Multicenter randomized trial comparing compression with elastic stocking versus bandage after surgery for varicose veins

Fabrizio Mariani, MD,[a] Enrico Maria Marone, MD,[b] Vincenzo Gasbarro, MD,[c] Matteo Bucalossi, MD,[a] Sara Spelta, MD,[b] Felix Amsler, MS,[d] Michele Agnati, MD,[c] and **Roberto Chiesa, MD,[b]** *Siena, Milano, and Ferrara, Italy; and Biel-Benken, Switzerland*

Objectives: **Postoperative limb compression is widely used after venous surgery to prevent thromboembolism and to reduce hemorrhage, edema, hematoma, and pain. Only limited studies have been published regarding the most adequate postoperative compression therapy after varicose vein surgery. This study evaluated the effectiveness of a new stocking kit used for postoperative limb compression.**

Methods: **The study compared the clinical practicability, ease to use, effectiveness, and safety of a postoperative stocking system (23 to 32 mmHg at the ankle) with compression bandages (control group). This prospective, randomized, open-label clinical trial, was performed in three Italian centers specializing in venous surgery. Sixty consecutive patients (classification CEAP $C_{2,S}$) underwent unilateral varicose vein surgery at one of the three centers. After surgery, patients were randomized for postoperative compression therapy with a new stocking system (Sigvaris Postoperative Kit; Ganzoni Sigvaris Corp, Winterthur, Switzerland) or standard stretch bandages (30 patients per group). Primary end points were incidence of venous thromboembolism, hemorrhage, limb hematoma, or edema.**

Results: **No episodes of venous thromboembolism were observed. The mean area of thigh hematoma on postoperative days 7 and 14 was 75.70 cm^2 and 2.93 cm^2, respectively, for the stocking group, and 92.97 cm^2 and 5.42 cm^2 for the bandage group (not significant). On postoperative day 7, edema was found in 50% of the patients wearing bandages and in 20% of the patients wearing the stocking kit, which was a significant reduction. No statistical difference was recorded for postoperative pain; however, better patient acceptance and quality of life after the operation were recorded in the stocking group.**

Conclusion: **Patients can be effectively treated with the Sigvaris Postoperative Kit. Patients treated with stockings have less edema compared with standard bandaging, and the application of the stocking kit improves patient quality of life and compliance with postoperative compression therapy. (J Vasc Surg 2011;53:115-22.)**

Postoperative limb compression is widely used after venous surgery to prevent venous thromboembolism and to reduce hemorrhage, edema, hematoma, and pain.[1,2] Despite this, only few randomized controlled trials (RCTs) are available concerning this practice.[3,4] Although a multitude of bandages and medical compression stockings (MCS) are currently used and described in case series, in the literature, we could find limited work on the optimum compression therapy that should be used after varicose vein surgery or that even compares advantages or drawbacks using these different products after surgery.[4] There is no evidence that one type of compression is better than another; the type of compression applied depends on personal preference and economic consideration.[5]

Most surgeons prescribe some form of compression bandaging or stockings, or both, for a variable duration after the procedure based on individual practice or prejudice rather than objective evidence. No significant difference between 1, 2, or 6 weeks of compression has been found for controlling postoperative complications, and so a minimum period of 1 week is advised.[6,7] Compression with a class II MCS (23 to 32 mm Hg), worn for 12 months after the surgical procedure, has been shown to be effective in reducing the incidence of recurrent varicose veins.[8]

The rationale for elastic compression use varies depending on whether the varicose disease is treated with more traditional surgical stripping or with endovascular or other techniques. In the first two types of treatment, use of concentric compression, with a bandage or MCS, is very widespread, at least for the first 24 to 48 hours. Frequently, eccentric compression is used to compress the strip track of the great saphenous vein (GSV) along the thigh.[9] The most widely used therapeutic approach, at least in Italy, appears to be short-to-medium stretch compression bandaging during the immediate postoperative period to obtain the most effective pressure possible to control hemorrhage and bruising, followed by wearing MCS for a period that varies

From the Department of General Surgery, University of Siena, Siena;[a] the Department of Vascular Surgery, Scientific Institute H. San Raffaele, "Vita-Salute" University, Milano;[b] the Department of Vascular Surgery, University of Ferrara, Ferrara;[c] and Amsler Consulting, Biel-Benken.[d]

The study has been funded by Sigvaris Switzerland by a reimbursement of the costs for the organization of the trial and the allocation of the stockings.

