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NEURILEMMOMA OF PERIPHERAL NERVES

A Report of Fourteen Cases, Including Three of the Lateral Popliteal Nerve

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Neurilemmomas are benign tumors of the nerve sheaths. They are usually painless and are often discovered accidentally (Stout 1935), very rarely causing motor disturbances (Seddon 1954, Buck-Gramcko 1958).

Neurilemmomas are most common in the upper extremities but may appear anywhere. Especially rare are neurilemmomas of the lateral popliteal nerve in the region of the fibular head. To the best of our knowledge, only 3 such cases have previously been reported in the English literature.

The following series of 14 neurilemmomas operated upon in our department included 3 cases in which there was involvement of the lateral popliteal nerve.

MATERIAL

During the past 15 years in our department operations for 14 neurilemmomas found in 9 patients have been performed. In 3 patients there were from 2 to 3 tumors (one patient had 3 neurilemmomas along the radial nerve). The mean age was 52 years, with a range from 26 to 82 years. Six patients were men and 3 women. The time interval between appearance of the tumor and the operation ranged from several months to 15 years (a mean of 7 years). All of the neurilemmomas except one were tender, 9 caused pain and 7 caused paresthesias. Only 2, which were located near the head of the fibula, caused motor disturbances. Only in one case was there a post-operative sensory loss. All of the neurilemmomas were easily removed without any apparent damage to the nerve. Complete relief was achieved in all patients except one (Case 1).

Four cases are presented in detail below. In 3 there was an involvement of the pateral peroneal nerve at the head of the fibula which caused pain and paresthesias

and, in 2 cases, motor disturbances. The fourth case presented neurilemmomas of the posterior tibial nerve at both ankle joints.

CASE REPORTS

Case 1. A 48-year-old clerk had intermittently complained of slight paresthesias in his left toes for several months, with progressive weakness of the dorsiflexors. An E.M.G. investigation revealed that there was no voluntary action of the anterior tibialis muscle and toe extensors and no connection between the lateral popliteal nerve and these muscles. There was good function of the peronei muscles. It was concluded that the lateral peroneal nerve was partly damaged at the fibular head, a phenomenon sometimes seen in shoemakers. His past history revealed nothing that could explain the damage to the nerve. On admission a soft, tender tumor was palpated at the neck of the left fibula. There was no sensory loss but there was dropfoot, with good action of the peronei muscles. There were no other findings: X-rays of the knee and spine were normal, as were the reflexes.

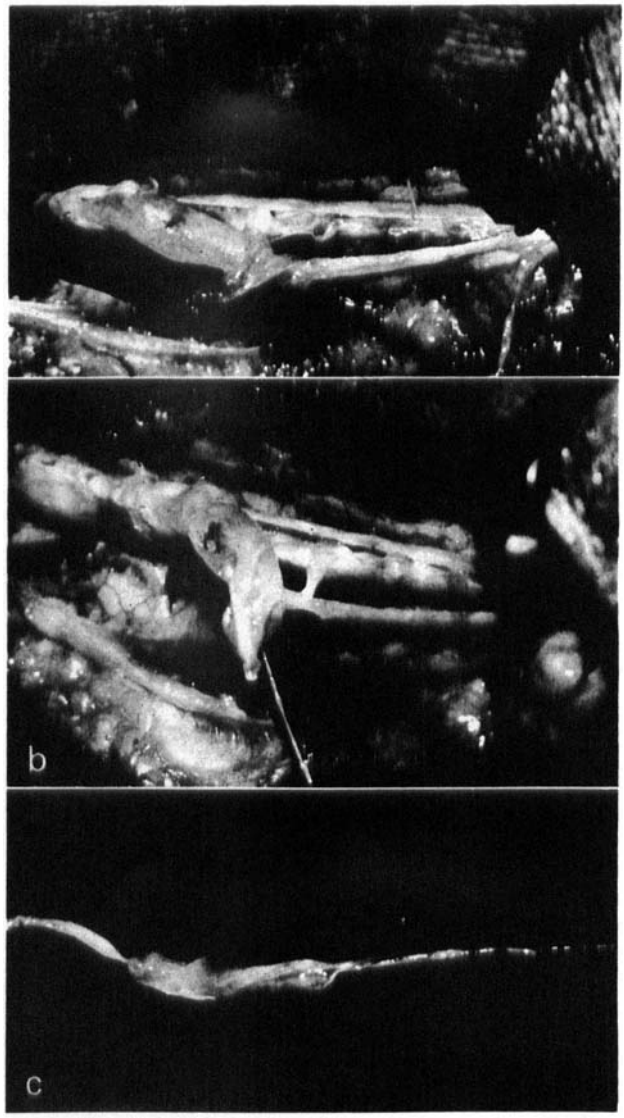
On operation the peroneal nerve was found to be thickened to about 1.5 cm in diameter for a length of approximately 10 cm at the neck of the fibula. Opening of the sheath (Figure 1) revealed an encapsulated tumor which could be seen to be pushing some of the nerve fibers aside and entrapping others. The tumor was easily removed without damage to the nerve. Inside the tumor there were numerous cysts containing a gelatinous fluid. Histological examination revealed an encapsulated tumor with organized elements in the form of Antony cells A in palisades and Antony cells B of myoid type. It was diagnosed as a neurilemmoma.

