Compression therapy after surgical treatment of varicose veins

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Keywords
Postoperative compression therapy, varicose veins, high ligation, radiofrequency ablation

Summary
Introduction: To this day, compression therapy remains an alternative to surgical treatment of varicose veins and the gold standard in the treatment of chronic venous insufficiency. Postoperative compression therapy is, however, controversial. The aim of this article is to review the current literature concerning postoperative compression therapy following varicose vein surgery.
Methodology: A literature search was carried out in Medline, PubMed and Embase on the subject of surgical treatment of varicose veins. The postoperative compression therapy used in each of the papers found by the search was recorded.
Results: 182 studies were identified, but only 7 of these were randomised. The duration of compression therapy varied from none up to compression for 6 weeks. Elastic compression was used in all cases, generally compression stockings.
Conclusions: Postoperative compression therapy after surgical treatment of varicose veins is recommended, irrespective of the type of surgery performed. Due to limited data, there is no recommendation concerning the duration of postoperative compression or a recommended length of a compression stocking.

Schlüsselwörter
Postoperative Kompressionstherapie, Varikose, Crossektomie, Radiofrequenzablation

Zusammenfassung
Einleitung: Die Kompressionstherapie ist bis heute eine Alternative zur operativen Varizensanierung und der Goldstandard in der Therapie chronisch venöser Insuffizienz. Umstritten ist die Frage der postoperativen Kompressionstherapie. Ziel dieser Arbeit ist es einen Überblick der aktuellen Literatur bezüglich der postoperativen Kompressionstherapie zu bieten.
Methodik: Es wurde eine Literaturrecherche in Medline, pubmed und Embase mit dem Thema der operative Varizensanierung durchgeführt. Aus den Arbeiten wurde die jeweils verwendete postoperative Kompressionstherapie erfasst.
Ergebnisse: Es wurden 182 Studien erfasst, davon jedoch nur 7 randomisierte Studien Die Kompressionstherapie variiert von keiner bis zu 6 Wochen langen Kompression. Es wurde immer eine elastische Kompression verwendet, zumeist Kompressionsstrümpfe.
Schlussfolgerung: Die postoperative Kompressionstherapie nach operativer Varizensanierung wird unabhängig der verwendeten operativen Methode empfohlen. Aufgrund der eingeschränkten Datenlage gibt es keine Empfehlung zur Dauer der postoperativen Kompression oder eine empfohlene Kompressionsstrumpflänge.

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Since ancient times, compression has been the treatment of choice for venous diseases of the lower extremity (1–3). Compression therapy remains the gold standard for chronic venous insufficiency. In addition to the classic open high ligation with stripping of the great saphenous vein, superficial varicose veins can be treated with a variety of endovenous procedures: various sclerosing techniques, radiofrequency ablation, laser ablation and cyanoacrylate. The side effects of surgical treatment are reduced by compression therapy (▶Tab. 1).

As long ago as 1979, randomised studies showed that a significant reduction in pain and of the length of hospitalisation as well as improved wound healing could be achieved through postoperative compression (4). Using radiolabelled red blood cells, a significant reduction in subcutaneous haematoma formation in the test leg was shown in 10 subjects undergoing bilateral high ligation and stripping of the great saphenous vein, in whom one leg was treated postoperatively with an elastic bandage exerting 40 mmHg (test leg) and the other (control leg) was bandaged with only 10 – 20 mmHg (5).

Houtermans-Auckel measured leg volume with a photoelectric method in 104 patients before and after stripping of varicose veins and demonstrated a significant reduction in leg circumference with compression stockings (6). Leg volume measurements were undertaken preoperatively and 3 days, 2 weeks and 4 weeks postoperatively. All subjects underwent elastic compression bandaging of the leg for at least 3 days postoperatively. At the first measurement 3 days postoperatively, the control group showed a reduction in leg volume. The control group was able to resume their work significantly earlier (after an average 11 days) compared with the test group (average 15 days). No addi-

Tab. 1 Postoperative side effects that can be reduced by compression

Surgical treatment of varicose veins (open or endovenous)	
Postoperative side effects reduced by compression	• Haematoma • Oedema • Pain • Thrombosis • Thrombophlebitis • Hyperpigmentation

tional follow-up after the end of 4 weeks was carried out.

The current European guidelines recommend compression therapy after surgical treatment of varicose veins, irrespective of the surgical method used (Level of evidence A, Class of recommendation I, 7). In France, postoperative compression therapy is used after classical varicose vein surgery in 97.1% of cases (8).

