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Review

Optimal duration of compression stocking therapy following endovenous thermal ablation for great saphenous vein insufficiency: A meta-analysis

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ABSTRACT

Background: The need for patients to wear compression stockings after varicose vein surgery and the duration of compressions tocking therapy has been debated. This study isa meta-analysis of randomized controlled trials (RCTs) to determine the optimal duration of compression stocking therapy after endovenous thermal ablation (ETA) of the great saphenous vein.

Methods: The PubMed, Embase, and Cochrane Library databases were searched before January 2019. Individual effect sizes were standardized, and a meta-analysis was conducted to calculate the pooled effect size by using a random effects model. The primary outcome was the severity of pain in the postoperative period. Secondary outcomes were quality of life (QoL), leg volume, bruising scores, consumptionof analgesic agents, recovery time off work, satisfaction, and the incidence rates of postoperative complications including paresthesia and phlebitis.

Results: Five RCTsinvolving775 patients were reviewed. The long-duration (1–2 weeks) group significantly reduced postoperative pain at 1 week (mean difference [MD] 1.19; 95% confidence interval [CI]: 0.58–1.80) and recovery time off work (MD: 1.01 day, 95% CI: 0.06–1.96)when compared with the short-duration (24–48 h) group. However, the mean pain scores at 2 (0.1; 95% CI: 0–0.2) and 6 weeks postoperatively (−0.3; 95% CI: −1.09-0.49) did not differ significantly between the two groups. Moreover, the incidence rates of complication, paresthesia, and phlebitis did not differ significantly between the short-duration and long-duration groups.

Conclusion: The use of compression therapy for a long time (1–2 weeks) is better than short-term (24–48 h) use in terms of postoperative pain at 1 week and recovery off work. Hence, we recommend the prescription of 1-week compression stocking therapy after ETA in routine clinical practice. However, the available evidence is of variable quality, further well-structured RCTs with improved standardization of compression treatment, types of stockings, and target populations are warranted.

1. Introduction

Varicose veins of the lower extremities are common and affect approximately 25% of adults in Western countries [1]. Conventional surgery (CS) of the great saphenous vein (GSV), which involves high ligation at the sapheno-femoral junction and stripping of the GSV above the knee, has been a standard treatment for varicose veins of the lower extremities [2]. The use of compression stockings is generally prescribed for reducing the incidence rates of hemorrhage, hematomas, and edema as well as for reducing pain after GSV stripping or ablation [3]. However, patients have frequently reported that wearing compressive stockings causes discomfort, which leads to low therapy compliance [4]. A recent meta-analysis of randomized controlled trials (RCTs) revealedthat compressive therapy for > 1 week following CS for varicose veins, did not provide any benefits in terms of postoperative reduction in pain scores, leg volume, incidence rates of complications, and recovery time off work [5].

In recent years, minimally invasive endovenous thermal ablation

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(ETA) techniques, such as endovenous laser ablation (EVLA) and radiofrequency ablation (RFA), have been widely used as alternatives to CS for treating varicose veins of the lower extremities [2]. Because ETA is less invasive than CS, it has gradually become one of the most commonly performed operations for treating varicose veins [6,7]. Although the intensity of postoperative pain and surgical complications were lower in the ETA group than in the CS group, the optimal duration of compression stocking therapy after ETA, in terms of efficacy and patient satisfaction, remains controversial [8]. One RCT compared various durations of compression stocking therapy after EVLA, and the results revealedthat wearing stockings for 2 weeks postoperatively after an initial 24-h period of wearing bandages results in a small but significant reduction of postoperative pain [9]. Another RCTindicated that a long duration of stocking treatment does not provide additional benefits such as improving the quality of life (QoL) and reducing the mean recovery time off work [10]. Therefore, we conducted a systematic literature review and meta-analysis of RCTs to evaluate the optimal duration of compression stocking therapy after ETA for varicose veins.

2. Materials and methods

2.1. Inclusion criteria

RCTs investigating the duration of compression stockingtherapy in patients with varicose veins after ETA were included in this review. We included RCTsclearly reporting the inclusion and exclusion criteria for patients, techniques used for varicose vein surgery, compression strategy, and definition and evaluation of postoperative outcomes. We excluded RCTs that met at least one of the following criteria: (1) patients had undergone CS or had received foam sclerotherapy, or (2) patient cohorts were reported in duplicate.

