SHORT REPORT

Complications following sural and peroneal nerve biopsies

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Nerve biopsy is used as part of the investigation of patients with peripheral neuropathy and is particularly useful in confirming the diagnosis of peripheral nerve vasculitis. Previous studies have suggested that sampling the peroneal nerve, in combination with peroneus brevis, is more sensitive than the sural nerve for this diagnosis but there are no published data on the complication rate of peroneal nerve biopsies. We have assessed the complications in 50 patients undergoing nerve biopsy, and have shown that although biopsy of the peroneal nerve may result in a larger area of sensory loss in some patients, other complications are not increased when compared with sural nerve biopsy.

Peripheral nerve biopsy can be a useful investigation as part of the assessment of a patient with peripheral neuropathy,^{1 2} particularly for the investigation of peripheral nerve vasculitis and paraproteineic neuropathies.² The peroneal nerve is the most frequently affected peripheral nerve in vasculitic neuropathy,^{3 4} and although a randomised controlled study has not been carried out, using combined superficial peroneal nerve and peroneus brevis muscle biopsy to investigate peripheral nerve vasculitis has a sensitivity of about 60%,^{4 5} compared with less than 50% with sural nerve biopsy.^{4–7} However, this procedure is not commonly undertaken in the UK. There are a number of publications documenting the complications following sural nerve biopsy^{1 6–16} but there are no published data on the complications after peroneal nerve biopsy. We have reviewed the complications in a series of 50 patients undergoing peroneal and sural nerve biopsies for the investigation of peripheral neuropathy.

METHODS

All patients had their biopsies performed in one institution as day case procedures under local anaesthetic, between 1998 and 2004, by a single operator (DAH). The nerve biopsies were taken from either the superficial branch of the common peroneal nerve in the lower third of the leg, or the sural nerve, posterior to the lateral malleolus. In general, patients who were considered clinically to have a high likelihood of vasculitis had combined peroneal nerve and peroneus brevis biopsies, and those with a symmetric distal neuropathy, sural nerve biopsy. Approximately 3 cm of nerve were resected, and in the case of peroneal biopsies, two or three samples of adjacent peroneus brevis, each measuring approximately 0.5 cm³, were removed via the same incision. Skin closure was with 4–6 interrupted nylon sutures. A pressure bandage was applied postoperatively and patients were instructed to rest the leg with elevation as much as possible for 48 h after surgery. Sutures were removed by the practice nurse 10–14 days postoperatively.

Patients were selected for this study to ensure that there were similar numbers of each type of biopsy but they were otherwise consecutive cases. Patients were invited to attend an outpatient clinic for the purposes of the audit, and those who did not attend were contacted by telephone. The assessments were carried out by a neurologist using a questionnaire. Individuals were asked about the presence of preoperative and postoperative dysaesthesia, paraesthesia, pain and numbness. If a

symptom was present preoperatively, they were asked whether it had become worse postoperatively. In those patients that were seen in the audit clinic, sensation was formally tested.

RESULTS

Patient follow-up ranged from 16 to 87 months post-biopsy (median 31 months) and ages from 33 to 81 years (median 63 years). Twenty-four patients had sural nerve biopsies and 26 peroneal nerve biopsies. Twenty-seven patients were reviewed in the outpatient clinic and the remainder by telephone interview with the neurologist. Of those who were contacted by telephone, seven had sural nerve biopsies and 17 peroneal nerve biopsies. Table 1 illustrates the final diagnoses.

Neurological complications

Reduced sensation in the distribution of the biopsied nerve, compared with the contralateral leg, was present in 24 of the 27 patients examined, although this was variable (fig 1). In two of the three patients for whom sensory loss could not be identified, there was a moderate pre-existing loss. Seventeen (34%) patients noted new onset or increased postoperative pain at the biopsy site immediately following surgery, and in 11 (22%) it was persistent at the time of review. Sixteen patients noted new onset or increased dysaesthetic symptoms immediately following surgery and 10 at the time of follow-up (20%). Paraesthetic symptoms were noted in 23 (46%) patients immediately following surgery and this was present at review in 23 (46%).

