



## Original article

# A prospective randomised trial of tourniquet in varicose vein surgery

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**A prospective randomised trial of 50 patients was carried out to assess the autoclavable Lofquist cuff (Boazal, Sweden) as a tourniquet in varicose vein surgery and determine the effect on bleeding, bruising, cosmesis and patient pain and activity.**

Patients undergoing unilateral long saphenous vein ligation, stripping and avulsions were randomised to tourniquet or no tourniquet. Lofquist cuffs were applied after inflation to 120 mmHg to the upper thigh for the duration of the surgery. Varicose vein grade, duration of surgery, blood loss, extent of bruising at 7 days, pain and activity scores over the first week, and wound complications and cosmetic result at 6 weeks were recorded. Patients' age, sex, and varicose vein grade were similar in the two groups. Peroperative blood loss (median, range) was significantly reduced in the tourniquet group (0 ml, 0–20 ml) compared to the no tourniquet group (125 ml, 20–300;  $P < 0.01$ ). Operative time and thigh bruising (median, range) were also reduced in the tourniquet group (30 min, 11–47 min; 72 cm<sup>2</sup>, 30–429 cm<sup>2</sup>), respectively, compared to the no tourniquet group (37 min, 18–50 min; 179 cm<sup>2</sup>, 24–669 cm<sup>2</sup>) both ( $P < 0.01$ ). There was no difference in pain and activity scores in the two groups and cosmetic results were also similar.

**The use of the Lofquist cuff tourniquet during varicose vein surgery reduces peroperative blood loss, operative time and postoperative bruising without any obvious drawbacks.**

*Key words:* Varicose veins – Tourniquet – Randomised controlled trial

Stripping of the long saphenous vein (LSV) is associated with reduced recurrence rates after varicose vein surgery<sup>1</sup> and is considered standard practice. Stripping of the LSV is, however, associated with bleeding, bruising and pain. The Esmarch and pneumatic tourniquet have been shown to reduce peroperative bleeding in varicose vein surgery,<sup>2,3</sup> but

both are, in our experience, difficult to use. The Lofquist cuff (Boazal, Sweden) is an autoclavable, inflatable 'doughnut' that can be rolled up the leg to exsanguinate the limb then held at the upper thigh to act as a sterile, convenient tourniquet. The aim of our study was to determine the effectiveness of the Lofquist cuff in varicose vein surgery, and determine

Table 1 Patient demographics and varicose vein grade

	No Tourniquet	Tourniquet
Number of patients	25	25
Age (mean) [years]	49 (32–65)	47 (29–80)
Sex (M:F)	1:4	1:2
Varicose vein grade*	2 (1–3)	2 (1–3)

\*1, no symptoms; 2, symptoms; 3, skin changes; 4, healed ulcer; 5, active ulcer.

the effect on bleeding, bruising, cosmesis and patient pain and activity.

Patients and Methods

A prospective randomised controlled trial of patients undergoing unilateral saphenofemoral disconnection with stripping of the LSV to the knee and multiple phlebectomies, with and without tourniquet, was carried out. Local ethical approval was obtained. All patients were recruited from the waiting list having been assessed by a single consultant using a hand-held Doppler with a 4 MHz probe. Patients with a history of deep venous thrombosis or deep venous insufficiency, extensive anterior thigh veins or sapheno-popliteal reflux were excluded. Patients were randomised using sealed envelopes on the day of operation. All patients were marked pre-operatively on the ward and TED (Kendall, UK) stockings applied.<sup>4</sup> At operation, a Trendelenberg tilt of 30°C was applied and the TED stockings rolled down to the ankle. Synchronous groin dissection and phlebectomies were carried out by a consultant and registrar. The LSV was stripped using a disposable Vasistrip (Astra) and phlebectomies achieved using stab incisions and Oesch hooks. In half the patients, a sterile Lofquist cuff (Boazal, Sweden) was used. The latter was inflated to 120 mmHg, rolled on to the leg and secured in the upper thigh for the duration of the surgery. Groin wounds were closed with absorbable sutures and all others with Leukostrips (Beiersdorf AG). All legs were firmly bandaged with cotton wool and crepe bandages with re-application of the TED stocking over the bandages. Bandages remained on for 48 h and were removed by the district nurse; TED stockings were worn for a further 2 weeks. Varicose vein grade, duration of surgery, peroperative blood loss (measured by weighing swabs placed beneath the legs), extent of bruising in the thigh at 7 days, and wound complications and cosmetic result at 6 weeks were recorded. Patient pain and activity using a daily linear analogue pain score ranging from 0–10 and a daily activity score from 0–7 as described by Khan *et al*<sup>5</sup> were recorded over the first week. Results were analysed using the Mann-Witney U test.