The post-operative course was uneventful but the dropfoot was still present 5 years later and the patient has had to wear a special shoe. The paresthesias, on the other hand, were relieved immediately after the operation. There was no recurrence of the tumor.

Case 2. A 41-year-old woman with an uneventful past history was admitted because of a tender mass at the head of the left fibula which had first appeared two years previously. Examination revealed no other pathological findings except for the tumor, about 3×5 cm in size, which was tender, with radiating pain along the left leg. Laboratory findings were normal. Opening of the nerve sheath during operation revealed a resilient tumor (Figure 2) the size of a pigeon's egg which was easily removed without damage to the nerve. Histologically this tumor also proved to be a neurilemmoma, as in Case 1. The post-operative course was uneventful. Eleven years later there had been no recurrence and there were no neurological disturbances.

Case 3. A 41-year-old man was admitted for operation because of a tumor at the head of the fibula which had appeared 4 years previously and grown slowly. It was tender and there was radiated pain and paresthesias along the lateral side of the leg to the region of his fifth toe. Four months before admission the pain and paresthesias had increased and paresis of the extensor of the big toe had appeared. The past history was non-contributory. The general examination was normal except for the local finding. On operation a tumor about 1.5×2.5 cm in size was found

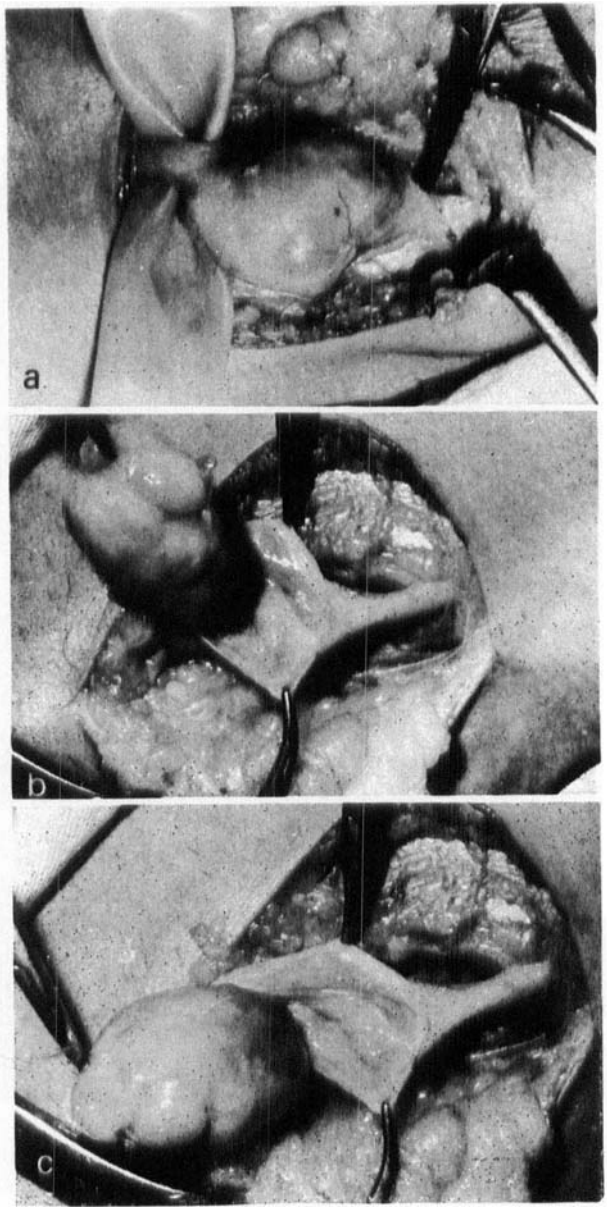
Figure 1.



