Why insurers should reimburse for compression stockings in patients with chronic venous stasis


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 provision of compression stockings and patient education for individuals who had had venous ulcers. The format and content of patient education was not reported.

Type of intervention
Secondary prevention.

Economic study type
Cost-utility analysis.

Study population
The study population comprised a hypothetical cohort of 55-year-old patients with a history of venous stasis ulceration.

Setting
The setting was primary and secondary care. The model related to patients in the USA.

Dates to which data relate
Data from studies published between 1988 and 1999 were used to model the effectiveness of the intervention. The resource use and costs data were taken from papers published between 1995 and 1999. The price year was 1999.

Source of effectiveness data
The effectiveness data were derived from a non-systematic review of published studies.

Modelling
A Markov state transition model was used to estimate the benefits and costs of providing compression stockings and patient education. The cycle length was 3 months and the model was run for the lifetime of all the patients. The health states considered in the model were no active ulceration, recurrent ulceration with or without hospitalisation for cellulitis or amputation, and death.

Outcomes assessed in the review
The model contained the following input parameters:

the mean age at initial ulceration;
the mean time to ulcer recurrence with compliance;
the mean time to ulcer recurrence without compliance;
compliance in patients with compression stockings and education;
compliance in patients without compression stockings and education;
the mean time for ulcer healing;
the incidence rate of hospitalisation (per recurrence);
the risk of amputation (per recurrence);
the annual excess mortality rate after amputation; and
the disutility of hospitalisation.

The quality adjustment factors for chronic venous insufficiency without ulceration, patients undergoing ulcer treatment and amputation were also derived from the literature.

**Study designs and other criteria for inclusion in the review**
This review was a non-systematic review of the literature. The designs of the primary studies were not reported.

**Sources searched to identify primary studies**
Not reported.

**Criteria used to ensure the validity of primary studies**
Not reported.

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

**Number of primary studies included**
The model input parameters and the utility weights were derived from 11 studies.

**Methods of combining primary studies**
Not reported.

**Investigation of differences between primary studies**
There was no discussion of any differences between the primary studies.

**Results of the review**
The mean age at initial ulceration was 55 years (range: 30 - 90).

The mean time to ulcer recurrence with compliance was 53 months (range: 53.0 - 18.7).

The mean time to ulcer recurrence without compliance was 18.7 months.
The compliance rate in patients with compression stockings and education was 100% (range: 0 - 100).

The compliance rate in patients without compression stockings and education was 0.

The mean time for ulcer healing was 4.6 months.

The incidence rate of hospitalisation (per recurrence) was 12% (range: 0 - 24).

The risk of amputation (per recurrence) was 0.4% (range: 0 - 0.4).

The annual excess mortality rate after amputation was 12% (alternative value: 0).

Patients undergoing ulcer treatment were allocated a quality adjustment factor of 0.80, while those who had undergone amputation were given a quality adjustment factor of 0.70. These compare to a quality adjustment factor of 0.96 for patients with a chronic venous insufficiency, but no ulceration.

Five days were deducted from life expectancy to account for the disutility of hospitalisation.

**Measure of benefits used in the economic analysis**
The outcome measure used in the economic analysis was the change in quality-adjusted life-years (QALYs). The improvement in quality of life associated with a reduced incidence of ulceration was taken from published studies (see Other Publications of Related Interest), as reported earlier. There were no details of how the different health states were evaluated, or by whom. The QALYs were discounted at an annual rate of 3%.

**Direct costs**
The categories of costs considered in the analysis were prophylaxis (study intervention) and treatment of the ulcer. The authors estimated resource use data for the time that a patient has an ulcer, and applied this to the length and frequency of ulceration identified by the model used to derive the effectiveness data.

The costs relating to the intervention in the study were the provision of compression stockings, the initial nurse education session and an additional evaluation at the time of ulcer recurrence. These costs were taken from the accounting system at the New York Presbyterian Hospital, New York, USA. The cost of an annual physician assessment was taken from Medicare reimbursement rates. Physician fees for an initial visit were taken from Medicare reimbursement rates. The cost of providing and changing (on a weekly basis) an Unna's paste boot was derived from the accounting system at the New York Presbyterian Hospital. The costs relating to hospitalisation for complications, amputation and subsequent nursing home costs were taken from published studies.

The unit costs for each item were reported. The price year was 1999. The costs were discounted at the rate of 3% per annum.

**Statistical analysis of costs**
The cost data were treated deterministically.

**Indirect Costs**
The model included the cost due to time lost from work, but only in the sensitivity analysis. This was taken from a published study. The paper reported the cost per month, which was discounted at a rate of 3% per annum. No dates were provided for the resource use or cost data. The price year is likely to have been 1999.