Competition of interest: none.

Correspondence: Prof Fabrizio Mariani, The Compression Therapy Study Group - CTG, Loc. Belvedere, ingr. 2, 53034 Colle di Val d'Elsa, Siena, Italy (e-mail: brtma@tin.it).

The editors and reviewers of this article have no relevant financial relationships to disclose per the JVS policy that requires reviewers to decline review of any manuscript for which they may have a competition of interest.

0741-5214/$36.00

doi:10.1016/j.jvs.2010.08.033

Table I. Descriptives and comparison of patient characteristics and drug administration between treatment groups

	Total (N = 60)		*Stocking (n = 30)*		*Bandage (n = 30)*		*Difference*	
Variable	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	t-*test*	P
Patient age, years	51.9	11.9	49.7	11.2	54.1	12.3	1.45	.154
	No.	*%*	*No.*	*%*	*No.*	*%*	χ^2	*P*
Sex								
Male	25	41.7	11	36.7	14	46.7	0.62	.432
Female	35	58.3	19	63.3	16	53.3		
Occupation								
Sitting	26	43.3	16	53.3	10	33.3	3.63	.162
Standing	18	30.0	9	30.0	9	30.0		
Pensioner	16	26.7	5	16.7	11	36.7		
Leg								
Right	37	61.7	18	60.0	19	63.3	0.07	.791
Left	23	38.3	12	40.0	11	36.7		
Analgesics								
No	35	58.3	17	56.7	18	60.0	0.07	.793
Yes	25	41.7	13	43.3	12	40.0		
LMWH								
None	40	66.7	20	66.7	20	66.7	0.27	.875
0.4 mL/days	15	25.0	7	23.3	8	26.7		
0.6 mL/days	5	8.3	3	10.0	2	6.7		

LMWH, Low-molecular-weight heparin; SD, standard deviation.

greatly from surgeon to surgeon. It is important to bear in mind that patients' compliance to compression therapy is often very poor once they have fully recovered from the procedure.[1,2]

Compression therapy after venous surgery has been shown to be indispensable, from the data cited above and should be routine in all centers.[1,2,10,11] Conceptually, compression stockings have inherent advantages when compared with bandages, but MCS can be difficult to don if they exert an ankle pressure of ≥30 mmHg. A stocking-based system was designed (Sigvaris Postoperative Kit; Ganzoni Sigvaris Corp, Winterthur, Switzerland) with the intent of implementing the advantages while minimizing the potential problems of stocking use. We report a multicenter randomized trial comparing the use of this stocking kit after varicose vein surgery with the patient-tailored bandages in use at the study centers.

METHODS

Study design. The study was a prospective, randomized open-label clinical trial performed in three Italian centers specializing in venous surgery. The purpose of the study was to compare the clinical practicability, ease of use, effectiveness, and safety of a new Sigvaris Postoperative Stocking Kit with a control that consisted of postoperative compression therapy currently in use at the participating centers. The study included 60 consecutive patients classified as C according to the CEAP classification[12] who underwent unilateral varicose vein surgery at one of the three study sites. Ethical committee approval was not required for this study. Patients gave informed consent and agreed to allow their medical and demographic data to be evaluated and published anonymously for scientific purposes.

Surgery was performed under local/regional anesthesia, and the procedure performed was standardized to flush ligation of the saphenofemoral junction, with ligation and division of the tributaries. The GSV was stripped to the level of the knee using a stripper, and multiple phlebectomies (ranging from 5 to 27) of the remaining varicosities were performed. Ligation of any incontinent perforating veins was performed, if necessary.