2.2. Search strategy and study selection

Relevant RCTs published before January 2019 were identified from the PubMed, Embase, and Cochrane Library databases. The following medical subject headings terms were used: “varicose vein”OR“great saphenous vein”, “compression”OR“stocking”OR“duration”OR“bandage” and “endovenous ablation” OR “laser”OR” radiofrequency”. The “related articles” option in the PubMed database was used to broaden the search scope, and all abstracts, studies, and citations retrieved were reviewed. In addition, we identified additional studies by using the reference sections of the relevant papers and by corresponding with subject experts. No language restrictions were applied. Our systematic review has been accepted by PROSPERO, an online international prospective register of systematic reviews that is curated by the National Institute for Health Research (CRD42017072710).

2.3. Data extraction

Baseline and outcome data were independently abstracted by 2 reviewers (JHC and SYC), and the study designs, study population characteristics, inclusion and exclusion criteria, compression techniques, complications, and posttreatment parameters were extracted. The reviewers’ individually recorded decisions were compared, and disagreements were resolved by consulting with a third reviewer (KWT). The authors of the studies were contacted for additional information.

2.4. Methodological quality appraisal

Two reviewers (JHC and SYC) independently assessed the methodological quality of each study by using the revised Cochrane Risk of Bias tool (RoB 2.0) [11]. Trials were awarded an overall risk of bias grade of high, some, or low risk of bias. This grade was calculated by assessing five domains: bias arising from the randomization process; bias owing to deviations from intended interventions; bias owing to missing outcome data; bias in measurement of the outcome; and bias in selection of the reported results.

2.5. Outcomes

The primary outcome was the intensity of pain in the postoperative period of1–6 weeks. The secondary outcomes were QoL, leg volume, bruising scores, consumptionof analgesic agents, recovery time off work, satisfaction and the incidence rates of postoperative complications including paresthesia and phlebitis.

2.6. Statistical analyses

Data were entered and analyzed using Review Manager, Version 5.3 (Cochrane Collaboration, Oxford, England). The meta-analysis was performed according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) and Assessing the methodological quality of systematic reviews (AMSTAR)guidelines [12,13]. Standard deviations were calculated using the confidence interval (CI) limits or standard errors reported in the RCTs. Continuous variables were analyzed using the mean difference (MD) and standard mean difference (SMD). Dichotomous outcomes were analyzed using the weighted risk ratios (RRs). The precisions of the effect sizes were reported as 95% CIs. Pooled estimates of the MD, SMD, and RR were computed using the DerSimonian and Laird random effects model [14]. The Cochran Q test and I^2 statistics were calculated to evaluate the statistical heterogeneity and inconsistency of the treatment effects, respectively, across the RCTs. Statistical significance was set at $P < .10$ for the Cochran Q test. Statistical heterogeneity across RCTswas assessed using the I^2 test, which quantifies the proportion of the total outcome variability across RCTs.

3. Results

3.1. RCT characteristics

Fig. 1 represents the flowchart of the screening and selection of RCTs. The initial search yielded 405 citations. However, 289 RCTs investigated irrelevant topics, such as the favorable choice of the

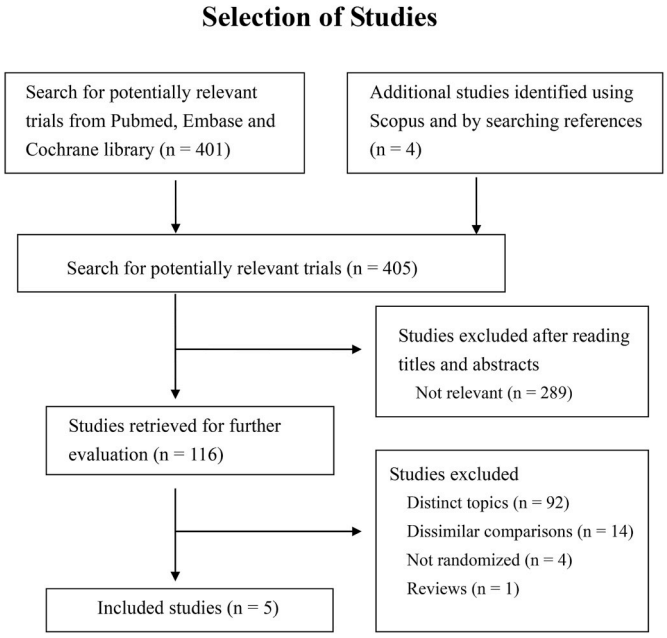

Fig. 1. Flowchart of RCT selection.

wavelength used in EVLA; 92 RCTs were studies on topics unrelated to this study; 14RCTs were related to comparisons different from the outcomes of our study (e.g., 1 RCTcomparedoutcomes in patients who received eccentric compression stockingtherapy); 4articleswere non-RCT retrospective studies conducted by an insurance company; and 1 article was a systematic review regarding compression stocking therapy following treatment for varicose veins. Hence, in total, 5 RCTs were eligible for meta-analysis in this study [8–10,15,16].

