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Varicose veins: optimum compression following sclerotherapy

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Summary

There is uncertainty regarding the most satisfactory technique of lower limb compression following sclerotherapy for varicose veins. We have compared a standard bandaging technique with a high pressure compression stocking in a randomised trial. Efficacy was judged on the success of injections, complications of the treatment and patient satisfaction. In the stockinged legs 144 of 156 injections were successful, compared with 117 of 147 in the bandaged group ($P<0.001$) (Chi squared). The incidence of superficial thrombophlebitis was also reduced in the stocking group. In addition, the stocking technique costs less in materials than conventional bandaging. We would recommend compression stockings for evaluation in sclerotherapy of varicose veins.

Introduction

Sclerotherapy remains a standard method of treatment of varicose veins *(1–4)*. In carefully selected patients using a proper technique extremely good and lasting results can be achieved. The importance of patient selection, use of an adequate sclerosant and maintenance of limb compression until vein wall adhesion has occurred is well recognised *(5)*. There are no standardised techniques for the injection of varicose veins or applying limb compression. There is debate as to the magnitude and duration of compression required. Application of bandages following sclerotherapy has become standard practice although it is now recognised that these may rapidly lose their efficacy *(6)*. A variety of elastic stockings are available for the treatment of venous diseases of the lower limb and these have been applied to the leg following sclerotherapy *(7,8)*. Most patients receiving sclerotherapy remain ambulant so we thought it appropriate and convenient for the patient to use such stockings to provide the compression required in this treatment. We have compared the stockings with a bandaging technique using criteria of treatment success and complications.

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Patients and methods

All patients with varicose veins attending a general surgery out-patient clinic were assessed. Patients with saphenofemoral incompetence or very high thigh perforating veins were considered unsuitable for sclerotherapy and excluded from this trial. Patients with unilateral varicose veins were randomly allocated to either bandaging or stocking treatment groups. Patients with bilateral varicose veins had one leg bandaged and one stockinged.

The Struva Forte stocking used in this trial was a high compression garment which applies 35 to 40 mmHg compression at the ankle with uniform gradient along the limb and has a waist tie to keep it in position. Application was facilitated by first placing a loosely fitting nylon stocking on the limb and then applying the high compression stocking over this. This was not easy, but once in position the stocking provided good uniform compression.

The bandaging technique required three four-inch Elastocrepe bandages applied evenly from toes to groin. These were covered with a layer of four-inch Elastoplast to secure the bandages during ambulation.

The injection technique in both groups was the same. Varicosities were marked with the veins distended, then 0.5 ml aliquots of 0.5% ethanolamine were injected with the veins empty. A maximum of six injections per limb was given. A dental swab was taped over each puncture site to secure haemostasis.

Patients were given a standard advice sheet following treatment and encouraged to walk at least 3 miles per day within their exercise limits. We were aware that some patients would remove their bandages or stockings and we asked them to record the frequency and duration of such breaks in compression.

All patients were assessed after 3 weeks and 6 weeks following initial sclerotherapy. The bandages and stockings were removed by the clinic nurse before the patients were seen. The observers did not know at the time of the examination which leg was bandaged or stockinged. Each patient was assessed by two separate observers and agreement reached with no knowledge of patient group. The specific data recorded was efficacy of sclerosis, the presence of superficial thrombophlebitis, the presence of hard cores at the injection sites, patient acceptability and convenience. In view of the varying number of injection sites per limb, data

were scored on a four point scale for each limb. For example, efficacy of sclerosis was judged according to the proportion of successful injections: 100%, 99%–75%, 74%–50%, or less than 50%. Similar scales were used for the other parameters assessed. Successful injections were defined as the complete disappearance of superficial veins at the site of injection, thrombosis as the presence of a lump at the injection site.

Statistical significance was assessed using Chi squared tests.

Results

A total of 42 patients were included in the trial, 33 female and 9 male patients. The mean age of the male patients was 52.6 years (range 42–69), female patients 43.2 years (range 28–60). Three of the patients had had previous surgery and 18 previous sclerotherapy.

Bandages were applied for a mean of 16 days (range 7–21 days), with a mean of 2.5 applications per patient (range 1–6 times). Stockings were applied for a mean of 18 days (range 7–28 days) and only one stocking per treated limb was required.

There were 156 injections in the stockinged limbs and 147 in the bandaged group. In the stocking group 144 of 156 injections were successful compared with 117 of 147 in the bandaged group ($P<0.001$). Thrombosis occurred in 27 of 156 injections in the stocking leg and 54 of 147 in the bandaged leg ($P<0.01$). Skin pigmentation occurred at the injection site in 18 of 156 injections in the stocking group, and 45 of 147 injections in the bandaged leg ($P = 0.01$) (Table I).