For 2 weeks postoperatively, 30 patients wore the Sigvaris stocking day and night, and 30 patients were treated with the short stretch bandage compression therapy commonly used at the participating centers.

The staff of each treatment center was made familiar with the use of the kit and its application. All patients were monitored for 14 days, regardless of whether the protocol was followed properly. Each center randomized and treated 20 patients. Each of the study locations began enrollment of patients on February 1, 2009, and the study ended on June 30, 2009, when the goal of 60 patients was achieved.

Patient evaluation and end point assessment. Inclusion criteria were:

- age 18 to 75 years,
- primary varicose vein surgery for saphenofemoral junction incompetence/GSV reflux,
- no contraindication to day case surgery,
- no previous effective compression treatment,
- ability and willingness to follow the protocol, and
- CEAP $C_{2,S}$.

Exclusion criteria were:

- age <18 or >75 years,
- patients with active ulceration,

Table II. Descriptors and comparison of objective outcome measures between treatment groups

	Total		*Stocking*		*Bandage*		*Difference*	
Postop variables	*No.*	*%*	*No.*	*%*	*No.*	*%*	χ^2	P
Complications							0.22	.640
No	55	91.7	27	90.0	28	93.3		
Yes	5	8.3	3	10.0	2	6.7		
Edema—day 7							5.93	.015
No	39	65.0	24	80.0	15	50.0		
Yes	21	35.0	6	20.0	15	50.0		
Edema—day 14							2.96	.085
No	54	90.0	29	96.7	25	83.3		
Yes	6	10.0	1	3.3	5	16.7		
	Mean	*SD*	*Mean*	*SD*	*Mean*	*SD*	t-*test*	P
Thigh hematoma								
Day 7, cm^2	84.3	62.7	75.7	48.9	93.0	73.9	1.07	.290
Day 14, cm^2	4.2	9.0	2.9	6.9	5.4	10.7	1.45	.154

SD, Standard deviation.

- previous sclerotherapy,
- refused consent,
- not suitable for day case surgery,
- effective compression therapy started before presentation,
- arterial insufficiency (all grades of Rutherford's classification[13]),
- neuropathy of diabetic or other origin,
- acute deep venous thromboembolism (DVT) or superficial venous thromboembolism (SVT),
- at high risk for DVT,
- antiplatelet therapy and oral anticoagulant therapy (high risk of bleeding),
- primary or secondary lymphedema,
- pregnancy,
- life expectancy <90 days, and
- latex intolerance.

Primary end points. Postoperative complications: DVT or SVT, hemorrhage, thigh hematoma, and/or edema.

Secondary end points. Secondary end points evaluated were

- patient acceptance of the stocking kit,
- quality of life after operation (Biswas modified questionnaire),[14]
- pain, assessed preoperatively with a visual analog scale (VAS) and postoperatively at 12 and 24 hours and at 3 and 7 days,
- patient mobility, determined by the Norton scale score,[15]
- trouble walking,
- constriction indentation lines,
- bandage or stocking sliding,
- difficulty donning the stocking,
- tolerance of the stocking or bandage, and
- patient satisfaction

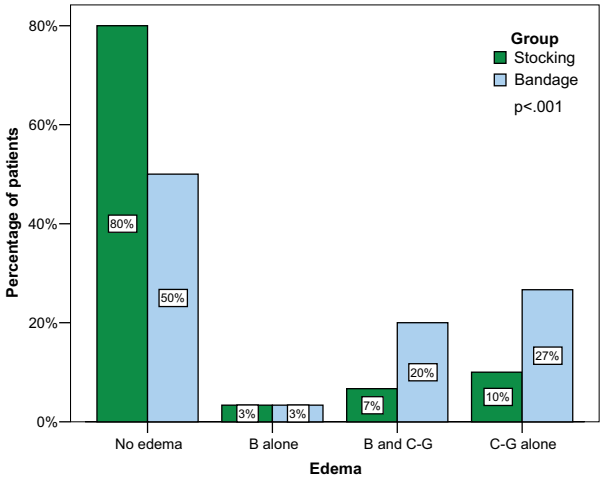

Fig 1. Patterns of edema 7 days after surgery for stocking and bandage groups.