These 5 RCTs were published between 2013 and 2017 and involved sample sizes of 70–400 and a total of 775 participants. In 3 RCTs, patients at stages C2, C3, or C4 of the clinical, etiological, anatomical, and pathophysiological (CEAP) classification were recruited [9,15,16]. One RCT only involved patients whose varicose veins were in the C2 stage [10]. Another RCT involved patients with symptomatic varicose veins [8]. One of our included RCTs used RFA [16],3 of our included RCTs [8–10] used EVLA, and Ayo et al. used both techniques [15]. RFA were performed with the Covidien Closure FAST^{TM}endovenous RFA catheter [15,16]. The laser ablations were 810–890 nm diode laser at 7 or 14 W for a total 60–80 J/cm delivery [8–10,15]. Regional anesthesia use was stated in one trial [10], and the procedures were performed under duplex ultrasound guidance in 3 trials [8,9,16]. Moreover, no concomitant phlebectomy was performed in all trials. The patients in the short-duration group received standard elastic bandage compression of the proximal part of the GSV for 24 h postoperatively in 3RCTs [9,10,15], whereas the patients in the short-duration group of another RCTused compression stockings for 48 h [8]. In the long-duration groups of4RCTs, the patients wore compression stockings for 1–2 weeks following the use of standard elastic bandages for 1 day postoperatively [8–10,15]. In Krasznai et al., the authors compared compression stockings for 4 h with 72 h (class II, thigh high, 23–32 mmHg) following the procedure [16]. Therefore, we classified 4 h compression as super short-duration group and 72 h compression as short-duration group. Across all 5RCTs, patient numbers in the 2 treatment groups were comparable (Table 1).

The methodological qualities of the included RCTs are summarized in Table 2. All RCTs have reported acceptable methods of randomization [8–10,15,16]. One RCT did not describe the blinding of patients and caregivers [8], and 3 RCTs have stated that the patients and caregivers were unblended [9,10,15]. Performance bias was noted in all the RCTs because the patients might have taken off the stocking without premission before the completion of the study period [8–10,15,16]. Two RCTs have not described the blinding of the outcome assessors [8,9], and another one mentioned that the assessors were unblended [16]. Two RCTs have reported that > 20% of the patients were lost to follow-up, but the loss was equal in the long-and short-duration groups. Moreover, detailed explanations were also included; therefore, the attrition bias may be a cause of concern [8,9]. One RCT specifically excluded patients with phlebotomies, and their data were also excluded; this contributed to high risk in attrition bias [15]. Finally, reporting bias might have been introduced in2RCTs because the statistics had been reported unclearly and without standard deviation [9,15].

3.2. Pain score

Four RCTs have assessed postoperative pain using a 10-point visual analog scale (VAS) [8–10,15]. Two RCTs could not be pooled because these RCTs have not reported the standard deviations or means [9,15]. The long-duration group significantly reduced postoperative pain at 1 week when compared with the control group (MD 1.19; 95% CI: 0.58–1.80). The differences in the mean pain scores at 2 (MD 0.1; 95% CI: 0–0.2) and 6 weeks (MD −0.3; 95% CI: −1.09-0.49) postoperatively were not significant between the short- and long-duration groups (Fig. 2).

Ayo et al. found that the pain scores at postoperative day 1 (mean 3.0 vs. 3.12, $P = .948$) and day 7 (mean 2.11 vs. 2.81, $P = .147$) did not differ significantly in the long-duration and short-duration groups [15].

Table 1
Characteristics of trials fulfilling inclusion criteria in the meta-analysis.