Comparing efficacy in whole limbs, 30 of 43 stockinged legs were 100% successful, that is to say, all injection sites were successfully obliterated. In the bandaged group only 21 of 42 legs were 100% successful ($P<0.05$). The full comparison appears in Table II.

TABLE I *A comparison of outcome at the injection sites*

	Number of injection sites	
	Stocking	*Bandaged leg*
Total injections	156	147
Successful	144	117*
Thrombosis at site	27	54†
Skin marking present	18	45‡

* $P<0.001$, † $P<0.01$, ‡ $P<0.05$.

TABLE II *A comparison of the success of injections in the two treatment groups*

Proportion of successful injections per treated leg (%)	*Number of legs*	
	Stocking	*Bandage*
100	30	21*
75–99	9	9
50–74	3	12
<50	0	0

* $P<0.05$.

TABLE III *A comparison of the incidence of superficial thrombophlebitis in the two groups*

Proportion of thrombosed injection sites per treated leg (%)	*Number of legs*	
	Stocking	*Bandage*
0	24	15*
1–25	9	0
26–50	6	15
>50	3	12

* $P<0.05$.

No superficial thrombophlebitis occurred in 24 of 42 stockinged limbs compared with 15 of 42 bandaged limbs ($P<0.05$). Full results are in Table III.

No significant differences in the rate of skin staining as a consequence of sclerotherapy could be demonstrated between the two groups. The results are summarised in Table IV.

TABLE IV *A comparison of the incidence of skin staining in the two groups*

Proportion of injection sites complicated by skin staining	*Number of legs*	
	Stocking	*Bandaged leg*
0	24	21 N.S.
1–25	9	0
26–50	9	9
50	0	0

Discussion

Two important considerations emerge from this study. Firstly, the efficacy of bandaging versus compression stockings to provide adequate compression following sclerotherapy. Secondly, the relative economics of the two techniques. It has been shown that the application of compression bandages to the lower limb produces a non-uniform gradient of compression which is variable and the duration of which is limited *(6,9)*. A 60% loss of efficacy within 6 hours has been noted. Studies have shown that bandaging a leg from 1 to 3 weeks following sclerotherapy makes no difference to the efficacy of treatment *(10,11)*. As compression is almost completely lost within a few hours this result is hardly surprising. It has been shown that a stocking will provide a more continuous compression and therefore be more effective in venous disease *(7)*. The lower incidence of superficial thrombophlebitis and short segments of thrombosed vein in the stocking group would support this view. Patient tolerance and acceptability was greater in the stocking group than in the bandage group. Patients appreciated that they could remove the stocking, wash it and reapply it without the need of a nurse or a visit to their own general practitioner.

The net cost of treatment using a compression stocking was £5.65 per treated limb (based on the use of 1 stocking) compared with £8.20 minimum for the bandaging technique (using 1 application of 3 bandages for each leg). In some patients fresh bandages had been applied by their general practitioner before they returned to the clinic almost doubling the cost of treatment in this group.

We would conclude that not only do stockings provide an effective and better means of compression than conventional bandages, but they are more readily accepted by the patient and can markedly reduce the cost per patient of treatment of varicose veins by sclerotherapy.

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Notes on books

A Manual of Accident and Emergency Resuscitation edited by Colin Robertson and Keith Little. 181 pages, illustrated. Paperback. John Wiley, Chichester. £3.95.

This offers students and doctors an excellent vade-mecum. It starts with an account of cardiopulmonary resuscitation. The next section deals with specific head, spinal, chest, abdominal injuries and burns. Miscellaneous conditions are then discussed followed by methods required in resuscitation.

A Manual of Oral Medicine by F F Nally and D J Eggleston. 75 pages. Paperback. Manchester University Press. £4.95.

This is a revised edition of the book first published in 1973. It discusses in simple terms all aspects of oral medicine for the medical student, the qualified doctor, dentist and for those working in the fields allied to oral medicine.

A Colour Atlas of Boari-flap Procedure by J G Gow. 63 pages, illustrated. Wolfe Medical, London. £12.00.

The book begins with a brief review of the operation, the investigations and preparation of the patient, the technique and the results. Colour illustrations clearly demonstrate the technique.

A Colour Atlas of Operations on the Internal Carotid Artery by H H G Eastcott; 63 pages, illustrated; Wolfe Medical, London. £12.

Mr Eastcott has provided, with radiographs and coloured photographs, a review of the carotid regions. He displays carotid endarterectomy, carotid body tumours, aneurysms and other lesions of the internal carotid artery.

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