Study treatment. The study treatment was either the standard compression bandaging provided at the participating centers (control group) or the Sigvaris Postoperative Kit. No initial bandaging was allowed before using the kit. The initial visit was the preoperative visit. The first postoperative visit was in the operating room immediately after the venous surgery when compression treatment began. The second visit was on postoperative day 7. The last was on postoperative day 14.

Digital photographs of the thighs were taken during the second and the last visits. The surface area of any hematoma seen was calculated by computer analysis of the digital photographs (MimiX software, Microlab Elettronica, Padova, Italy). The presence of edema was evaluated by circumference measurements at the B (thinnest part at the ankle), C (middle calf), F (middle thigh), and G

Table III. Comparison of hematoma for patients with and without administration of low-molecular-weight heparin *(LMWH)*

	Total		*LMWH[a] (n = 20)*		*No LMWH (n = 40)*		*Difference*	
Complication	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	χ^2	P
Thigh hematoma, cm^2								
Day 7	84.3	62.7	120.3	83.9	66.4	39.2	3.41	.001
Day 14	4.2	9.0	8.7	13.2	1.9	4.7	2.90	.005

SD, Standard deviation.
[a]0.4 to 0.6 mL/day.

(about 5 cm below the groin) points of the treated limbs. These measurements were taken at all visits. The measurements were made, with the patient standing, using a Sigvaris Measuring System (587 SMS), which is identical to the Leg-O-Meter, which consists of a tape measure fixed to a stand and attached to a small board on which the patient is in standing position.

Blinded randomization was obtained using sealed envelopes numbered from 1 to 20 for each center containing the information for stocking or bandaging group. The envelopes were opened not before the operation was completed.

Bandaging. Bandages were applied by an expert study physician. They were tailored to the patient's situation. Short stretch bandages were applied in two or more layers with spiral turns or figure-of-8 turns. Cotton rolls along the thigh were used to create eccentric compression with the bandages. Depending on the patient's anatomy, two to four (mean, 3) bandages were used. These were worn day and night by the control patients between their visits. Bandages and dressings were changed on visits at day 7 and 14 by an expert study physician. If problems with the bandages occurred, patients contacted the study center, and on an additional visit, a new bandage was applied by an expert study physician.

Sigvaris stocking kit. The kit consists of a light under-stocking, which does not exert compression and an outer stocking manufactured from double-covered natural rubber with an open toe, which is a thigh-high stocking with a waist attachment. The stocking kit was worn over the postoperative dressings and cotton roll, creating eccentric compression. Comparable with the standard conditions of the bandaging group, the stockings were worn day and night and only removed at the visits of day 7 and 14. The outer stocking exerted 23 to 32 mmHg at the ankle and approximately 20 mmHg at the level of the thigh (compression declared by Ganzoni Sigvaris).

Concomitant therapy. The choice of local therapy, including the materials used for the dressings, padding, and eccentric compression cotton rolls, was left to the treating physician. This information was documented at each visit. Dressings were changed only at the treatment centers. Apart from low-molecular-weight heparin (LMWH) as prophylaxis of DVT, the systemic use of medication was not allowed; de facto, one center routinely used LMWH (0.4 to 0.6 mL subcutaneous daily) for 7 days after surgery in all 20 patients enrolled (10 per group), whereas the other centers did not apply LMWH.