Author [year]	Inclusion criteria	Surgery	No. of leg	Age. year, mean ± SD	Intervention
Ayo [2017]	GSV reflux, CEAP stage C2-C5	RFA (91%) and EVLT with 890 nm laser at 7 W for total 60–80 J/cm (9%).	S: 46 L: 39	S: 49 L: 52	S: 24 h elastic bandages L: 24 h elastic bandages +1 w stockings (30–40 mmHg; thigh length)
Bakker [2013]	Symptomatic varicose veins	EVLT with 810 nm diode laser at 14 W for total 70 J/cm	S: 48 L: 45	S: 49.5 ± 12.7 L: 51.3 ± 11.1	S: 48 h stockings L: 1 w stockings (Mediven Struva®, AG hip, 35 mmHg), worn continually day and night
Elderman [2014]	CEAP stage C2 or C3	EVLT with 810 nm diode laser for total 70–80 J/cm	S: 56 L: 55	S: 54.9 ± 11.7 L: 50.9 ± 13.5	S: 24 h elastic bandages L: 24 h elastic bandages + 2 w stockings (class II, thigh length) during daytime
Krasznai [2015]	CEAP stage C2-C4	RFA	Ss: 50 S: 51	Ss: 53 ± 16 S: 54 ± 13	Ss: 4 h stockings S: 72 h stockings (23–32 mmHg; class II, thigh length)
Ye [2016]	CEAP stage C2	EVLT with 810 nm diode laser at 14 W for total 80 J/cm + high ligation of GSV	S: 200 L: 200	S: 49 (40–60)† L: 48 (37–59)	S: 24 h elastic bandages L: 24 h elastic bandages + 2 w stockings (23–32 mmHg; class II, thigh length) during daytime

Values are presented as mean ± standard deviation, except: as indicated by † mean (range).
CEAP, clinical, etiologic, anatomic, and pathophysiologic classification; EVLT, endovenous laser ablation; GSV, great saphenous vein; L, long–duration; S, short–duration; Ss, super short-duration; RFA, radiofrequency ablation.

Table 2
Methodological quality assessment of the included trials.

Study [year]	Selection bias	Performance bias	Detection bias	Attrition bias	Reporting bias	Others
Ayo [2017]	Low risk	Some concerns (Not compliance)	Some concerns (No standard on bruising score)	Some concerns	Some concerns	Low risk
Bakker [2013]	Low risk	Low risk	Some concerns	Some concerns	Low risk	Low risk
Elderman [2014]	Low risk	Some concerns (Not compliance)	Some concerns	Some concerns	Some concerns	Low risk
Krasznai [2015]	Low risk	Some concerns (Not compliance)	Some concerns	Low risk	Low risk	Low risk
Ye [2016]	Low risk	Some concerns (Not compliance)	Low risk	Low risk	Low risk	Low risk

Elderman et al. evaluated pain by assessing the differences in the mean pain scores at different time points; they reported that a small but significant difference in pain scores was observed at1 week after laser surgery and that lower scores were observed in the group that wore stockings than in the group that did not. The observed absolute difference in pain scores at the different time points was small and disappeared within 2 weeks after surgery [9].

3.3. QoL

Three RCTshave assessed QoL by using different assessment tools at 1 and 2 weeks postoperatively [8,10,15]. One RCT each used the Chronic Venous Insufficiency Questionnaire [15], Short Form Survey Questionnaire [8], and Aberdeen Varicose Vein Symptoms Severity Score for QoL assessment [10]. The study by Bakker et al. could not be included in pooling because it reported the scores of 8 QoL subgroups without a total score [8]. The pooled SMDs in the QoL total scores at 1 and 2 weeks postoperatively were 0.16 (95% CI: −0.03-0.36) and 0.06 (95% CI: −0.14-0.25), respectively. No significant differences in the QoL measures were observed between the 2 groups at 1or 2 weeks postoperatively.

Bakker et al.indicated that at 1-week follow-up, physical function (short-duration group 85.1 [± 11.2] vs. long-durationgroup 95.7 [± 10.1]; $P \leq .001$) and vitality (short-duration group 75 [± 13.0] vs. long-durationgroup 83.7 [± 13.4]; $P = .03$) were both significantly higher in the long-durationgroup than in the short-duration group. A post hoc power analysis for these outcome variables yielded power values of 98.5% and 77.8%, respectively. At 48 h and 6 weeks postoperatively, no significant differences were observed between the 2 groups [8].

3.4. Recovery time off work

Two RCTshave assessed the recovery time off work by encouraging the patients to return to work as soon as they felt sufficiently well and comfortable after surgery [9,10]. The long-duration group had a significant shorter recovery time off work (MD 1.01 day, 95% CI: 0.06–1.96) than did the short-duration group (Fig. 3).

