Clips versus suture technique: is there a difference?
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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
The use of two health technologies for the closure of sternal and leg wounds were considered: subcuticular suture technique (suture closure) and skin stapling technique (clip closure).

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised patients undergoing CABG.

Setting
The setting was hospital. The study was carried out at the Montreal General Hospital, Montreal, Canada.

Dates to which data relate
The effectiveness and resource data were collected between January 1996 and December 1998. The price year was not reported.

Source of effectiveness data
The effectiveness data were derived from a single study.

Link between effectiveness and cost data
The costing was undertaken prospectively on the same patient group as that used in the effectiveness analysis.

Study sample
Power calculations were not performed. Patients who had undergone isolated elective or emergency CABG at the Montreal General Hospital from January 1996 to December 1998 were included in the sample. Overall, 162 patients participated in the study; these were equally divided into two groups. The average age of the participants was 64(+-10.2) years in the suture closure group and 65.8(+-9.1) years in the clip closure group.

Study design
The study was a prospective randomised clinical trial carried out in a single centre, namely the Montreal General Hospital in Quebec. Follow-up data were collected on all the included patients at the first post-operative visit, usually 3
to 6 weeks after discharge. Patients were pre-operatively, prospectively randomised to have their sternal and leg incisions closed with either a suture or clip closure. The same surgeon performed all assessments in a non-blinded fashion.

Analysis of effectiveness
All patients included in the study were accounted for in the analysis. The primary health outcomes were assessed, both in terms of the number of wounds occurring during the hospitalisation and the follow-up, and the degree of cosmesis (acceptable scar), scored on the basis of a 4-grade scale. A wound was considered as the presence or absence of leakage, inflammation, infection, necrosis and swelling. The two groups were compared by a statistical analysis: overall, both had similar demographics and no relevant difference in pre-operative cardiac status and function, although there were significantly greater numbers of women and diabetic patients in the clip closure group.

Effectiveness results
During the hospitalisation period, no statistically-significant difference was found between the two groups, although regarding sternal wound, a stronger trend toward inflammation was noted in the "clips group". In the follow-up period, there was a significantly greater rate of infection of the sternal wound when closed with clips than with suture closure (6 versus 1). The two groups were similar with respect to the cosmetic outcome.

Clinical conclusions
The study showed a higher rate of in-hospital inflammation of sternal and leg wound when using clip closure. Thus, suture closure technique was considered more effective than clip closure.

Measure of benefits used in the economic analysis
The health outcomes were not aggregated in a single benefit measure, and therefore a cost-consequences analysis was performed.

Direct costs
The costs were not discounted since they were incurred in a short period of time, at most 6 months. Only the costs of the closure were included and the boundary adopted was that of the hospital. The estimation of resources and quantities was derived from data based on the hospital charts. The resource data were collected between 1996 and 1998. The price year was not reported.

Statistical analysis of costs
No statistical analysis was carried out.

Indirect Costs
Indirect costs were not included.

Currency
Canadian dollars (Can$).

Sensitivity analysis
No sensitivity analysis was carried out.

Estimated benefits used in the economic analysis
See effectiveness results reported previously.

Cost results
The average costs of wound closure per patient operated on were Can$4.5 and Can$15 when using the suture and clip closures, respectively. Given that approximately 1,000 operations are performed annually at the authors' institution, the adoption of suture closure rather than clip closure represents an annual saving of approximately Can$10,500.

Synthesis of costs and benefits
Not applicable.

Authors' conclusions
The authors concluded that suture closure seems to be a better and cheaper method of wound closure than skin clips for patients undergoing CABG.

CRD COMMENTARY - Selection of comparators
The rationale for the comparison between the two interventions was clear: they are commonly used in the wound closure for patients undergoing CABG.

Validity of estimate of measure of effectiveness
The randomisation process used to allocate the patients into the two treatment groups should have ensured the internal validity of the study. However, the groups were shown not be comparable with respect to specific characteristics such as gender and diabetes. Even though the authors attributed this to an "unfortunate outcome of our randomisation process", this could have biased the results.

Validity of estimate of measure of benefit
Not applicable.

Validity of estimate of costs
Only the direct costs of the closure technique were included in the study, and these were likely to be specific to the Canadian setting. Higher costs are likely given that hospitalisation may be lengthened by complications such as infections. These costs should also have been included in the analysis.

Other issues
The authors did not address the issue of the generalisability of the results to other settings, although they did compare their results with other studies. Sensitivity analyses were not performed. Given that both the interventions have effects on patients' comfort and disability, it might have been more appropriate to adopt a utility measure related to patients' values in order to measure the effectiveness of the technologies.

Implications of the study
The main implication of the study is that suture closure is the preferred technology, even though clip closure has the advantage of greater speed of performance. Suture closure is preferred, mainly because of its lower cost and the reduced incidence of complications.

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