Saphenous Nerve Injury Caused by Stripping of the Long Saphenous Vein

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Summary

Sensory impairment in the cutaneous distribution of the saphenous nerve was measured in 30 patients after bilateral stripping of the long saphenous vein. The vein was stripped upwards in one leg and downwards in the other. Three months after operation a significantly greater incidence of sensory loss was found in those legs in which the vein was stripped upwards (13 out of 26) compared with those which had been stripped downwards (6 out of 26).

We recommend that the long saphenous vein should be stripped downwards.

Introduction

Some surgeons prefer to strip the long saphenous vein downwards, while others prefer to strip the vein from below upwards. Since the saphenous nerve is in close proximity to the long saphenous vein distal to the knee, it is common for patients to complain of areas of diminished sensation in the area of the saphenous nerve after the stripping of the long saphenous vein.¹⁻³ We report the results of a trial to determine the incidence of sensory loss on the medial aspect of the lower leg following stripping of the long saphenous vein, and to ascertain whether the direction in which the vein is stripped affects the incidence and area of postoperative sensory impairment.

Patients and Methods

Patients attending two units in this hospital who required bilateral long saphenous vein stripping for varicose veins were included in the trial. Before operation, legs were examined neurologically by one of us (J.W.), who acted as neurological assessor throughout the trial. Disorders which might affect the sensory nerves of the legs were looked for (diabetes, arterial disease, lumbar disc lesions, and any neurological abnormality), and such patients were excluded from the trial. Any patients with a history of thrombophlebitis, or evidence of changes in skin and subcutaneous tissues which might make the saphenous nerve and the long saphenous vein more adherent to each other, were also excluded from the trial. A constant surgical technique was used. A short transverse incision was made at the groin to expose the saphenofemoral junction, and a 1 cm incision immediately above the medial malleolus to expose the lower end of the long saphenous vein. The vein was stripped upwards in one leg and downwards in the other. The choice of which leg to strip downwards was made at random by drawing cards marked "right" or "left." After the ligation and division of the long saphenous vein, the stripper was inserted either at the saphenofemoral junction or at the ankle. In some cases when it was

difficult to negotiate the stripper past valve cusps in a retrograde fashion a reversible-ended stripper was used (Graves-Lowers stripper). This enabled the head to be changed after the stripper had been passed from below up, and the vein then to be stripped from above down. In two patients, however, when the stripper was passed from below it appeared at the groin in the femoral vein having passed through a previously undetected perforating vein. These two patients were excluded from the trial after exploration and ligation of the perforating vein. Before completing the operation, any haematoma was evacuated via the groin incisions by sweeping firmly up the line of the saphenous vein with a rolled swab. The legs were kept raised while sterile crepe bandages were firmly applied. A compression bandage was not applied as the vein was stripped but no excess haematoma formation was observed. When the operation was over the stripped long saphenous vein was examined to detect any adherent peripheral nerve. Technical difficulties during operation excluded a number of patients from the trial. Small incisions for avulsion of superficial varicosities did not exclude patients from the trial, but patients requiring exploration for perforating veins or surgery to the short saphenous vein were not included. The neurological assessor was not told the direction of vein stripping.

On the sixth postoperative day, and at attendance in the outpatient department three months later, the patients were asked whether they had noticed any sensory impairment in their legs. Then the legs were examined neurologically. Any areas of impaired or lost sensation were mapped out with felt pen on the patient's legs and then on to tracing paper and graph paper. Thus a permanent quantitative record of any sensory impairment in the legs was obtained. Areas of sensory impairment outside the cutaneous distribution of the saphenous nerve were discounted.

Results

The trial included 30 consecutive patients, of whom 8 were men and 22 were women. The mean age was 39 years. All of the patients were assessed on the sixth postoperative day, but four failed to attend for three month follow-up.

No nerve tissue was seen attached to any of the stripped long saphenous veins.

SUBJECTIVE SENSORY IMPAIRMENT

On the sixth postoperative day 3 legs out of 60 (5%) had subjective sensory loss in the cutaneous distribution of the saphenous nerve (table I).

TABLE I—Sensory Impairment on Sixth Postoperative Day after Stripping of Long Saphenous Vein

	Legs stripped Upwards (n = 30)	Legs stripped Downwards (n = 30)
Subjective sensory impairment . . .	1	2
Objectively determined sensory impairment . . .	10	12
Mean areas of sensory loss . . .	29.7 cm ² (range 2 to 66 cm ²)	91.8 cm ² (range 3 to 492 cm ²)

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At three months follow-up 8 legs out of 52 (13%) had areas of subjective sensory impairment. One patient complained of bilateral sensory loss, while six complained of loss in the legs which had been stripped upwards. The greater incidence of subjective sensory impairment noted by the latter patients three months after operation is significant ($P < 0.05$) (table II).

TABLE II—Sensory Loss Three Months after Stripping of Long Saphenous Vein

	Legs stripped Upwards (n = 26)	Legs stripped downwards (n = 26)
Subjective sensory impairment . .	7	1
Objectively determined sensory impairment	13	6
Mean areas of sensory loss	39.9 cm ² (range 1 to 120 cm ²)	36.5 cm ² (range 2.5 to 92 cm ²)

OBJECTIVE SENSORY LOSS

On the sixth postoperative day 22 out of 60 legs (37%) had objective sensory loss. Eight patients had bilateral, and six unilateral, sensory impairment. There was no significant difference between the incidence of loss in those legs in which the vein was stripped upwards (10 out of 30) and those in which it had been stripped downwards (12 out of 30) (table I).