3.5. Satisfaction

One RCT assessed patient satisfaction by using a 5-point-scale at 2 days, 2 weeks, and 6 weeks postoperatively [9]. Patients who wore stockings reported significantly higher satisfaction scores at 2 days (4.44 vs. 4.15) and 6 weeks (4.59 vs. 4.18)thandid those who did not wear stockings; however, the absolute differences were small. The differences in the means of satisfaction were −0.29 (95% CI: −0.69-0.11), −0.38 (95% CI: −0.78-0.02), and −0.41 (95% CI: −0.76-0.06) for 2 days, 2 weeks, and 6 weeks postoperatively, respectively. Significant differences were observed at 6 weeks postoperatively in favor of the group that wore stockings.

3.6. Bruising score

In 2RCTs, the bruising scores were compared postoperatively [10,15]. Ayo et al. evaluated bruising on a scale of 0–5 and found that the mean bruising scores determined at 7 days postoperatively were similar in the compression and noncompression groups (1.2 vs. 1.4, $P = .561$) [14]. Ye et al. evaluated bruising scores, ranging from 0 to 3 and reported that > 65% of patients exhibited bruising around the treated sites in both groups 24 h after surgery when the elastic bandage was removed; however, no significant difference was observed between the 2 groups at 1 and 2 weeks postoperatively [10].

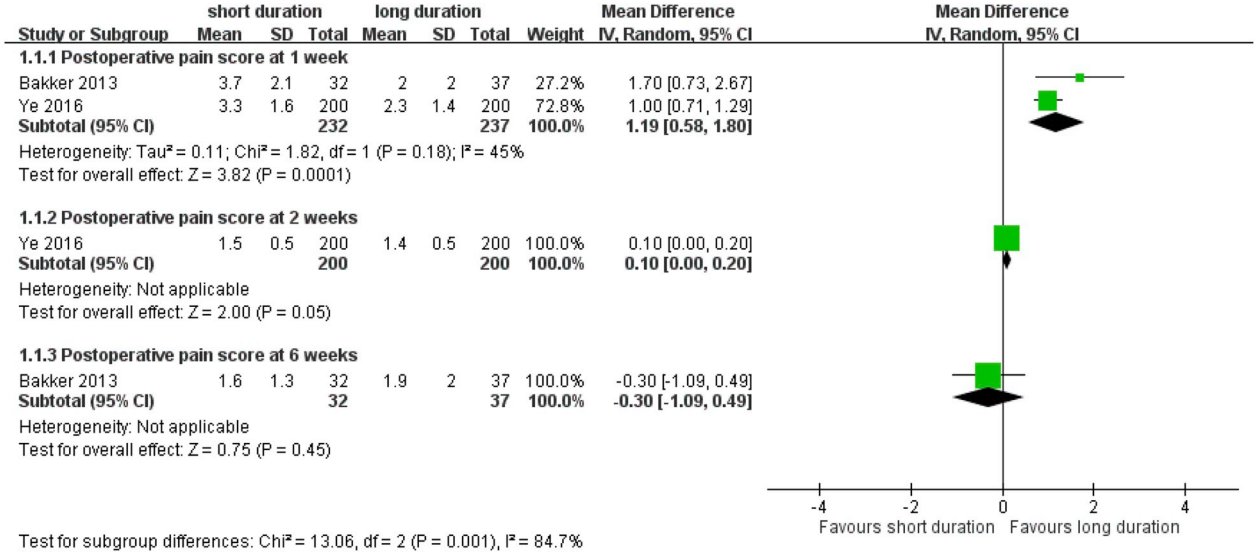

Fig. 2. Forest plot of comparison: Postoperative pain scores at 1, 2, and 6 weeks; outcome: long-duration group significantly reduced pain scores at 1 week when compared with short-duration group; however, no significant difference at 2 and 6 weeks between groups.

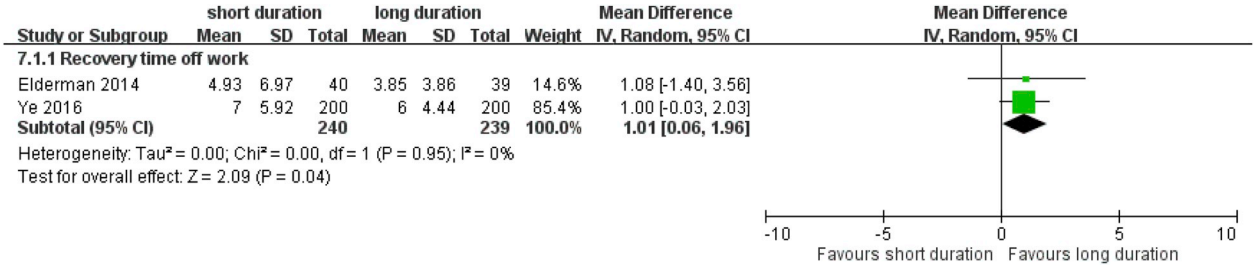

Fig. 3. Forest plot of comparison: Recovery time off work; outcome: long-duration group significantly reduced recovery time off work when compared with short-duration group.