Table IV. Multivariate model to test influence of treatment group on pain of the lower limb after surgery controlled for pain before surgery and within subject improvement of pain after surgery

Variable	F	P
Pain before surgery	26.59	<.001
Treatment group (between patients)	0.08	.783
Improvement of pain (within patients)	20.14	<.001

If an oral or parenteral medication was required, the need for the particular drug, its dose, when it was started, and how long it was used were closely monitored. Analgesic therapy was only allowed during the first 6 hours postoperatively.

Statistical analysis. Data were analyzed using SPSS 13.01 software (SPSS Inc, Chicago, Ill). Data are presented as a mean ± standard deviation. Group differences of nominal variables were analyzed with χ^2 testing. The *t*-test for independent samples was used to compare normally distributed linear variables. Multivariate analysis of variance was chosen to compute the influence of the treatment group on the course of pain within the first week after surgery. Changes between the times were compared by using *t*-tests for paired samples. All tests were two-tailed, and a value of $P < .05$ was considered significant.

RESULTS

The study included a homogenous cohort of 60 patients whose CEAP classification was $C_{2,S}$, E_p, $A_{s,p}$, $P_{r.}$ No patients were excluded from the study. The characteristics of the patients in the two groups were not significantly different (Table I).

Primary end points. The postoperative compression therapy was maintained in all patients during the entire 2-week study period. Bandages had to be changed at an additional visit in six patients (2 at the second and 4 at the third postoperative day). Five patients presented with complications after surgery, three in the stocking group and two in the bandage group (Table II). A large bruise in the groin,

Table V. Post-hoc analysis for pain before and after surgery between treatment groups (between patients) and between time points (within patients)

	Total		*Stocking*		*Bandage*		*Difference*	
Variable	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	t-*test*	P
Pain VAS preop	3.10	2.56	2.80	2.71	3.40	2.42	0.91	.369
Difference	*t = 4.16; P < .001*		*t = 2.64; P = .013*		*t = 3.19; P = .003*			
Pain after 3 days	1.85	2.07	1.70	2.07	2.00	2.08	0.56	.578
Difference	*t = 3.77; P <.001*		*t = 3.67; P = .001*		*t = 2.10; P = .045*			
Pain after 7 days	1.22	1.79	1.03	1.79	1.40	1.79	0.79	.431

SD, Standard deviation*; VAS,* visual analog scale.

an infection with dehiscence of part of the groin incision, and lymphorrhea at the groin occurred in the stocking group. A hemorrhage of the GSV strip track in the thigh and a SVT of the calf were seen in the bandage group.

Postoperative edema was significantly more frequent after day 7 in the bandage group and still tended to be after day 14 (Table II). On day 7, no edema was found in 80% of the patients using the stocking kit, whereas only 50% of the patients using bandaging were free of edema. There was a higher incidence of edema at points C and G (calf and middle thigh) in the bandage group than in the stocking group (Fig 1). Constriction indentation lines and bandage sliding were the likely causes for these edema patterns. Constriction indentation lines and sliding were seen two and three times more frequently in the bandage group than in the stocking group, respectively.

Thigh hematoma, seen on postoperative days 7 and 14, did not differ between the two groups (Table II). The 20 patients who were given LMWH (0.4 to 0.6 mL subcutaneous daily for 7 days postoperatively) showed a significantly larger area of thigh hematoma on days 7 and 14 than those who were not given LMWH (Table III).

Pain in the lower limb assessed using a VAS was significantly reduced within 7 days ($P < .001$) but was not influenced by the postoperative treatment group ($P = .783$; Table IV). Post hoc analysis showed pain levels 3 days postoperatively were significantly reduced compared with preoperatively. A further significant improvement occurred between days 3 and 7 for the entire sample and for both treatment groups separately (Table V, Fig 2).

