Cost-effectiveness of negative pressure wound therapy for postsurgical patients in long-term acute care

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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.

CRD summary
This study evaluated the cost-effectiveness of negative-pressure wound therapy, using reticulated open-cell foam, delivered by a vacuum-assisted closure (VAC), following surgery. The authors concluded that the average cost per cubic centimetre of wound volume reduction indicated that VAC was cost-effective, but further study was needed. The study was generally well reported, but the extreme differences between the two groups of patients at the start of the study make the results highly uncertain.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
This study evaluated the cost-effectiveness of negative-pressure wound therapy, using reticulated open-cell foam, delivered by vacuum-assisted closure (VAC), following surgery.

Interventions
The VAC intervention was compared with standard care, which was topical advanced moist wound care, without VAC. VAC therapy was applied as a bridge to wound closure or until granulation coverage of the underlying anatomical structures. Once this was achieved, wound care converted to standard care. Standard care included the application of alginates, hydrofibres, hydrocolloids, collagen, growth factors, hyaluronic acid, and silver dressing.

Location/setting
USA/in-patient care.

Methods
Analytical approach:
A retrospective review was undertaken of the charts of patients who had undergone surgery, were 18 years old or older, and had a single wound treated with or without VAC. The analysis included data until the patient was discharged from hospital, with a mean of 39.5 days for VAC, and 33.9 days for standard care. The perspective was not explicitly stated.

Effectiveness data:
The data were from the records of 36 patients treated with VAC, and 15 patients treated with standard care. The age, gender, wound area, wound volume, and wound healing measured by the Bates-Jensen Wound Assessment Tool (BWAT), at the start of the study, were compared between the two groups using statistical methods. Statistically significant differences were found for all three wound characteristics. The primary effectiveness outcomes were the daily average wound area reduction (cm²), and the daily average wound volume reduction (cm³).

Monetary benefit and utility valuations:
Not relevant.

Measure of benefit:
The primary measures of benefit were the average reduction in wound area and volume, compared with those at the start of the study.
**Cost data:**
All costs were from the hospital. The cost categories included labour, hospital bed costs, VAC, and materials. The costs were reported in US $.

**Analysis of uncertainty:**
Variability in the data was assessed and presented using various statistics.

**Results**
The mean reduction in wound area from the start of the study was 49.85cm² for VAC and 5.23cm² for standard care. The mean reduction in wound volume from baseline was 227.40cm³ for VAC and 14.91cm³ for standard care.

The average total costs for VAC were $2,704.95, while those for standard care were $461.01.

The mean area reduction to cost ratio was $54.26 per cm² for VAC, and $88.15 per cm² for standard care. The mean volume reduction to cost ratio was $11.90 per cm³ for VAC, and $30.92 per cm³ for standard care.

**Authors’ conclusions**
The authors concluded that the average cost per cubic centimetre of wound volume reduction indicated that VAC was cost-effective, but further study was needed.

**CRD commentary**
**Interventions:**
The interventions were sufficiently described and appear to have been appropriate. Advanced moist wound care included a wide variety of treatments, which increases the likelihood that it was representative of usual practice.

**Effectiveness/benefits:**
The groups that were compared were too dissimilar at the start for reliable comparisons. For example, the wound area was 93.1cm² for VAC, but 9.3cm² for standard care. The authors acknowledged these wide variations, but it was not clear that they appropriately accounted for them. They also acknowledged that the retrospective chart review had a risk of bias, and the study was very small. The outcomes were clinically meaningful, but health-related quality-of-life was a relevant outcome for these patients and decision-makers, and it was not considered.

**Costs:**
The costs were given as total categories, rather than individual items, making it difficult to transfer them to other settings. The reporting about the costs was limited; no perspective and no price year were given. As all the costs were from the hospital, it seems that a hospital perspective was taken. The costs were reported without variance statistics; the minimum and maximum values were given. No sensitivity analysis of the costs was undertaken.

**Analysis and results:**
The results were clearly reported, but it was difficult to assess their validity due the large variation between groups at the start. The authors acknowledged some limitations to their study: it did not account for the impact of co-morbidities in patient healing; the patient groups differed in their wounds, and the treatments used; and patients in the VAC group tended to be younger, which affects wound closure. The authors indicated that the hospital had been progressively replacing the usual wound care treatments with VAC, so institutional bias may have been introduced.

**Concluding remarks:**
The study was generally well reported, but the extreme differences between the two groups of patients at the start of the study make the results highly uncertain.

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