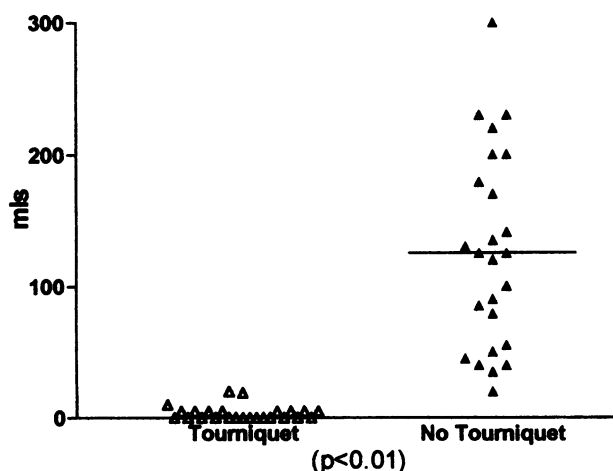


Figure 1 Peroperative blood loss

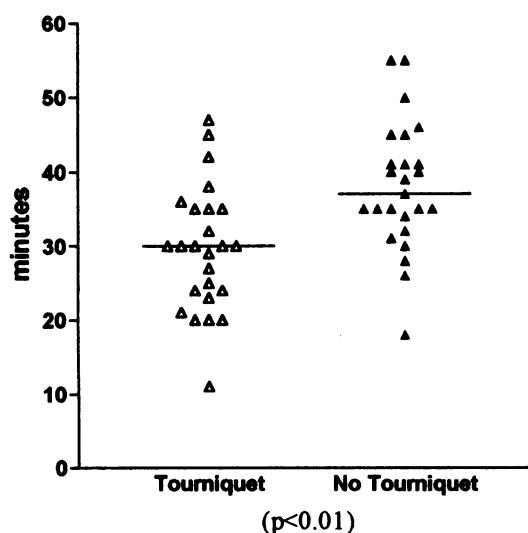


Figure 2 Operative time

Results

A total of 50 patients were randomised with 25 in each group. Patient demographics (Table 1) were broadly similar, with more males in the no tourniquet group. There was no difference in varicose vein grade between the two groups. Peroperative blood loss (median, range) was significantly reduced in the tourniquet group (0 ml, 0–20 ml) compared to the no tourniquet group (125 ml, 20–300;  $P < 0.01$ ) as shown in Figure 1.

Operative time (median, range) was shorter when tourniquet was applied (30 min, 11–47 min), compared without tourniquet (37 min, 18–50 min;  $P < 0.01$ ) as shown in Figure 2. Bruising in the thigh (median, range) at 7 days was also reduced in the tourniquet group (72 cm<sup>2</sup>, 30–429 cm<sup>2</sup>) compared to the no tourniquet group (179 cm<sup>2</sup>, 24–669 cm<sup>2</sup>;  $P < 0.01$ ) as shown in Figure 3.