Secondary end points. Mental state, joint mobility, and activity (measured with the Norton scale) were very good for all patients in both groups. In the stocking group, 84% of patients resumed work ≤2 weeks; in the bandage group, 58% resumed work ($P = .054$; Table VI). Stockings had a significant benefit, compared with bandages, regarding trouble walking and sliding. Twice as many patients in the bandage group had problems with constriction indentation lines, but the difference was not significant. Three patients had problems donning their stockings. Overall, the patients who wore stockings mentioned significantly fewer problems than those who wore bandages (Table VI). Patient tolerance of compression therapy during the day and night was

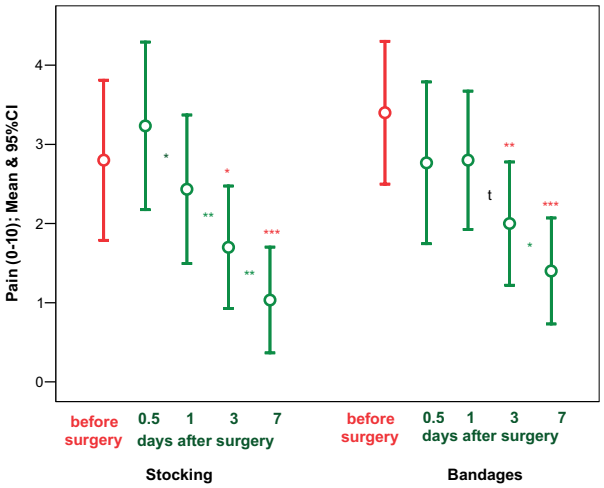

Fig 2. Pain before and at 12 hours, 1 day, 3 days, and 7 days after surgery for stocking and bandage groups is presented with the 95% confidence interval *(CI)*. Compared with pain before surgery (above error bars) and with preceding measure (between error bars). t $P < .1$ *$P < .05$; **$P < .01$; ***$P < .001$.

significantly better with stockings than with bandages. There was no difference in satisfaction with overall appearance after surgery (Table VI, Fig 3). After wearing the Sigvaris postoperative under-stocking and outer-stocking for 2 weeks, 60% of patients rated the quality of their stockings as very good and 40% as good.

DISCUSSION

At present, different types of treatment for venous insufficiency have been proposed. Endovenous laser therapy and radiofrequency ablation are alternative procedures to standard surgical stripping of GVS. These techniques appear to be safe and effective, but large RCTs comparing endovascular and surgical procedures are lacking, and many authors concord that long-term results of endovenous laser therapy and radiofrequency ablation need to be published before considering these techniques as standard treatment. One of the advantages of endovascular techniques is the reduction of the incidence of hematoma, so the application of a stocking system after these procedure is less neces-

Table VI. Comparison of subjective outcome measures between treatment groups

	Total		*Stocking*		*Bandage*		*Difference*	
Outcome	*No.*	*%*	*No.*	*%*	*No.*	*%*	χ^2	P
Resumption of work								
≤2 weeks	32	72.7	21	84.0	11	57.9	3.71	.054
>2 weeks	12	27.3	4	16.0	8	42.1		
Trouble walking								
No	42	70.0	26	86.7	16	53.3	7.94	.005
Yes	18	30.0	4	13.3	14	46.7		
Constriction indentation lines								
No	48	80.0	26	86.7	22	73.3	1.67	.197
Yes	12	20.0	4	13.3	8	26.7		
Sliding								
No	44	73.3	26	86.7	18	60.0	5.45	.020
Yes	16	26.7	4	13.3	12	40.0		
Application problems								
No	57	95.0	27	90.0	30	100.0	3.16	.076
Yes	3	5.0	3	10.0	0	0.0		
	Mean	*SD*	*Mean*	*SD*	*Mean*	*SD*	t *test*	P
Total problems, No.	1.25	1.43	0.77	1.17	1.73	1.53	2.75	.008
Tolerance of stocking/bandage	2.03	0.78	2.43	0.63	1.63	0.72	4.60	.000
Patient satisfaction	2.63	0.64	2.67	0.61	2.60	0.67	0.40	.689