The varying areas of sensory loss extended from the region of the medial malleolus upwards on to the medial aspect of the legs (fig. 1). When the area of impaired sensation in the 30 legs in which the vein had been stripped upwards (mean 29.7 cm², range 2-66 cm²) is compared at six days with the area of impaired sensation in the 30 legs in which the vein had been stripped downwards (mean 91.8 cm²; range 3-492 cm²) no significant difference (X^2) can be shown ($t = 1.407$), though the mean areas are considerably different.

FIG. 1—Diagrammatic representation of typical site and area of sensory loss after stripping.

At three months follow-up 19 out of 52 (37%) had an area of sensory impairment. In four patients there was bilateral, and in 11 patients unilateral, sensory loss. There was a significantly greater incidence of sensory impairment in legs in which the vein had been stripped upwards (50%), as compared with

23% (6 out of 26) in those stripped downwards ($P < 0.05$). The area of sensory loss in the 13 patients in whom the vein had been stripped upwards (mean 39 cm²; range 1-120 cm²) was similar to the area lost in those stripped downwards (mean 36.5 cm²; range 2.5-92 cm²) with no statistically significant difference.

Of the 10 legs with observed sensory loss at six days, in which the vein had been stripped upwards, only two had returned to normal at follow-up three months later. However, of the 12 legs with sensory loss in which the stripper had been passed downwards 6 had returned to normal. Sensory impairment was detected for the first time at the follow-up in seven legs in which no sensory loss had been detected on the sixth postoperative day.

Discussion

Sensory disturbance in the cutaneous distribution of the long saphenous nerve is a well-recognized complication after stripping of the long saphenous vein.¹⁻⁵ Nevertheless, the incidence of sensory disturbance has not been reported, nor the area of skin involved measured. Sensory impairment may be transient³ or permanent,⁴ and may be due to trauma to the saphenous nerve caused by the passage of the stripper, or to the dissection of the saphenous vein at the ankle.¹ Garnjobst² gives the same explanation for the transient sensory losses, but noted that in four patients who had suffered permanent sensory loss secondary incisions were present just below the knee on the medial side of the leg. For this reason, patients requiring such incisions were excluded from our trial.

The results of this trial show that in the immediate postoperative period after stripping patients are unlikely to be aware of sensory loss in the legs. Areas of sensory impairment were detected by simple neurological tests in 37% of legs on the sixth postoperative day. At the three month follow-up, 27% of legs had subjective areas of impaired or lost sensation in one or both legs, and there was objective evidence of impaired sensation in 37% of legs.

At six days postoperatively there was no significant difference

FIG. 2—Long saphenous vein and nerve just below knee. Vein is further from nerve at this point but branches occur in close relationship to vein and show inverted V effect. Arrows from above downwards show: (1) main-stem saphenous nerve; (2) inverted V of saphenous nerve lying on main trunk of long vein.

FIG. 3—Close proximity of long saphenous vein to saphenous nerve in lower third of leg. Branching portion of nerve lying astride vein is clearly seen. Arrows from above downward show: (1) close proximity of nerve (R) to vein (L); (2) and (3) branching of nerve in close relation to and on surface of vein.

in the number of patients with sensory loss after stripping up or down. There was, however, a greater area of loss after stripping downwards, but by three months the difference in area was not significant. The reason for this is that those patients who had sensory loss after stripping downwards showed a greater tendency for the area to decrease or completely resolve (9 out of 12 legs) compared with those legs which had been stripped upwards (5 out of 10 legs). We believe the likely explanation is that though the bulk of vein attached to the stripper on stripping downwards does traumatize the nerve it causes only a neuropraxia, whereas stripping upwards is more likely to cause avulsion of branches of the nerve, which is not recoverable. The incidence of sensory

disturbance at three months, whether judged by the patients' observations or by simple objective neurological tests, was significantly greater in those legs in which the vein had been stripped upwards. The difficulty in performing neurological tests on the legs of patients within a few days of stripping varicose veins may explain the increased incidence of sensory loss detected at three months.

The anatomical relationship between the saphenous nerve and the long saphenous vein probably explains the increased incidence of sensory disturbance found in legs in which the stripper had been passed upwards. The saphenous nerve (L3, 4) supplies the medial side of the lower leg, and becomes subcutaneous at the knee. At this point it is deep to the long saphenous vein, and separated from it by subcutaneous fat. The nerve becomes progressively more closely related to the vein as it descends to the ankle, and commonly bifurcates, straddling the vein near the junction of the middle and lower third of the leg (figs. 2 and 3). We would suggest that in stripping the long saphenous vein upwards the head of the stripper may engage the inverted V formed by the branching saphenous nerve, and so may avulse portions of nerve.

Measured areas of lost sensation diminished between the sixth postoperative days and the three months follow-up in legs which had been stripped downwards (91.8 cm^2 - 36.5 cm^2) but remained roughly comparable in those stripped upwards (29.7 cm^2 - 39.9 cm^2) (tables I and I). This supports our suggestion that, whereas stripping in an upward direction may lead to avulsion of the nerve by engagement of the head of the stripper in a bifurcation, stripping from above downwards tends to cause less severe nerve injuries with earlier recovery.

We suggest that the long saphenous vein should be stripped from above downwards to lessen trauma to the saphenous nerve below the knee.

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References

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