3.7. Consumption of analgesics

In 1RCT, the consumption of analgesics and the duration for which the stockings were worn each day were compared. The results revealed that analgesic consumption differed between the groups [9]. The patients who did not wear compression stockings were reported to have consumed paracetamol more frequently than did patients who wore the stockings during the study period; however, no differences were observed in the consumptionof nonsteroidal anti-inflammatory or opioid drugs.

3.8. Complications

In 3RCTs, the incidence rates of postoperative complications, including paresthesia and phlebitis, were compared [8–10]. The short-duration and long-duration groups showed nonsignificant differences in the incidence rates, with RRs of 1.10 (95% CI: 0.49–2.46)for any complication, 1.35 (95% CI: 0.63–2.89)for paresthesia, and 1.16 (95% CI: 0.55–2.46)for phlebitis. The value of I^2 in the any complication group was 52%, which indicated moderate heterogeneity. The values of I^2were 0% in the paresthesia and phlebitis groups, which indicated the absence of heterogeneity across RCTs (Fig. 4).

3.9. Leg volume

Only one RCT reported leg volume, which was assessed using circumferential measurements of the leg at 3 standardized points of the treated leg [16]. The differences in changes in leg volume between 72 h compression and 4 h super short-duration compression were not significantat3 days ($P = .45$) or 2 weeks ($P = .11$) postoperatively. The mean difference in the leg volume at 3 days and 2 weeks postoperatively were 31.00 (95% CI: −50.00-112.00) and −85.00 (95% CI: −188.34-18.34)mL, respectively. Moreover, postoperative pain and time to full recovery did not differ significantly between groups.

4. Discussion

The prescription of compression stockings after ETA is a standard practice worldwide; however, its duration is controversial. In our included trials, patients in short duration groups were wearing elastic socks for 24–48 h, whereas long duration groups were 1–2 weeks. Our meta-analysis indicated that long-duration compression did not result in higher reductions in pain at 2 and 6 weeks postoperatively; fewer postoperative complications; more favorable changes in leg volume, bruising scores, or QoL than did short-duration compression after ETA. However, long-duration compression significantly reduced

