Peripheral Nerve Schwannomas – an Analysis of 16 Patients

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Summary

16 patients with peripheral nerve neurinomas (benign schwannomas) were operated upon in our hospital between 1990–1995. The largest tumours were found on proximal segments of peripheral nerves (brachial plexus: 15 cm, sciatic nerve: 20 cm). The average duration of symptoms was 1 1/2 years (range: 3 months – 15 years). Pain or painful paraesthesias were the main complaints (13/16). Postoperatively, 9 patients were painfree while 4 improved. Similarly, neurological deficits were favourably influenced by the operation: Out of 5 patients with motor deficits 4 had complete, 1 patient had partial recovery. One out of 4 patients with sensory deficits had complete recovery, 2 remained unchanged, while 1 worsened. Two patients developed new motor and 6 patients new sensory deficits, which (in the course of time) did not disappear completely. New deficits developed predominantly in patients with large tumours or longstanding symptoms. Tumour recurrences were not seen during the follow-up period of 23 months. Our findings revealed that in the majority of cases peripheral nerve neurinomas can be excised with good results. Patients should be treated by a neurosurgeon with special expertise in peripheral nerve surgery. The patient should be thoroughly informed pre-operatively about any eventual new neurological deficits following surgery.

Keywords: Benign Schwannoma; peripheral nerve surgery.

Introduction

Tumours arising from peripheral nerves are rare, the commonest being the (benign) neurinoma. The term neurinoma dates back to 1910, when Verocay was the first to postulate that this tumour has histologically to be distinguished from neurofibromas [13]. He was also the first to state the (meanwhile) widely acknowledged theory, that this tumour arises from Schwann cells [12]. In the Anglo-American literature the tumour is called Neurilemmoma or Schwannoma (according to its origin).

Intraspinal neurinomas and the so-called acoustic neurinoma are the most commonly reported tumours in the literature with regard to surgical excision. For surgical treatment of extraspinal neurinomas of the peripheral nerves, however, there exist only a few reports comprising of small series or case reports [2, 7, 9, 12, 14]. In larger series [10] often important parameters as the affected nerve, the patient’s history and the pre-and postoperative neurological state are not sufficiently defined to allow comparison of clinical results.

In 1922, Sommer wrote: “The favourable prognosis of a peripheral neurinoma in general is restricted by the fact, that radical resection of the tumour without the bearing nerve is impossible in many cases...” [11]. With microsurgical techniques, however, one should expect that neurinomas could be excised more gently.

The present study reports the results of 16 patients we operated upon for peripheral nerve neurinomas.

Patients and Methods

Included in the present study are 16 patients (7 males and 9 females) whose ages ranged from 28 to 67 years (mean: 48 years), who were operated in our hospital between 1990 and 1995. In most of the cases the diagnosis of a peripheral nerve neurinoma could be established pre-operatively by a combination of symptoms consisting of a visible (in distal localizations) or palpable mass in the course of a peripheral nerve, by (spontaneous or elicitable) referred pain or paraesthesias or neurological deficits corresponding to the affected nerve. MRI usually showed a well-defined mass with enhancement after injection of Gadolinium and cystic formations. Five patients had been operated on elsewhere prior to admission. Two patients had biopsies, 2 a partial resection of the tumour and 1 only inspection. Following these procedures 1 patient suffered from a transient and 1 patient from a persistant sensory deficit. Despite the fact, that the histological diagnosis of a neurinoma was
confirmed in 3/5 cases, only 1 patient was referred to a neurosurgical department thereafter. The 4 other patients were admitted after 7 months, 4 years (2 patients) and 7 years because of persistent or progressive symptoms.

To resect the peripheral nerve neurinoma, the tumour as well as its parent nerve were exposed. Using microsurgical techniques, the unaffected nerve fascicles, displaced by the tumour, were dissected from the tumour capsule and the nerve element from which the tumour arose was identified (Fig. 1). In general the tumour bearing nerve element was a very thin fascicle, from which the tumour was then resected either in toto or after piecemeal removal of the centre first. Only in 2 cases was a partial autologous nerve graft necessary.

On average, patients were discharged 3 days after surgery. The average follow-up period of all 16 patients was 23 months. The postoperative neurological status of each patient was documented at the end of their hospital admission. Eleven patients were seen at least once in our outpatient department (mean: 11 months after surgery). Seven patients were evaluated later by telephone interview.

Results

1. Duration of Symptoms

The shortest duration of symptoms was 3 months and the longest 15 years (median 1 1/2 years). To one patient the duration of symptoms was unknown.

2. Tumour Site

Two tumours were localized in the brachial plexus (posterior cord, origin of the radial nerve), 5 in the median nerve (axilla, forearm (3x), wrist), 2 in the ulnar nerve (upper arm, Loge de Guyon), 1 in the radial nerve (elbow), 1 in the sciatic nerve (gluteal region), 2 in the tibial nerve (lower leg) and 2 in the peroneal nerve (fibular head, lower leg). One was located in the skin without clear evidence of its origin from a nerve.

3. Tumour Size

The smallest tumour had a diameter of 0.5 cm while in the largest sized it was 20 cm (median: 2 cm). The largest tumours were found in proximal segments of the peripheral nerves (sciatic nerve: 20 cm, brachial plexus: 15 cm). In one case the tumour size was not documented. 10 patients had recognized a growing mass in their history. Interestingly, the 2 largest tumours of the series (see above) were not recognized by the patients as a mass. In 14 patients the mass could be identified by palpation (not in the 2 patients with tumours arising from the tibial nerve).

4. Histology

In all the 16 patients the diagnosis of “Neurinoma” or “benign Schwannoma” was histologically confirmed. The most frequent tissue type was Antoni A (n = 5) and mixed types A and B (n = 5). In 2 patients an Antoni B tumour was seen. In the remaining 4 cases tissue typing was not possible [1]. The patient with the largest tumour of the series (20 cm, sciatic nerve) suffered from Neurofibromatosis type 1.

5. Clinical Results

Pain: Pre-operatively, pain or paraesthesiae were present in 13/16 patients. In 9 patients pain was the only symptom. Nine patients became painfree, and pain improved in the remaining 4. No patient developed pain after surgery.

Motor deficits: 5/16 patients had pre-operative motor deficits. After surgery deficits disappeared completely in 4 of them and partially in 1 patient. 2 patients presented new motor deficits following surgery. 1 recovered partially and 1 remained unchanged. Both had had symptoms of long duration (6 and 10 years) and one had the largest tumour of the series (20 cm).

Sensory deficits: 4/16 patients had sensory deficits. Postoperatively, in 1 patient the deficits disappeared, remained unchanged in 2 and worsened in 1. New and persisting sensory deficits developed after surgery in 6 patients. Among them were both patients with the largest tumours (15 and 20 cm) and 3 patients with the longest pre-operative duration of symptoms and signs (6, 10 and 15 years).

6. Tumour Recurrence

No recurrences were observed during the mean follow-up of 2 years (23 months). In one patient with a