Compression stockings reduced the occurrence of the post-thrombotic syndrome in proximal DVT

Brandjes DP, Büller HR, Heijboer H, et al. **Randomised trial of effect of compression stockings in patients with symptomatic proximal-vein thrombosis.** Lancet. 1997 Mar 15: 349:759-62.

Objective
To evaluate the effectiveness of knee-length compression stockings in preventing the post-thrombotic syndrome (PTS) in patients with a first episode of proximal deep venous thrombosis (DVT).

Design
Randomized controlled trial with a median 76-month follow-up.

Setting
2 centers in Amsterdam, the Netherlands.

Patients
194 patients (mean age 60 y, 56% men) with a first episode of venogram-proven proximal DVT (including thrombi involving the popliteal vein or above, irrespective of concomitant calf-vein thrombi). Exclusion criteria were a life expectancy < 6 months, paralysis of the leg, bilateral thrombosis, leg ulcers or extensive varicosis, or current use of compression stockings. 6 patients (3%) were lost to follow-up.

Intervention
96 patients were allocated to sized-to-fit, knee-length, graded elastic compression stockings and were told to wear them during the day only. The stockings were customized for each patient and applied 2 to 3 weeks after the first episode of proximal DVT. 98 patients were allocated to no stockings. All patients received heparin for ≥ 5 days; warfarin was continued for 3 months.

Main outcome measures
The primary outcome measure was the cumulative incidence of mild-to-moderate PTS assessed using a standard scoring system. Secondary outcomes were severe PTS and recurrence of venous thromboembolism.

Main results
Fewer patients developed mild-to-moderate PTS in the stocking group than in the control group ($P < 0.001$), and fewer patients developed severe PTS in the stocking group than in the control group ($P < 0.001$) (Table). No difference existed for recurrence of venous thromboembolism.

Conclusion
Sized-to-fit, knee-length, graded compression stockings reduced the occurrence of mild-to-moderate and severe post-thrombotic syndrome in patients with a first episode of proximal deep venous thrombosis.

Source of funding: Amstol Stichting.

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Abstract and Commentary also published in *ACP Journal Club.* 1997;127:35.

Graded compression stockings vs no stockings*

Outcome	Compression stockings EER	No stockings CER	RRR (95% CI)	ARR |EER – CER|	NNT (CI)
Mild-to-moderate PTS	20%	47%	58% (35 to 73)	27%	4 (3 to 7)
Severe PTS	11%	23%	51% (7 to 75)	12%	9 (4 to 74)

*PTS = post-thrombotic syndrome. Other abbreviations defined in Glossary; RRR, ARR, NNT, and CI calculated from data in article.

Commentary

PTS is a common sequela of DVT and can lead to painful and disabling symptoms years after the initial thrombosis. In a natural history study by Prandoni and colleagues (1) of the clinical course of DVT, 29% (CI 23% to 35%) of patients developed PTS after 8 years. The management of patients with established PTS is difficult and unsatisfying, especially in patients who present with severe pain or skin breakdown. Although thrombolytic therapy has been touted for prevention of this syndrome, it is expensive and occasionally associated with fatal complications; in addition, the magnitude of benefit (if any) is unknown.

This well-done study by Brandjes and colleagues shows that in a well-defined patient population with first-time DVT, the application of knee-length compression stockings can decrease the incidence of both mild-to-moderate and severe PTS. Of note is that 76% of patients always wore their stockings and only 7% seldom or never did. Close follow-up may be needed to ensure these high rates of compliance to achieve a benefit for patients in nonresearch settings.

Unfortunately, 30% of patients in the stocking group developed PTS, indicating the need for further research. Meanwhile, it is worth pointing out that DVT prophylaxis is still underutilized and that the best way to prevent PTS is to prevent DVT.

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Reference

1. **Prandoni P, Lensing AW, Cogo A, et al.** The long-term clinical course of acute deep venous thrombosis. Ann Intern Med. 1996;125:1-7.