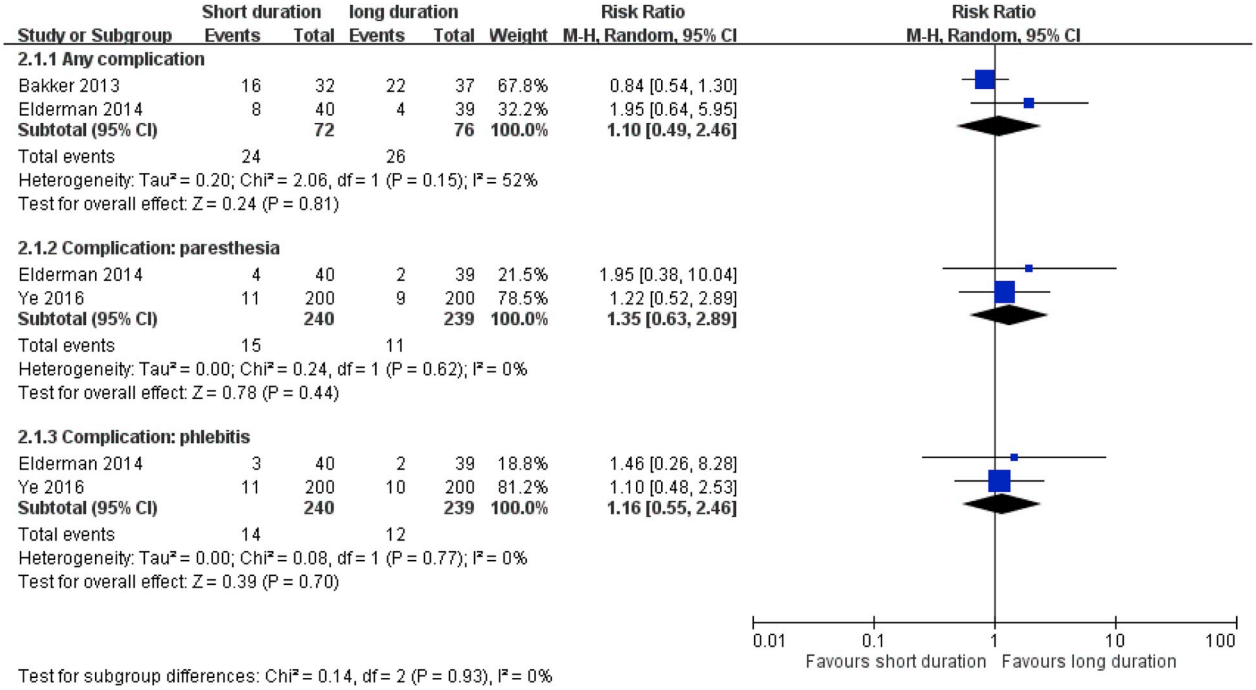

Fig. 4. Forest plot of comparison: Different postoperative complications; outcome: no significant difference between the short- and long-duration groups.

postoperative pain at 1 week and recovery time off work when compared with the short-duration compression. Therefore, wearing of postoperative stockings for 1-week period has modest benefits.

Wearing elastic stockings for short durations has several advantages. Patients often complain of discomfort because of increases in leg temperature associated with wearing compression stockings. In one trial, 63% of patients discarded their stockings prior to the completion of the 6-week follow-upperiod because of discomfort [17]. In our included trials, Ye et al. indicated that 8.5% of patients discarded their stockings prior to the completion of the 1-week follow-up period, and 13% did not compliance with stocking at 2-week follow-up [10]. In Bakker et al., 4 of 45 patients discontinued stockings in the long-duration group [8]. The patients would have been more comfortable with a short duration of compression stocking therapy.

Evaluation of pain is crucial after the ETA of theGSV. Pain is closely associated with postoperative complications, the patients' QoL, and patients' satisfaction. All the RCTs we reviewed have reported pain scores by using the VAS. The pooling results showed that patients who worecompression stockings for over 1 week did not experience higher reductions in pain thandid patients who worethe stockings for a short duration. However, 3RCTshave reported a small but significant difference between the 2 groups [8–10]. The results of these RCTs showed that wearing stockings for the optimal duration can reduce the severity of pain, thus reducing analgesic consumption. We concluded that wearing stockings after RFA or EVLA on GSV for a long duration provides pain relief. Hence, a long duration not exceeding 1 week is recommended.

Conventional GSV stripping involves the removal of the damaged GSV, which results in a large wound bed and the subsequent formation of hematomas [18]. The application of RFA and EVLA on the GSV of patients with varicose veins has rapidly increased in recent years. Several RCTs and meta-analyses have indicated that significant reductions in tenderness, ecchymosis, and hematomas were associated with minimally invasive treatments compared with CS [19,20]. Moreover, one of the RCTsthat we included showed that patients who worethe stockings for a super short-duration had a lower incidence rate of postoperative complications [16]. Two of our RCTs have shown no significant difference in the incidence rates of complications between patients who worecompression stockings and those who did not [9,10]. Our previous meta-analysis showed that even wearing the stocking for a short-duration was adequate after CS for pain relief [5]. The postoperative period and pain are assumed to be shorter and less intense after RFA and EVLAthan after open surgery, thus enabling the patient to resume a normal life [21].

One of the RCTs that we included reported the use of RFA [16],3 of our included RCTs [8–10] have reported the use of EVLA, and Ayo et al. [15]reported the use of both techniques. Although the patients in these RCTs had undergone different forms of minimally invasive surgery, namely RFA and EVLA, a meta-analysis indicated that EVLA and RFA appear similar in terms of safety, effectiveness, clinical efficacy, ablated length of the vein, pain score, QoL, occlusion, thrombophlebitis, hematoma, and recanalization [22]. Similarly, our meta-analysis showed no differences between the pain scores and incidence rates of complications in RFA and EVLA.

The RCTs that we reviewed have investigated several types of compression stockings. Two of our included RCTs have evaluated the effectiveness of wearing class II 23–32-mmHg stockings with compression bandages for 2 weeks postoperatively [9,10]. Bakker et al. [8] used Mediven Struva® 35-mmHg stockings and Ayo et al. [15] used thigh-high 30–40-mmHg stockings. Elderman et al. mentioned that the average daily wearing time of the stockings in the treatment group was 12.48 h per day [9]; however, the other RCTshave not reported time data forthe long-duration groups. Although the types of compression stockings differed, the heterogeneity in pain scores at 2 weeks postoperatively and the incidence rates of the complications of paresthesia and phlebitis were relatively low.