Patients who underwent peroneal nerve biopsies had an age range of 41 to 81 years (median 63), with a follow-up period of 18–62 months (median 25). This compares with an age range of 33–79 years (median 63) and follow-up period of 16–87 months (median 42) for patients undergoing sural nerve biopsy. Complication rates were generally higher in patients undergoing sural nerve biopsies with 7 (29%) reporting postoperative pain, 7 (29%) dysaesthesia and 9 (38%) paraesthesia at the time of follow up. These values compare with 4 (15%) patients reporting pain, 3 (11%) dysaesthesia and 14 (54%) paraesthesia in those undergoing peroneal nerve biopsy. It was noted that the 16 patients who had pain preoperatively had a 38% chance of an increase in painful symptoms following biopsy, whereas 34 patients who did not have pain as a symptom preoperatively had a 15% chance of developing the symptoms postoperatively. In the 20 patients who had reduced sensation preoperatively, 15% developed new onset or increased dysaesthesia, 15% paraesthesia and 15% pain postoperatively. These values compare with patients who have had normal sensation preoperatively of whom 23% developed dysaesthetic

Table 1 Final diagnoses of the patients

Axonal neuropathy without specific features	33
Peripheral nerve vasculitis	6
Chronic inflammatory demyelinating neuropathy	3
Paraproteinaemic neuropathy	2
Motor neuron disease	2
X linked spinobulbar atrophy	1
Familial neuropathy	1
Uncertain	2

Figure 1 Diagram illustrating area of reduced sensation in those patients reviewed in clinic. Findings in 10 patients who underwent peroneal nerve biopsy (A, B) and in 14 who underwent sural nerve biopsy out of 17 examined, who had sensory loss (C).

symptoms, 66% paraesthetic symptoms and 30% pain. Although these values suggest a correlation between the presence of preoperative symptoms and postoperative complications, the small number of cases precluded useful statistical analyses.

Surgical complications

Overall, nine patients reported a delay in wound healing (greater than 3 weeks), five of whom were treated with postoperative immunosuppression, and one was a diabetic. In four of these patients, wound infection was reported. Two patients suffered from postoperative haematomas which did not require specific treatment. In one patient a neuroma was noted on examination but the patient was not aware of this previously.

DISCUSSION

Our findings are similar to those found in previous studies on sural nerve biopsies. Using cumulative data from previous studies, 117/396 (30%) patients suffered postoperative pain,^{1 8–10 13–16} 49/123 (40%) paraesthesia^{8 9 16} and 68/204 (33%) dysaesthesia,^{8–10 13 15} and wound infection was reported in 20/242 (8%) patients.^{1 14–16} Although follow-up periods and patient groups varied, these data are similar to our findings.

In general, we found that the complication rates were slightly lower in patients undergoing peroneal nerve biopsy, although this may, in part, be due to the lack of preoperative unpleasant symptoms in these patients, as the peroneal nerve was chosen as the biopsy site in mononeuritis multiplex and the sural nerve in distal symmetrical neuropathy.

The significant rate of complications following peripheral nerve biopsies in our study highlights the importance of only undertaking this procedure when there is a reasonable likelihood of detecting a treatable disorder. Fascicular biopsy has been investigated as an approach to reduce complications without success.¹⁰ Some authors have advocated immobilising the leg in a plaster cast for at least 7 days following surgery to aid wound healing² and one group has used microsurgical repair to reduce neurological problems.¹⁷ However, this latter method can only be used if no more than 1 cm of nerve is removed.

Although some patients undergoing peroneal nerve biopsy had a relatively large area of reduced sensation postoperatively, we did not find an increase in painful neurological complications compared with patients undergoing sural nerve biopsy. Given that peripheral nerve vasculitis is one of the most common treatable conditions diagnosed by nerve biopsy and that combined peroneal nerve and peroneus brevis may be more sensitive than sural nerve biopsy in diagnosing vasculitis,^{4–7} we recommend sampling the peroneal nerve in conjunction with the peroneus brevis when vasculitis is a possibility.

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