4 layer bandaging reduced healing time and saved nursing time and cost in venous leg ulcer

O'Brien JF, Grace PA, Perry IJ, *et al.* Randomized clinical trial and economic analysis of four-layer compression bandaging for venous ulcers. *Br J Surg* 2003;**90**:794–8.

Clinical impact ratings GP/FP/Primary care ★★★★★☆☆ IM/Ambulatory care ★★★★★☆☆

Q In patients with venous leg ulcers, does 4 layer bandaging reduce healing time more than usual care?

METHODS

Design: randomised controlled trial.

Allocation: concealed.*

Blinding: unblinded.*

Follow up period: 12 weeks.

Setting: health centres and a regional hospital in Ireland.

Patients: 200 patients (mean age 71 y, 66% men) who had a venous leg ulcer (clinical evidence of venous disease, ankle:brachial pressure index ≥ 0.9 , and no other identifiable cause).

Interventions: 4 layer bandaging (n=100) or usual care (n=100). Dressings were done by community nurses. All nurses were trained in application of 4 layer bandaging. The bandages were designed to provide sustained external compression of 40 mm Hg at the ankle and consisted of a sterile wound contact layer, natural padding bandage, light comfortable bandage, light compression bandage, and flexible cohesive bandage. Usual care was determined by the public health nurse or general practitioner treating the patient and could include topical or absorbency dressings, low pressure bandages, and elasticated support.

Outcomes: time to healing. Healing was defined as full epithelialisation and no scab present. Resources used and cost per patient were assessed including dressing products, nursing time (dressing application, administration, and travel), and mileage.

Patient follow up: 99%.

*See glossary.

MAIN RESULTS

Analysis was by intention to treat. At 12 weeks, leg ulcers were healed in more patients in the 4 layer bandaging group than the usual care group (54% v 34%, $p < 0.001$); the difference remained after

adjusting for age, ulcer area and duration, deep venous thrombosis, rheumatoid arthritis, and diabetes ($p = 0.015$). The rate of healing was also better in the 4 layer bandaging group ($p = 0.006$). The 4 layer bandaging group required fewer dressing treatments than the control group, which reduced the nursing time and cost per patient in total nursing time (table).

CONCLUSION

In patients with venous leg ulcers, 4 layer bandaging reduced healing time and was associated with lower costs in nursing time than usual care.

4 layer bandaging v usual care for venous leg ulcers*

Outcomes	4 layer bandaging	Usual care	Difference in means (95% CI)
Nursing time (h)	5.6	8.0	2.4 (1.6 to 3.2)
Cost per patient in nursing time (€)	99.6	144.2	44.6 (29 to 60)

*CI defined in glossary; difference and CI calculated from data in article.

Commentary

Venous ulcers are largely managed in the community, requiring nurses' visits for dressings for months or years. A systematic review found that compression is more effective than dressings alone for healing venous ulcers. No specific high compression system, however, was recommended.¹

O'Brien *et al* compared one high compression system, 4 layer bandaging, with usual care in which compression was rarely used. 4 layer bandaging can be applied using the constituent bandages or as a kit.² The study patients were similar to ulcer patients in most communities, and the trial design and analysis minimised selection and withdrawal bias.

The trial duration of 12 weeks, similar to other leg ulcer trials, is too short to measure the time to healing of different treatments, since many ulcers take months to heal. At 12 weeks, patients treated with 4 layer bandaging were more likely to heal than those treated with usual care. The usual care protocol was not described in detail. It is known that 5% of usual care group patients received high compression.

This trial essentially confirms what is known already about dressings for venous ulcers: high pressure is superior to no pressure in promoting healing.^{1, 3} This trial doesn't tell us how 4 layer bandaging compares with other high compression systems, such as Unna's boot or compression hosiery, and this question deserves further study. In the meantime, physicians and wound care specialists caring for patients with venous ulcers should use pressure dressings for the best clinical outcome.

E Andrea Nelson, PhD, RGN
University of York
York, UK

1 Fletcher A, Cullum N, Sheldon TA. A systematic review of compression treatment for venous leg ulcers. *BMJ* 1997;**315**:576–80.

2 Blair SD, Wright DD, Backhouse CM, *et al.* Sustained compression and healing of chronic venous ulcers. *BMJ* 1988;**297**:1159–61.

3 Morrell CJ, Walters SJ, Dixon S, *et al.* Cost effectiveness of community leg ulcer clinics: randomised controlled trial. *BMJ* 1998;**316**:1487–91.

For correspondence: Mr P E Burke, St. John's Hospital, Limerick, Ireland. vshellock@mwhb.ie

Source of funding: Smith & Nephew Ltd.