure appear to have been included. The resource use quantities were based on patient-level data and valued using publicly available UK sources. The time horizon for the costs was not explicitly stated, but appears to have been the wound healing period. Discounting was not performed, which was appropriate for a short-term scenario.

Analysis and results:
The effectiveness and cost data were not combined into cost-effectiveness ratios and a cost-consequences analysis was performed. The 95% confidence intervals or standard deviations for the patient-level data were not presented, making it difficult to see if the differences across strategies were significant. The author acknowledged that this study lacked patient-level effectiveness data, and its generalisability to the wider NHS could be limited by the restrictions imposed on surgery type. The results of the one-way sensitivity analyses were not fully reported.

Concluding remarks:
There were several limitations to the analyses and an absence of clear reporting of the methods and results. The author's conclusions should be considered with caution.

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