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Nerve Injury and Small Saphenous Vein Surgery

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Objective. *To assess nerve injuries in small (short) saphenous vein surgery.*
Design. *Prospective study.*
Methods. *During a five and a half year period, 272 small saphenous vein operations were studied in 217 consecutive unselected patients, to assess postoperative nerve injuries. Patients with nerve injuries were treated and followed-up by an independent peripheral nerve surgeon.*
Results. *A peripheral nerve injury occurred three times in 272 procedures: two sural nerve injuries and one common peroneal nerve injury. There was a full recovery of all three nerve injuries, the latest after 18 months.*
Conclusions. *Nerve injuries following small saphenous vein surgery are rare and may have a good recovery.*

Keywords: Small saphenous vein surgery; Nerve injury; CEAP classification.

Introduction

Varicose vein surgery and nerve injuries and are well described for the great saphenous vein.[1] There are no large series observing nerve injuries in small saphenous vein surgery.[1–6] Also more than half of the respondents of a recent survey have seen major disabling nerve damage as a complication of small saphenous vein surgery.[5] The aim in this prospective study is to assess the frequency and outcome of nerve injuries following small saphenous vein surgery in regard of potential prevention of nerve injuries.

Patients and Methods

In a five and a half year period (1st January 1999–30th July 2004) 217 consecutive unselected patients underwent 272 small saphenous vein procedures (1357 great saphenous vein procedures were performed in the same period).

The study population comprised of 166 female (76%) and 51 male (24%) patients. The age ranged from 22 to 80 years (mean 52.6 years). Fifty-five patients (25%) underwent bilateral procedures. Ninety-four patients (43%) underwent great saphenous vein surgery at the same occasion. Ten times a sapheno-popliteal disconnection was performed due to pure sapheno-popliteal incompetence with a normal, competent small saphenous vein and 262 times the small saphenous vein was stripped. The chronic lower extremity venous disease was classified according to the CEAP classification. Venous insufficiency was classified as in C6 in 11 cases (4%), as C5 in three cases (1%), and as C4 in 29 cases (11%). The remaining 229 cases (84%) were C2. Etiology was primary. The anatomical distribution was as four in all patients. Pathophysiologic mechanism was reflux in all patients. In 14 patients recurrent phlebitis was an additional indication for operation. Some 17 patients had undergone one or more previous venous popliteal procedures.

Surgical technique

The sapheno-popliteal junction was marked preoperatively (Colour duplex ultrasonography, Acuson Aspen/Sequoia, Acuson Corporation, Mountain View CA, USA).The poplitea was accessed via a transverse incision and absorbable suture material was used for the high ligation (Vicryl, Ethicon Endo-Surgery, Johnson and Johnson Company, Spreitenbach, Switzerland). The small saphenous vein was stripped when it was found to be incompetent in the

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preoperative duplex ultrasonsography to reduce recurrence rates by disconnecting the mid-calf perforator and communicating veins to the great saphenous system.[1] The sural nerve was identified when the small saphenous vein was dissected. No other nerves were exposed. Retractors were handled with greatest care. The small saphenous vein was stripped from proximal to distal to avoid nerve injuries.

A conventional stripper (Vastrip, Astra Tech, Sweden) was used. Stab avulsions were made as preoperatively marked. According to the protocol all patients were pre- and postoperatively checked for a sensitive or motoric deficit by an independent surgical registrar. All patients were checked again by the angiologist or the operating surgeon 10 days after the operation. In case of a nerve deficit the patients were followed up by with an independent peripheral nerve surgeon until full recovery.

Results

Three patients had diabetic polyneuropathy that was postoperatively unchanged compared to preoperatively. There was no other preoperative nerve deficit. In three patients, a nerve injury occurred (1.1%). Once it was a common peroneal nerve injury (0.37%) and twice a sural nerve injury (0.74%).

A 24 year old patient underwent disconnection of a very lateral and supra-popliteal junction The procedure was uneventful. Postoperatively there was a complete common peroneal paresis on the operated side. There was no activity at all evocable in the electromyography. The peripheral nerve surgeon revised in a second procedure the peroneal nerve. The latter was macroscopically 100% intact, there was no relevant haematoma. The patient needed an orthesis and physiotherapy. The gradual and full recovery of the common peroneal nerve took 15 months.

A 39-year-old female underwent bilateral small saphenous ligation and stripping. On the left side there was postoperatively a 5 by 8 cm area of hypaesthesia on the mid dorsal lower calf. Gradually and without any treatment the sensation came back fully within 18 months.

A 68-year-old male with chronic skin changes underwent unilateral small saphenous ligation and stripping of the small saphenous vein. At the time of the stripping a portion of 15% of the sural nerve was torn just at the level of the distal, retromalleolar incision. It was repaired by the peripheral nerve surgeon with perineural suturing within the same procedure. This patient had clinically no neurological deficit at any time of the follow-up.

No patients had a painful neuritis. There was no delayed onset of neurological complaints after 10 days.

In general, there were no neurological deficits resulting from pre-existing or hospital acquired vertebral pathology. There was no neurological deficit caused by spinal anaesthesia.

Discussion

Surgery of the small saphenous vein is a common operation. The procedure carries a small risk of peripheral nerve injury.

The nerve injury can involve the sural nerve, the peroneal or tibial nerve or smaller branches. Neurological deficits become obvious in careful postoperative examination.

If the nerve injury in the form of a macroscopic discontinuation is discovered during surgery, immediate operative repair is recommended to achieve the best outcome. Most of these nerve injuries may not be visible at the time of the operation. The sural nerve can be injured during the stripping of the vein and, therefore, the injury may not be visible. Blunt instruments held during operation to achieve a clear operating field can cause nerve injuries in spite of careful handling. Nerve injuries other than those resulting in a small sensory deficits should be investigated by a neurologist to define the type and extent of the injury and to define the treatment.

As nerve injuries in great saphenous vein surgery or stab avulsions are well documented we did our study of nerve injuries in small saphenous vein surgery only.[1]

In our patients we had three nerve injuries in 272 small saphenous vein procedures. Once the peroneal nerve was involved and twice the sural nerve. Our three patients with nerve injury had a full recovery.

For the sapheno-politeal ligation we dissected the small saphenous vein down to the sapheno-politeal junction without formal exposure of the popliteal fossa.[5]

We believe that the blunt retractors caused the peroneal nerve injury in spite of careful handling at the time. The revised nerve was macroscopically 100% intact and there was no relevant haematoma. Due to the lateral and supra-popliteal position of the sapheno-popliteal junction in this patient the peroneal nerve was closer than normally positioned sapheno-popliteal junctions. Ligation of the small saphenous vein more distal to the junction may avoid in very lateral and supra-popliteal junctions the risk of

peroneal nerve injury by avoiding pressure by blunt retractors close to the peroneal nerve.[5] But this may carry a higher risk of local recurrence.

In conclusion, nerve injury following small saphenous vein surgery is rare. We recommend neurological examination in all patients undergoing vein surgery pre- and postoperatively. In very lateral and suprapopliteal junctions more distal ligation may reduce the risk of peroneal nerve injury. The outcome of these nerve injuries may be benign. Nevertheless medicolegal action may occur.[1,4,5] Therefore, and in general all patients should have an informed preoperative consent including the risk of nerve injuries.

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