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A Prospective Study of Cutaneous Nerve Injury Following Long Saphenous Vein Surgery

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Objectives. *The aim of this study was to identify the incidence and distribution of nerve damage in patients undergoing primary venous surgery.*
Methods. *Patients undergoing primary great saphenous vein surgery between February and November 2003 were enrolled. In all cases the great saphenous vein was 'flush' ligated at the sapheno–femoral junction and stripped to the knee by inversion without using a stripper head; multiple phlebectomies were performed using an Oesch hook. A vascular nurse followed up patients 6 weeks post-operatively. Those reporting altered sensation and/or pain were examined by a doctor to provide an objective assessment of any neurological damage. These patients were again followed up by telephone at 6 and 12 months.*
Results. *Sixty-three limbs from 54 patients were enrolled. Numbness or paraesthesia was identified in 17 (27%) limbs at 6 week follow-up. 11 (17%) limbs were affected below the knee and 7 (11%) limbs were affected at the thigh or groin. One of the limbs was affected above and below the knee. Of these 17 limbs there was resolution in six limbs at 6 months and nine limbs at 12 months. Two patients with persistent nerve lesions regretted undergoing surgery.*
Patients undergoing bilateral surgery were more likely to report abnormal sensation (χ^2 test, $p=0.006$). There was no significant difference between the incidence of nerve injury for consultant, SpR or SHO as first operator (χ^2 test, $p=0.9$).
Conclusion. *This study demonstrates the frequency of nerve injury during primary great saphenous vein surgery. It will be useful for clinicians providing informed consent and may provide a benchmark for comparison with newer techniques.*

Keywords: Varicose vein; Nerve injury; Surgical treatment, saphenous vein stripping.

Introduction

Varicose veins are a significant cause of morbidity in the UK and are estimated to cost 2% of the total National Health Service budget.[1] 10–15% of men and 20–25% of women suffer varicose veins, and although there is general consensus about the optimum treatment of the problem, the results are not perfect. Complications of varicose vein surgery are the commonest cause of litigation in general surgery.[2] These include recurrent varicose veins, infection, unsightly scarring and nerve damage.

Nerve damage resulting from surgery has been recognised as a problem for many years but there is very little data on the frequency and prevalence of this problem. Retrospective estimates of the incidence of nerve damage when the great saphenous vein is stripped from the groin to the ankle range from 23 to 40%.[3,4] One prospective study estimated it to be 20% 3 months post-operatively.[5] Prospective studies of nerve damage when the vein is stripped to the knee range from 19% at 6 weeks to 7% at 3 months.[6,7]

A recent review of nerve injuries and varicose vein surgery by Sam *et al.* highlights the lack of data about this seemingly common problem and it is clear that further information would be useful.[8] The aim of this study was to prospectively evaluate the incidence of cutaneous nerve injury following great saphenous vein surgery.

Methods

Patients with primary (non-recurrent) great saphenous varicose veins requiring surgery were invited to take part in the study at the time of pre-operative assessment. Patients excluded from the study were: Those unable or unwilling to participate, patients with a history of surgery on the limb to be operated on and patients with abnormal neurological findings at pre-operative assessment (e.g. due to previous trauma,

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ulceration or diabetic neuropathy). All neurological assessments were made by members of the surgical team.

The presence of sapheno–femoral reflux was confirmed by hand held (continuous wave) Doppler ultrasound examination. The veins were marked pre-operatively with the patient standing. As part of our usual consent process, patients were warned about the risk of nerve damage and invited to attend follow-up at 6 weeks.

All operations were performed by a consultant, specialist registrar or senior house officer (always in the presence of a consultant or specialist registrar with an interest in vascular surgery). All operations were performed supine, with head down tilt, and under general anaesthesia. Surgery was undertaken through a small skin crease incision, centred over the sapheno–femoral junction. Tributaries were ligated with 00 Vicryl (Ethicon, UK) and then the great saphenous vein was divided and ligated at its junction with the femoral vein. A vein stripper (AstraTech, Sweden) was introduced into the proximal end of the great saphenous vein and passed distally to a point between 4 and 8 cm below the level of the knee joint. The stripper tip was retrieved through a 0.5–1 cm longitudinal incision. The proximal end of the vein in the groin was fastened to the stripper with a ligature and the vein stripped from groin to calf without using a stripper head to allow inversion of the vein. Phlebectomies were performed at points marked pre-operatively using stab incisions made with a size 11 surgical blade (Swann-Morton, UK). Varicosities were delivered through the wounds using Oesch hooks (Downs Surgical, UK). The groin incision was closed with 00 Vicryl for subcutaneous tissue and 000 Monocryl (Ethicon, UK) for the skin. The stripper exit and phlebectomy wounds were closed with 000 Monocryl (stripper wound) and Urgostrips (Urgo, France).

At 6 weeks, each patient was interviewed and examined by a specialist vascular nurse (not involved in the surgical procedure). Patients were asked specifically about pain, numbness, tingling, burning, altered sensation and weakness. A neurological examination was performed to identify potential motor or sensory neurological deficits. The sensations tested were light touch (using cotton wool) and pain (using a neurological examination pin). The patient was asked to close his/her eyes and asked to respond when touched. The whole of each operated limb was examined. Where an area of numbness was identified the borders were defined by testing from the abnormal area to the normal area. Where an area of dysaesthesia was identified the area was mapped from the normal to the abnormal area.

Patients with no subjective or objective neurological deficits were discharged with no further plans for review. Patients with neurological deficits were seen by a doctor to confirm and record the position and extent of the deficit. These patients were then contacted by telephone 6 months following surgery and questioned about the persistence of the deficit at this stage. They were also asked at this stage whether or not they regretted having undergone vein surgery. Patients with a neurological deficit at 6 months were again contacted by telephone 12 months following surgery.

Statistical analysis was performed by constructing contingency tables and testing with chi-square statistic. Significance was considered to have been reached when $p<0.05$.

Results

Between February 2003 and November 2003, 54 patients underwent surgery. Seventy-one percent were classed as CEAP 2 with 24% CEAP 4 and 5% CEAP 5 (Table 1). Nine received bilateral surgery; giving a total of 63 limbs in the study. Of the 54 patients, 49 were female and the median age was 51 years (range 25–78 years). The results are summarised in Fig. 1.

6 week follow-up

At 6 week follow-up, neurological deficits were identified in 17 (27%) limbs from 15 patients. Of this group of 17 limbs, six were affected above the knee, 10 below the knee and one both above and below the knee (Table 2). This gives a total of seven above and 11 below knee deficits. No motor deficits were detected. At this stage, the majority of deficits were on the medial aspect of the limb; five on the thigh, eight on the leg and two on the ankle. Therefore, 10 of the 64 (15.6%) limbs undergoing surgery had deficits that could be attributed to saphenous nerve branch injury.

The incidence of nerve injury in relation to grade of first operating surgeon in order of consultant, registrar and senior house officer were 36, 25 and 28%, respectively. There was no statistical difference between them (χ^2 test, $p=0.9$).

There were eight affected limbs in six of the nine patients undergoing bilateral surgery (i.e. eight of 17 which is 47%). χ^2 analysis showed that patients undergoing bilateral varicose vein surgery were