COST-EFFECTIVENESS OF USING ACCEL-HEAL IN THE MANAGEMENT OF CHRONIC NON-HEALING VENOUS LEG ULCERS IN THE UK

INTRODUCTION

- Electric stimulation has acquired a substantial body of evidence to support its use in wound management [1,2].
- Delivery of electric current to a chronic wound requires a device that can pass an electrical current across the wound bed. One such device is Accel-Heal which emits a specific sequence of microcurrent electrical pulses which interact with biological processes that have become static within a chronic non-healing wound.
- The aim of this study was to assess the potential cost-effectiveness of using Accel-Heal plus compression bandaging compared to compression bandaging alone in patients with chronic non-healing venous leg ulcers (VLU's), from the perspective of the UK’s National Health Service (NHS).

METHODS

Markov Model

- A 5-month Markov model was constructed depicting the management of chronic, non-healing VLU's of >6 months duration in the UK.
- The model considers the decision by a clinician to continue with a patient’s previous standard care (i.e. compression bandaging alone) or to treat with Accel-Heal plus compression bandaging.

Model Inputs

- This model was populated with clinical outcomes and healthcare resource use obtained from a clinical evaluation of a cohort of 21 patients treated with Accel-Heal.
- In the clinical evaluation, patients’ ulcers’ sizes were measured at different time points and at different frequencies. Time-series forecasting was undertaken to interpolate and extrapolate each patient’s ulcer’s size, using moving averages, to provide a continuous estimate of wound size over a period of 20 weeks from the start of Accel-Heal treatment. This forecasting predicted which Accel-Heal-treated ulcers would either heal, improve, remain unchanged or get worse and the rate of healing.
- The treatment patterns, clinical outcomes and resource use of patients in the clinical evaluation had remained unchanged in the 6 months preceding the start of Accel-Heal therapy. Hence, it was assumed that these would continue to remain unchanged in the next 5 months had they not been treated with Accel-Heal. Therefore, patients’ treatment patterns, clinical outcomes and resource use in the period preceding the start of Accel-Heal therapy and those treated with placebo were used as a proxy for treatment with compression bandaging alone.

Model Outputs

- Published utilities for VLU’s [3] were assigned to the respective states in the model and unit costs at 2008/09 prices [4-5] were assigned to the estimates of healthcare resource use in the model.
- The model was used to estimate:
  - The expected 5-monthly healthcare costs of a patient receiving either Accel-Heal plus compression bandaging or continuing with compression bandaging alone.
  - The expected effectiveness of each treatment at 5 months.
  - The expected number of quality-adjusted life years (QALYs) associated with each treatment at 5 months.
  - The cost-effectiveness of Accel-Heal plus compression bandaging compared to compression bandaging alone at 5 months (i.e. the cost per QALY gained) from the perspective of the UK’s National Health Service (NHS).
- The base-case analysis assumed that patients only received 3 units of Accel-Heal at a cost of £40 per unit.

Sensitivity Analyses

- Probabilistic and deterministic sensitivity analyses were undertaken to identify how the cost per QALY gained with Accel-Heal plus compression bandaging would change by varying different parameters in the model.

RESULTS

Clinical Outcomes

- At the start of the clinical evaluation, patients’ mean age was 69.2 years, 62% were female and the age of their wound was a mean 2.0 years. By allowing for the probability of recurrence [6], 36% of patients in the Accel-Heal group is expected to be healed by 5 months compared to 9% of those treated with compression bandaging alone (Figure 2).
- Hence, using Accel-Heal is expected to lead to a 6% increase in health gain of 0.017 QALYs (95% CI: 0.017, 0.017) at 5 months after the start of treatment.

Resource Use and Corresponding Costs

- Use of Accel-Heal plus compression bandaging instead of compression bandaging alone is expected to lead to a 27% reduction in the requirement for nurse visits (from a mean 49.0 to 35.9 visits per patient) over the first 5 months after the start of treatment (Figure 3), thereby potentially releasing 13 nurse visits per patient for alternative use within the system.

Cost-Effectiveness Analysis

- Use of Accel-Heal is expected to lead to a cost reduction of £131.0 (95% CI: £126.8, £135.5) over 5 months and a 6% improvement in health gain of 0.017 QALYs (15 months).
- Hence, Accel-Heal is expected to afford the NHS a dominant treatment since the cost per QALY gained was an estimated £769.6.

- Probabilistic sensitivity analyses demonstrated that at a cost of £40 per unit of Accel-Heal, it is likely that 98% of a cohort would be cost-effectively treated with Accel-Heal up to a threshold of £20,000 per QALY.

- Deterministic sensitivity analyses showed that the relative cost-effectiveness of Accel-Heal plus compression bandaging was very sensitive to the acquisition cost of Accel-Heal, the number of units per treatment and the number of nurse visits in both groups. The relative cost-effectiveness of Accel-Heal plus compression bandaging was relatively insensitive to changes in healing rates and recurrence rates.

Net Resource Implications and Budget Impact

- The current population in the UK is 67.8 million people. Assuming the prevalence of VLU’s is 0.2% [7], that would equate to 135,600 people with a VLU per annum. Assuming that 6% of the wounds are long-term non-healing of >6 months duration [8], that would equate to 47,000 people in the UK with a long-term non-healing VLU of >6 months duration.
- If all 47,000 patients with a hard-to-heal VLU were treated with Accel-Heal plus compression bandaging (23 units at £40 per unit) instead of compression bandaging alone, the expected net impact to the NHS would be:
  - 15% reduction in NHS costs (£6.2 million) over the first five months of treatment, from £41.3 to £35.2 million.
  - 27% reduction in the number of nurse surgery visits (0.6 million) over the first 5 months of treatment, from 2.3 to 1.7 million nurse visits.

DISCUSSION

- The clinical basis of the model was a clinical evaluation of Accel-Heal among a relatively small sized group of patients at one centre.
- Due to the nature of the clinical data set and lack of a prospective comparator, the model may not be predictive of the incremental differences in clinical outcomes and resource use that will be seen in clinical practice. As such, the model was not intended as a comparator for clinical decision-making.
- While the cost of Accel-Heal treatment is not currently covered by the NHS, the economic impact of reducing the resource requirements of Accel-Heal over 5 months has been estimated.
- The model has been published by NHS England and the authors have no other conflicts of interest that are directly relevant to the content of this paper.

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REFERENCES


FIGURES

Figure 1: Markov model depicting the management of chronic, non-healing VLU’s due to compression bandaging alone with Accel-Heal plus compression bandaging compared to compression bandaging alone. The arrows depict the possible movement of patients between the different health states.

Figure 2: Expected effectiveness at 5 months.

Figure 3: Expected number of nurse visits over 5 months.

Figure 4: Distribution of expected NHS costs.

Keywords: Accel-Heal, cost-effectiveness, critical leg wounds.