

Clean up varicose vein surgery—use a tourniquet

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Summary

A controlled randomised trial has been carried out to ascertain if there are tangible benefits from using a tourniquet when avulsing varicose veins during routine varicose vein surgery. Twenty-six patients have been studied. Twenty limbs were operated on with a tourniquet and 20 limbs without a tourniquet. The mean weight of varices excised was 2.76 g (range 0.51–8.79 g) with a tourniquet and 2.68 g (0.77–11.27 g) without a tourniquet (NS, Wilcoxon's rank sum test). Mean blood loss was 16 ml (0–136 ml) with a tourniquet and 107 ml (16–581 ml) without a tourniquet ($P < 0.01$, Wilcoxon's rank sum test). The mean time to complete avulsions was 38 min with a tourniquet and 35 min without a tourniquet (NS, Student's *t* test).

The tangible benefits of a tourniquet are limited to the saving of blood which can amount to 500 ml per leg. Losses could amount to 1 litre in bilateral cases operated upon without tourniquet. The method is simple, provides a clean operating field and should be more widely used.

Introduction

The use of a tourniquet in varicose vein surgery is described by Royle (1), and Farrands *et al.* (2) have recently reported on the benefits that can result. Very few surgeons use the technique despite its simplicity. Familiarity confirmed its simplicity and convenience but we wished to test the method by a controlled randomised trial to see if there were measurable benefits. In particular the improved operating conditions seem to offer the chance of a more complete excision of the varices and this has been tested by weighing the excised varices. Besides the obvious saving of shed blood it seemed there might also be a saving of operating time, particularly as there is less cleaning to do before applying the dressings.

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Methods

A prospective controlled randomised trial was carried out on 26 patients undergoing operation for primary varicose veins. The mean age of the group was 51 years (9 men, 17 women). A total of 40 lower limbs were studied, each limb being randomised at the start of operation. A coin was spun by the anaesthetist to decide whether or not a tourniquet was used. In bilateral cases the coin was spun twice, once to decide which surgeon operated on which leg (consultant or registrar), and a second time to decide on which leg the tourniquet was applied. In bilateral cases a tourniquet was always applied to one leg, with the intention that this would help to match the two groups of limbs. Severity was graded preoperatively as mild, moderate or severe, on an arbitrary basis before randomisation. Table I shows that the two groups were reasonably matched for age, sex, severity and operator. The slight excess of mild cases in the no-tourniquet group would produce a bias towards a higher yield of varices in the tourniquet group.

In all cases a standard operation was performed with flush saphenous vein ligation, stripping of the long saphenous vein to below the knee and multiple avulsions of varices through stab incisions. Where a tourniquet was used an Esmarch bandage was applied in the sterile

TABLE I *Legs studied*

	Tourniquet	No tourniquet
Number of legs	20	20
Average age of patients	49	52
Females	12	14
Grade:		
Mild	3	6
Moderate	15	12
Severe	2	2
Surgeon:		
Consultant	13	12
Registrar	7	8

field in a centripetal direction to exsanguinate the limb and was made secure on the mid-thigh. It was applied after the groin dissection, after insertion of the stripper and after avulsion of varices on the upper thigh. On completion the limb was firmly bandaged up to the tourniquet before this was removed. Groin wounds were closed with an absorbable subcuticular suture (PDS®, Ethilon) and the stab incisions with Micropore® adhesive tape (3M Health Care). As the operation proceeded the avulsed varices from each limb were carefully collected by the scrub nurse in a pot of saline. This helped to wash off some adherent blood. The intraoperative blood loss was measured by weighing swabs but attention was restricted to loss during avulsing, excluding losses during groin dissection and stripping. Besides small swabs, large abdominal packs were placed under the legs to absorb blood but no attempt was made to estimate further losses on to the drapes or the surgeon's gown. Hence, losses are underestimated, particularly where no tourniquet was used and where the measured loss was high. For each limb, time was measured from the start of avulsing to application of the last dressing. It included the time taken to apply the tourniquet where one was used. It excluded the time taken to dissect the groin and to insert the stripper into the long saphenous vein.

After the operation the excised varices were removed from the saline, mopped dry on absorbent paper and weighed. When no tourniquet was used the excised varices were bloodstained and the saline wash only partly removed the blood. Such varices would be expected to weigh slightly more and produce a bias in favour of the group with no tourniquet.

Wilcoxon's rank sum test was used in comparing the groups for the weight of varices excised and blood loss. Student's *t* test was used to compare operating times.

Results

The mean weight of the excised varices was 2.76 g (range 0.51–8.79 g) in the tourniquet group and 2.68 g (range 0.77–11.27 g) in the no-tourniquet group. There was no significant difference between the groups using Wilcoxon's rank sum test.

The mean blood loss in the tourniquet group was only 16 ml (range 0–136 ml), compared with 107 ml (range 16–581 ml) in the no-tourniquet group. By Wilcoxon's rank sum test the difference between the groups was significant ($P < 0.01$).

The mean operating time was 38 min (range 20–56 min) in the tourniquet group and 35 min (range 24–58 min) in the no-tourniquet group and the difference

was not significant (Student's *t* test). The 3-min difference is effectively the additional time to apply the tourniquet.

No significant difference was found between the consultant and the registrar in terms of weight of varices excised.

Discussion

The tourniquet has not been shown to be beneficial in terms of excising more varices or in saving operating time. There is a considerable saving of blood, on average about 100 ml per leg, but this is underestimated, particularly when losses are high. Blood loss tends to be ignored in varicose vein surgery, but we have shown that this can exceed 500 ml per leg without a tourniquet, which means losses in excess of 1 litre for bilateral cases without tourniquets. The tourniquet does not eliminate blood loss in all cases because some loss occurs where high thigh varices have to be avulsed before the tourniquet is applied. The measured losses are very similar to those reported by Farrands *et al.* (2).

Apart from the limitation of the high thigh varices the only practical problem is that the tourniquet may interfere with the passage of the stripper. The stripper is passed downwards from the groin before applying the tourniquet. The exit wound for the stripper is conveniently made in a bloodless field after the tourniquet has been applied.

There have been no complications from the use of a tourniquet but the toes may have a cyanotic hue for 1–2 h after operation, which on occasion has caused concern to nurses, who should be informed that a tourniquet has been used.

As with many details of surgical technique the choice comes down to the surgeon's preference. This technique can be recommended to surgeons who like to operate in a clean, bloodless field and the saving of blood is worthwhile. The method deserves wider use.

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References

- 1 Royle JP. Operative treatment of varicose veins. In: Greenhalgh RM, ed. *Vascular Surgical Techniques*. London: Butterworths, 1984:261.
- 2 Farrands PA, Royle G, Najmaldin A and Webster JHH. Varicose veins surgery: effect of tourniquet on intra-operative blood loss and postoperative cosmesis. *Br J Surg* 1987;74: 330.

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