**Currency**
US dollars ($).
Sensitivity analysis
A sensitivity analysis was undertaken to investigate the robustness of the results. The parameters varied were the recurrence rates, patient compliance, treatment costs, the cost of providing compression stockings and patient education, amputation rate, costs relating to days lost from work, quality of life adjustments for each health state, and the patients' age. The analysis appears to have been one-way. No rationale for the choice of parameters used in the sensitivity analysis was reported. The ranges were derived from the literature.

Estimated benefits used in the economic analysis
The estimated discounted QALYs were 15.05 in the intervention group and 14.68 QALYs in the comparator group. This indicates that the incremental benefit of the provision of compression stockings and patient education was 0.37 QALYs over the lifetime of the patient.

Cost results
The total lifetime costs for patients who received compression stockings and patient education was $14,588, compared with $20,492 for those patients who did not receive such treatment.

The incremental saving of the intervention was $5,904 over the lifetime of the patient.

Synthesis of costs and benefits
The estimated benefits and costs were not combined in the main analysis presented in this paper. This was due to the fact that the study intervention was cost-saving, being more effective and less costly than the comparator. The results of the sensitivity analysis showed that only under unrealistic assumptions (such as compliance rate below 52%, treatment cost of venous stasis ulceration reduced by 98%, costs of prophylaxis increased to 210%) would the intervention of compression stocking and patient education no longer be cost-saving. The inclusion of indirect costs under a societal perspective suggested that the intervention led to more substantial cost-savings ($17,080 during patient lifetime).

Authors' conclusions
The provision of compression stockings and patient education was cost-saving for patients who had had venous ulcers.

CRD COMMENTARY - Selection of comparators
The comparator used in this study was chosen as it reflected current practice. It was also a 'do-nothing' approach, thus resulting in an absolute assessment of the provision of compression stockings and patient education. You should consider how this relates to current practice in your own setting when interpreting the results of this study.

Validity of estimate of measure of effectiveness
The lack of detail on how the primary studies were selected, assessed and combined introduces ambiguity into the model parameters, and hence the clinical effectiveness evidence. Overall, the methodology and conduct of the review were not reported satisfactorily. A systematic review would have provided a more robust assessment of the clinical effectiveness of the intervention.

The model used to assess the effectiveness of compression stockings alongside patient education estimated 100% compliance amongst those who receive that intervention. It is questionable as to whether this is a realistic estimate. However, this was tested in the sensitivity analyses (see Validity of Estimate of Costs).

Validity of estimate of measure of benefit
The study used published studies to derive the health benefit in terms of the quality-adjusted life expectancy resulting from the intervention. It is not possible to comment on the quality of these assessments since no details of the methods
used in these studies were reported. However, the use of QALYs simplifies comparisons with the benefits of other health care interventions. Appropriate discounting was carried out.

**Validity of estimate of costs**

A societal perspective appears to have been adopted in the study, although the indirect costs were only considered in the sensitivity analysis. The economic evaluation included all relevant health care and nursing home costs and those associated with days of work lost. However, informal and/or social care or other societal costs were not assessed. The cost data were taken from sources relating to a range of years, but the costs were adjusted to a single price year. This enhances the potential for reflation exercises at a later date.

The study reported the unit costs and the number of units required for each group of patients could be deduced from the paper. This increases the generalisability of the study. A comprehensive sensitivity analysis, which considered the robustness of the costs and clinical outcomes used in the study, was undertaken. However, variability in resource use was not included in these analyses. The costs were appropriately discounted to reflect preferences for future expenditure. The study appears to have used a combination of costs and prices in the costing analysis. The authors stressed that only true costs, rather than charges or reimbursement rates, were used.

**Other issues**

The authors compared their estimates of the costs of treating ulcers with a number of other studies. However, they did not compare their preventive intervention with other options to prevent ulcers. The issue of generalisability to other settings was not directly addressed, although the authors’ discussion implied that they felt that their results could be generalised across the USA. The conclusions drawn from the study were applied to the whole patient population with venous ulcers, but the study focused on patients who were middle-aged or older. The appropriateness of this evidence for younger patients and children needs to be considered. Extensive sensitivity analyses were performed, which ensure the high external validity of the analysis.

**Implications of the study**

The authors concluded that the provision of compression stockings and patient education is cost-saving, and argued that insurers should reimburse the costs associated with the provision of compression stockings and patient education. In particular, the authors stressed that due to the substantial cost-savings obtained, even very expensive compression modes could be included in a reimbursement programme.

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None stated.

**Bibliographic details**


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**Other publications of related interest**


Krasner D. Painful venous ulcers: themes and stories about their impact on quality of life. Ostomy/Wound

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**MeSH**
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