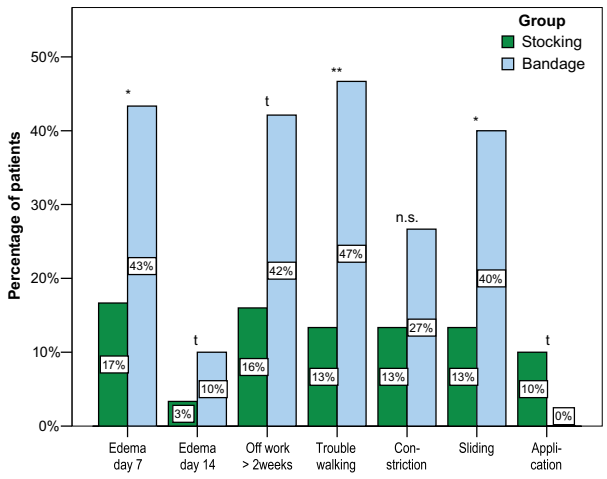

Fig 3. Edema, resumption of work, and problems with compression therapy for stocking and bandage groups. t $P < .1$ *$P < .05$; **$P < .01$; ***$P < .001$.

sary.[16-19] For these reasons and because standard surgery is worldwide the most used and accepted technique for the treatment of venous insufficiency, we decided to verify the effectiveness of stocking systems after surgical stripping of GVS.

Many surgeons would agree that postoperative limb compression is the most effective treatment to reduce complications and thigh hematoma immediately after venous surgery. The results of RCTs comparing medical compression stockings with bandages after varicose vein surgery are not uniform, but compression is recommended fairly because therapy improves outcome and benefits outweigh possible harm[4] (grade 1B or 2B, based on the scoring criteria from the international Grading of Recommendations Assessment, Development and Evaluation group[20]; Table VII).

The quality of the compression products in the reported trials was often questionable and the outcome parameters were weak. Up to now, no single trial has compared compression vs no compression after removal of refluxing varicose veins ($C_{2\text{-}6}$) by surgery or endovenous procedures. High-pressure bandages reduce bleeding after venous surgery[21] but lose pressure much faster than do MCS.[22] Patients tolerate stockings better than bandages (all grade 1B).[21,23]

Compression can be achieved with different methods, principally with banding or stocking systems. To be effective, the compression has to meet the following conditions: pressure should be at least 20 mmHg at the ankle, it has to be graduated, it must be consistent, and it should be appropriate to the underlying venous pathology (CEAP clinical class).[1-3] Many centers usually use bandages as standard postoperative limb compression; however, bandages can create different problems that reduce patient compliance with compression therapy. Different studies have evaluated MCS after a period of bandaging.[5,6] Houtermans-Auckel et al[24] concluded that wearing MCS after elastic bandaging for 3 days offered no additional benefit in postoperative care after GSV stripping. The factors assessed were control of limb edema, pain, complications, and return to work.[24]

Biswas et al[14] assessed several outcomes after traditional saphenofemoral ligation and GSV stripping surgery. These included resumption of work, duration of pain and quantity of analgesics used, postoperative complications,

Table VII. Randomized controlled trials using medical compression stockings (*MCS*) and bandages after venous surgery[a]

First author (year)	*Indication*	*Comparison*	*Outcome*	*Grade*
Travers[8]	C_2 after surgery	20-30 mmHg	Recurrence: after 1 year reduced by MCS	2B
(1994)	MCS	MCS (Medi)		
Rodrigus[6]	C_2 after surgery	Dauerbinde (Lohmann), then Tubi-grip for 1, 3, 6 weeks	Wear time: no difference on symptoms and side effects	2B
(1991)	Tubi-grip/band			
Bond[5]	C_2 after surgery	TED 10-12/30-40 vs band	Pain and costs: no difference	2B
(1999)	MCS/band	1 week		
	MCS	TED vs. Medi vs Panelast band (Lohmann)		
Raraty[7]	C_2 after surgery	Band 1 week/crepe 16 hours, then TED 6 weeks	Day 1: less pain	2B
(1999)	MCS/band	TED, Panelast band (Lohmann)	Week 1: less bleeding with Panelast band	
Travers[21]	C_2 after surgery	Crepe 1 day/ band 6 days	Panelast less bleeding (labeled RBC) than crepe band	1B
(1993)	Band/band	Panelast (Lohmann)		
Shouler[22]	C_2 after surgery	15/40 mmHg, 3 weeks	No difference: bruising, phlebitis	1B
(1989)	MCS/band	MCS (Brevet) vs band (Brevet Varex)	15 mmHg more comfort	
Coleridge-Smith[23]	C_2 after surgery	Crepe/elastocrepe band/20-30 mmHg	Pressure loss of band, not of MCS	1B
(1987)	MCS/band	(Venosan, Salzmann)		