In the current literature, 182 studies can be found that are concerned with compression therapy after surgical treatment of varicose veins, but only 7 randomised studies (▶ Tab. 2, 9). The duration of the compression therapy ranged from zero to a maximum of 6 weeks. Elastic compression was used in all cases, generally compression stockings. After open varicose vein treatment, compression treatment of at least 3 days was always used.

Compression therapy for 7–14 days after laser ablation produced a significant reduction in pain and increased well-being/quality of life (14, 15) (▶ Tab. 2). The studies are very heterogeneous and there was no guidance for patients postoperatively. In all studies, there were only a few patients with varicose veins on both legs. Elderman et al. excluded patients with recurrent varicose veins (15). No mini-phlebectomies were performed In any of the available studies involving endovenous procedures. As a result, they are gentler and compression therapy could be dispensed with (12). In clinical practice, however, a mini-phlebectomy is generally performed in addition to the endovenous procedure to remove the side branches and this results in postoperative haematoma and oedema. Moreover, compression therapy following endovenous procedures supports occlusion of the truncal veins (7, 13).

This variable practice of vascular surgeons is emphasised by the research group of El-Sheikha. Enquiries were made of 348 surgeons in Great Britain and Ireland using a questionnaire. The questions contained therein referred to the method of surgery, the nature and duration of the compression therapy after foam sclerotherapy, the nature and duration of the compression therapy after endovenous laser or radiofrequency ablation and the nature of postoperative analgesia. The results were very heterogeneous with a duration of compression of 0–96 days. Equally variable was the type of compression used: compression stockings, bandaging, pads and various combinations of the available options (10). Due to the limited nature of these data, the European guidelines give no recommendation concerning the duration of postoperative compression. Neither is there any recommendation regarding the height of compression (only below-knee or the entire leg) (7).

Discussion

Compression has been shown to reduce postoperative subcutaneous haematomas (5), but this was investigated in a population of only 10 patients. A reduction in leg oedema through compression was shown by taking circumference measurements 3 days and 2 and 4 weeks after surgical treatment of varicose veins (6). However, there are no long-term data on these patients. Does the leg volume return to the baseline level after compression is stopped? After how long? How much does sedentary work occupation affect the leg volume? The same study provides an argument against compression therapy, because patients without compression therapy resumed their work significantly earlier (6).

The new endovenous procedures are more gentle. In the available studies, no additional phlebectomy was performed with the endovenous procedures (6, 10–15). Compression therapy is helpful for reducing pain after miniphlebectomy. Compression therapy also supports the occlusion of truncal veins after endovenous procedures (7, 13). From the studies conducted to date, it seems that 7 days of postoperative compression is helpful. Because of the varying protocols using different types of postoperative compression, postoperative management and patient information, guidelines offer no recommendation on the length or duration of compression (7).

There is an urgent need for new studies using the same standard protocol to substantiate the evidence for postoperative compression and to achieve a standardisation of postoperative compression therapy.

Author	Year	Patients	Therapy	Duration of compression	Days (d)	Assessment
El-Sheikha (10)	2016	348*	endovenous	AES/ bandaging	7.5 (2–30)	non-standard regime
Biswas (11)	2007	110	open	AES/ bandaging	7 or 21	no difference
Houtermans-Auckel JP (6)	2009	104	open	AES/ bandaging	3 or 28	no difference
Hamel-Desnos CM (12)	2010	60	endovenous	AES	0 or 21	no difference
O'Hare JL (13)	2010	124	endovenous	bandaging	1 or 5	no difference
Bakker NA (14)	2013	109	endovenous	AES	2 or 7	compression for 7 days
Elderman JH (15)	2014	111	endovenous	bandaging	1 or 14	compression for 14 days

Tab. 2 Literature review (adapted from 9); *348 consultant surgeons were questioned about the prescribed compression

Conclusions

Postoperative compression therapy after surgical treatment of varicose veins is recommended in the European guidelines, irrespective of the surgical method used (7, Level of evidence A, Class of recommendation I). Due to the limited data, there is no recommendation concerning the duration of postoperative compression or the recommended length of a compression stocking.

Conflict of interest

Dr Thomas Noppeneny, consultancy contract with medi GmbH, Bayreuth

Ethical guidelines

Preparation of the manuscript did not involve any studies on humans or animals.

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