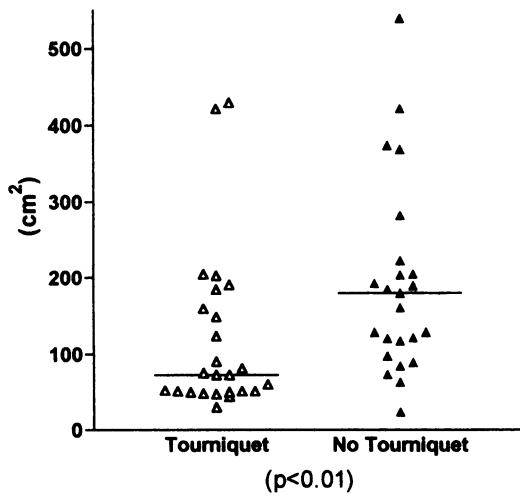


Figure 3 Bruising in the thigh at one week

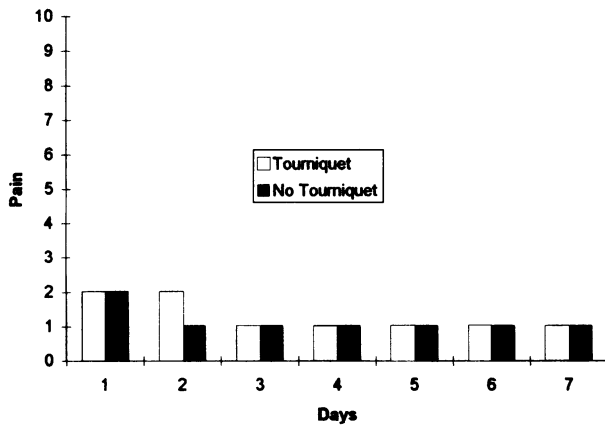


Figure 4 Pain scores (median) during the first week

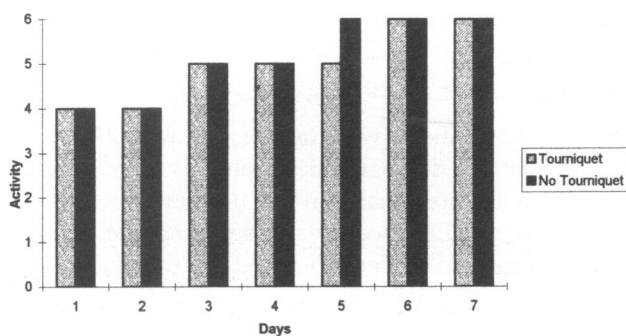


Figure 5 Activity (median) during the first week. Activity scores: 1, unable to walk around; 2, can walk if absolutely necessary; 3, can walk around house, but not up stairs; 4, mobile around house including stairs; 5, mobile outside with difficulty; 6, freely mobile outside; 7, back to full normal activities including work<sup>5</sup>

There was no significant difference in patient pain (Figure 4) and activity (Figure 5), over the first week, between the two groups. The cosmetic result at 6 weeks was similar in both groups.

Three patients had temporary saphenous neuralgia, two occurring in the no tourniquet group. Two patients had minor wound complications including one wound infection and one groin haematoma; both in the no tourniquet group.

Discussion

Significant blood loss can be associated with varicose vein surgery<sup>1</sup> and previous studies have shown that the Esmarch and pneumatic tourniquet reduce peroperative blood loss.<sup>1,2</sup> We found, in our study, that the sterile Lofquist cuff (Boazal, Sweden) is easy to use and proved effective as a tourniquet with a significant reduction in peroperative blood loss. We found no difficulty in passing the LSV stripper beneath the inflated tourniquet and, in addition, have demonstrated reduced postoperative bruising; however, this did not correlate with any improvement in patient postoperative pain or activity. There was no excess morbidity or complications associated with the use of the Lofquist cuff and the almost bloodless operative field allowed easier phlebectomies; this is probably reflected in the reduced operative time.

Conclusions

In summary the Lofquist cuff is safe and effective as a tourniquet, significantly reducing peroperative blood loss, operative time and postoperative bruising in varicose vein surgery without any obvious drawbacks.

References

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