RBC, Red blood cell; *TED,* thromboembolic deterrent stockings.
[a]Modified from Partsch et al.[4]

and patient satisfaction. All of the treated patients were bandaged for the first 3 days and subsequently wore antithromboembolic stockings (ATS) for 1 to 3 weeks. The results were not significantly different if compression lasted 1 week or 3 weeks.[14] Their choice of using ATS, which should never be prescribed for therapeutic purposes, seems debatable because ATS should only be used for prevention of VTE.

However, postoperative MCS have been felt to be less preferable than bandages for many reasons: conventional 20-30 mmHg and 30-40 mmHg thigh-high stockings exert less pressure at the thigh than bandages, they are often not tolerated at rest, they can be difficult to don over surgical wounds and dressings, and they become easily soiled with blood. Nevertheless, the Sigvaris Postoperative Kit, with 23-32 mmHg pressure at the ankle and approximately 20 mmHg pressure at the thigh, has been designed to use the advantages of MCS while minimizing any potential problem.

Concerning costs, the price of a single bandage is about $15, and the mean number of bandages used per patient was three. This total of about $45 has to be compared with $90 for the Sigvaris Postoperative Kit.

Our study demonstrated that stockings were equally as effective as bandages in preventing postoperative complications and thigh hematoma, whereas edema patterns 7 days after surgery were very different between stocking and bandage groups. No edema was found in 80% of the patients wearing the stocking kit vs 50% of the patients wearing bandages. The bandage group also had a higher prevalence of edema at points C and G (calf and middle thigh). We concluded that constriction indentation lines and bandage sliding were responsible for these edema patterns.

Pain was significantly reduced after surgery, independent from wearing stockings or bandages. Patients who wore stockings were able to return to work sooner after surgery than those who wore bandages, and trouble in walking was significantly reduced in the stocking group; moreover, patient tolerance of compression therapy was significantly better with stockings than with bandages.

CONCLUSION

Patients can effectively be treated with the Sigvaris Postoperative Kit. Patients treated with stockings have less edema compared with those treated with standard bandaging, and the application of the stocking kit improves patient compliance with postoperative compression therapy.

Unfortunately, patients with severely restricted ankle or hand movements are unable to don the second stocking and experience intolerable pain if they tried to force the issue. Patients with a severe peripheral vascular disease (ankle-brachial index <0.5) cannot wear stockings. In this case, a rigid or short stretch bandage would be indicated, if tolerated by the patient.

Larger studies are needed to confirm these data and improved quality of life and to suggest the replacement of standard postoperative bandages with high-pressure stocking systems.

Special thanks to Ted King, MD, FAAFP, FACPh, Vein Clinics of America, Oak Brook, Ill, for revising the manuscript linguistically.

AUTHOR CONTRIBUTIONS

Conception and design: FM
Analysis and interpretation: FM, FA
Data collection: FM, EM, VG, MB, SS, MA, RC

Writing the article: FM, EM, FA
Critical revision of the article: EM, VG, RC
Final approval of the article: FM, EM, VG, MB, SS, FA, MA, RC
Statistical analysis: FA
Obtained funding: FM
Overall responsibility: FM

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Submitted Jun 6, 2010; accepted Aug 13, 2010.