Closure of partial-thickness facial burns with a bioactive skin substitute in the major burn population decreases the cost of care and improves outcome

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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 a bioactive skin substitute (BSS) for the closure of partial-thickness facial burns in major burn patients.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised major burn patients with partial-thickness burns at least mid-dermal in depth.

Setting
The setting was secondary care. The study was performed in Boston (MA), USA.

Dates to which data relate
The dates to which the effectiveness and cost data related were not reported. The price year was also not given.

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

Link between effectiveness and cost data
The costing appears to have been performed on the same sample population as that used in the effectiveness analysis. It was not stated whether the data were collected prospectively or retrospectively.

Study sample
No power calculations, to assure a certain power, appear to have been performed in the planning phase of the study. A total of 34 major burn patients with partial-thickness facial burns were randomised to one of the treatment groups. There were 18 patients in the CP group and 16 patients in the BSS group. The authors did not report any evidence that the study sample was representative of the study population.

Study design
This was a randomised controlled study that was carried out in a single centre. The randomisation method used to allocate the patients was not reported. The patients appear to have been followed up until their wounds healed. The
authors did not report any loss to follow up. The outcome assessment does not appear to have been blinded.

**Analysis of effectiveness**
The clinical analysis appears to have been conducted on an intention to treat basis. The primary health outcomes used were:

- patient pain during facial care;
- patient pain between facial care;
- the healing time (i.e. time to achieve 95% re-epithelialisation);
- the time to extubation (for those patients requiring initial intubation); and
- the number of patients experiencing wound infection.

Patient pain was assessing on a 10-point scale, ranging from 0 (no pain) to 10 (worst pain). The patient groups were shown to be comparable in terms of their age, percentage of total body surface burn, percentage of full thickness, number of patients requiring initial intubation, and etiology of the burns.

**Effectiveness results**
Pain with facial care proved to be significantly higher for patients treated by CP (score 7; standard deviation, SD=2) than for patients receiving the BSS treatment (score 3; SD=1).

Pain between facial care was not significantly different between CP and BSS patients. The scores were 4 (SD=2) for CP patients versus 2 (SD=1) for BSS patients.

The mean healing time was significantly longer for patients treated by CP (15 days; SD=4) than for patients receiving the BSS treatment (9 days; SD=4).

The mean time to extubation among patients initially requiring intubation was significantly longer for those treated by CP (7 days; SD=2) than for those treated with the BSS (4 days; SD=1).

No wound infections occurred in either group.

**Clinical conclusions**
The use of the BSS to treat partial-thickness facial burns in the presence of major burns improved patient comfort and healing rates.

**Measure of benefits used in the economic analysis**
No summary measure of benefit was used in the economic analysis. In effect, a cost-consequences analysis was performed.

**Direct costs**
The resource quantities were reported separately from the costs for nursing times only. The direct costs considered in the economic analysis were those of the hospital. These were nursing costs, supplies (including skin substitutes, topical antibiotics and creams), and medication costs (sedatives and analgesics). It was unclear whether the costs of the intervention performed to substitute the skin were included. The authors reported that the cost data were obtained from current hospital, pharmacy and burn centre costs. Therefore, the costs appear to have been estimated from actual data. The dates to which the resource use data related were not reported. The price year was also not given. Discounting was not performed, which was probably appropriate since the follow-up period appears to have been less than 2 years.
Statistical analysis of costs
Statistical analyses of the costs were performed. Dunnett's t-tests were carried out.

Indirect Costs
No indirect costs were reported.

Currency
US dollars ($).

Sensitivity analysis
No sensitivity analyses were performed.

Estimated benefits used in the economic analysis
See the 'Effectiveness Results' section.

Cost results
The total mean costs were $3,020 (SD=350) for patients treated by CP versus $2,390 (SD=290) for patients treated with the BSS. The costs associated with adverse events that could arise from the use of narcotics were not considered at analysis.

Synthesis of costs and benefits
Not applicable due to the cost-consequences approach undertaken.

Authors' conclusions
The use of a bioactive adherent skin substitute (BSS) for the treatment of partial-thickness facial burns in the presence of a major burn was cost-effective when compared the current practice (CP).

CRD COMMENTARY - Selection of comparators
The treatment of partial-thickness facial burns with antibiotic ointments and cleansing was used as the comparator because it was the CP in the authors' setting. You should decide whether this is a widely used health technology in your own setting.

Validity of estimate of measure of effectiveness
A randomised controlled trial was performed, which was appropriate for the study question. The appropriateness of the randomisation method used to allocate the patients cannot be assessed, as the authors did not report it in the paper. However, randomisation guaranteed that the patient groups were comparable at baseline in terms of the age, percentage of total body surface burn, percentage of full thickness, number of patients requiring initial intubation, and etiology of the burns. The dates to which the effectiveness data related were not given. It was not stated how the patients were selected for the effectiveness analysis. This may increase the likelihood of selection bias in the study, thus limiting the internal validity of the effectiveness analysis. There was no evidence that the study sample was representative of the study population, which may limit the external validity of the study findings.

Validity of estimate of measure of benefit
No summary measure of benefit was used in the economic analysis. In effect, a cost-consequences analysis was
Validity of estimate of costs
The perspective adopted for the economic analysis (i.e. the hospital) was rather limited. In addition, it did not consider relevant costs such as lost productivity that occurs among the patients considered at analysis (it should be borne in mind that most of the analysed injuries occurred in the workplace, as the authors acknowledged). A broader perspective (i.e. societal) would, therefore, have been more appropriate. Moreover, some relevant costs associated with the perspective considered may not have been included. For example, the costs of the intervention performed to substitute the skin, or the costs of adverse events associated with the use of analgesics. Therefore, the cost-effectiveness results may have been biased. The costs and the quantities were not reported separately, which hinders reflection exercises in other settings. The generalisability of the cost results to other settings may be limited since the dates relating to the cost data and the price year were not reported.

Other issues
No appropriate comparisons of the study findings with those from other studies were reported. The generalisability of the study findings to other settings cannot be objectively assessed, as the authors did not provide evidence that the study sample was representative of the study population and the reporting of the costs was lacking.

Implications of the study
The authors commented that the use of the BSS has potential disadvantages since it is necessary to perform the skin substitution in the early post-burn period, otherwise the wound may not close adequately.

Source of funding
None stated.

Bibliographic details

Other publications of related interest


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Subject indexing assigned by CRD

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