Considerable heterogeneity was observed across the RCTsincluded in our analysis because of various clinical factors. First, we cannot be sure that all patients received identical diagnoses with similar severity. One of the included RCTs did not report the CEAP classification of patients [10]. Second, the intervention methods applied to the control groups varied. The duration of compression stocking therapy in the long-duration groups ranged from 72 h to 2 weeks. Third, the compression protocol and types of stockings differed across the RCTs. For example, forthe long-duration group, Elderman et al. reported that the average time during which the stockings were worn in the treatment group was 12.48 h per day [9]. Ayo et al. also mentioned that patients wore compression stockings for approximately 24 h after the procedure and then daily during waking hours for the remainder of the first 7 days after the procedure [15]. In addition, none of the included RCTs assessed the effects of the involvement and experience of multiple surgeons, which might have contributed to differences in treatment outcomes. Finally, some outcomes, such as pain scores, in the RCTs by Ayo et al. and Krasznai et al. were measured at different time points. Such differences among RCTs resulted in heterogeneity [15,16].

4.1. Limitation

This study had several limitations. First, only one of the included RCTs reported an adequate technique for assessing performance bias [8]. Second, 3RCTs have reported a lack of blinding of the personnel assessing the outcomes [9,10,15]. Third, most RCTs have analyzed their data according to a per-protocol principle, which might have biased the evaluation of the effects of the compression duration. In addition, the RCTs have not included a systematic assessment of compliance with wearing the elastic stockings in the long-duration group. For example, only Ye et al. reported compliance between groups [10]. Finally, the effects of differences in CEAP stages on the outcomes are not known because this classification had not been discussed in all the RCTs.

5. Conclusion

We conclude that long-duration compression therapy does not result in higher reductions in pain at 2 and 6 weeks postoperatively; fewer postoperative complications; or more favorable changes in leg volume, bruising scores, or QoL than does short-duration compression therapy after ETA. However, long-duration compression significantly reduced postoperative pain at 1 week and recovery time off work when compared with the short-duration compression after ETA. Based on these results, we recommend the prescription of 1-week duration compression after ETA in routine practice. However, the available evidence is of variable quality, additional studies involving several well-structured RCTs with improved standardization of compression treatment, types of stockings, and target populations are warranted.

Ethical approval

We confirm that the manuscript has been read and approved by all named authors and that there are no other persons who satisfied the criteria for authorship but are not listed. We further confirm that the order of authors listed in the manuscript has been approved by all of us.

We confirm that we have given due consideration to the protection of intellectual property associated with this work and that there are no impediments to publication, including the timing of publication, with respect to intellectual property. In so doing we confirm that we have followed the regulations of our institutions concerning intellectual property.

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We confirm that there has been no significant financial support for this work that could have influenced its outcome.

Author contribution

Study concept and design: Jian-Hong Chou, Shiaun-Yeu Chen, Tsai-Wei Huang, Ka-Wai Tam.

Analysis and interpretation: Jian-Hong Chou, Shiaun-Yeu Chen, Yueh-Ting Chen, Cheng-Hsien Hsieh, Tsai-Wei Huang, and Ka-Wai Tam.

Data collection: Jian-Hong Chou, Shiaun-Yeu Chen, Yueh-Ting Chen, Cheng-Hsien Hsieh.

Writing the article: Jian-Hong Chou, Shiaun-Yeu Chen.

Critical revision of the article: Jian-Hong Chou, Shiaun-Yeu Chen, Yueh-Ting Chen, Cheng-Hsien Hsieh, Tsai-Wei Huang, Ka-Wai Tam.

Final approval of the article: Jian-Hong Chou, Shiaun-Yeu Chen, Yueh-Ting Chen, Cheng-Hsien Hsieh, Tsai-Wei Huang, Ka-Wai Tam.

Statistical analysis: Jian-Hong Chou, Shiaun-Yeu Chen.

Overall responsibility: Tsai-Wei Huang, Ka-Wai Tam.

Conflicts of interest

We confirm that there are no known conflicts of interest associated with this publication "Optimal Duration of Compression Stocking Therapy Following Endovenous Thermal Ablation for Great Saphenous Vein Insufficiency: A Meta-Analysis"

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Guarantor

Tsai-Wei Huang and Ka-Wai Tam are guarantor.

Provenance and peer review

Not commissioned, externally peer-reviewed.

Data sharing

The investigators will share data used in developing the results presented in this manuscript on request to the corresponding author at kelvintam@h.tmu.edu.tw.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ijsu.2019.03.024.

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