within the peroneal nerve (Figure 3). It was encapsulated and was easily removed without damage to the nerve fibers. Histologically the findings were similar to those in Cases 1 and 2 but included cystic structures with mucoid degeneration. The pathological diagnosis was: neurilemmoma with degenerative intraneural cysts.

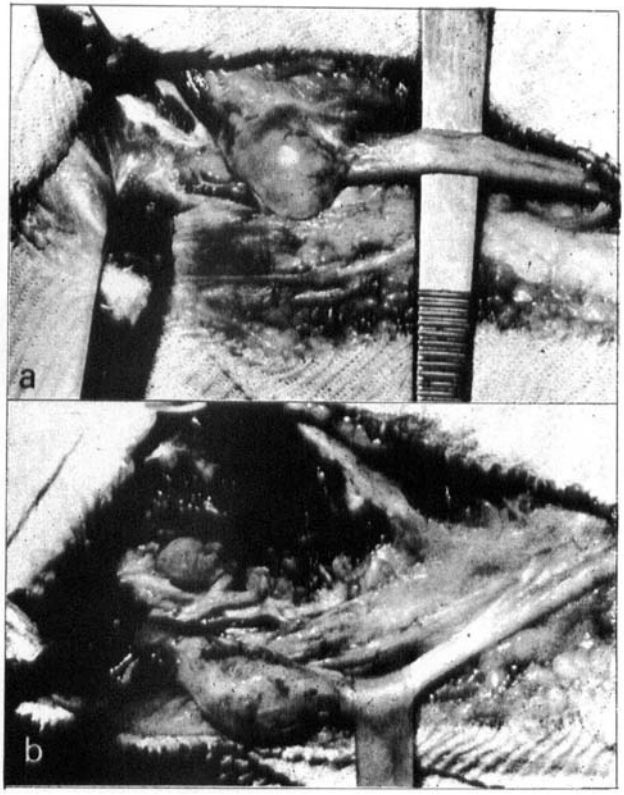
Case 4. This case is worth a brief mention because of its peculiarity. This 60-year-old man was operated upon because of a neurilemmoma of the right posterior tibial nerve which had caused him pain and paresthesias for several

Figure 2.



years. Post-operatively his symptoms disappeared, but 7 years later the same symptoms developed in the left leg and foot. Three years later a neurilemmoma was removed from the identical site on the left posterior tibial nerve, with subsequent disappearance of the symptoms.

Figure 3.



DISCUSSION

In the literature, neurilemmomas are also known by other names: neurinoma and schwannoma. These are benign tumors which develop from the nerve sheaths. Verocay (cited by Buck-Gramcko 1958) called them neurinomas in 1910, while Stout (1946) was the first to call them neurilemmoma. Masson (cited by Buck-Gramcko 1958) and Buck-Gramcko (1958) use the term schwannoma.

From the pathological standpoint, much has been written about neurilemmomas and neurofibromas (Stout 1935, 1946, 1949). Today, neurofibromas are differentiated from neurilemmomas, both clinically and histologically, in the latter by the use of a special staining technique. According to Stout, neurofibromas are "non-encapsulated and have tangled network cells showing Schwann sheath proliferation." Special staining will reveal a great number of neurites. These tumors may become malignant. In contrast, neurilemmomas are encapsulated

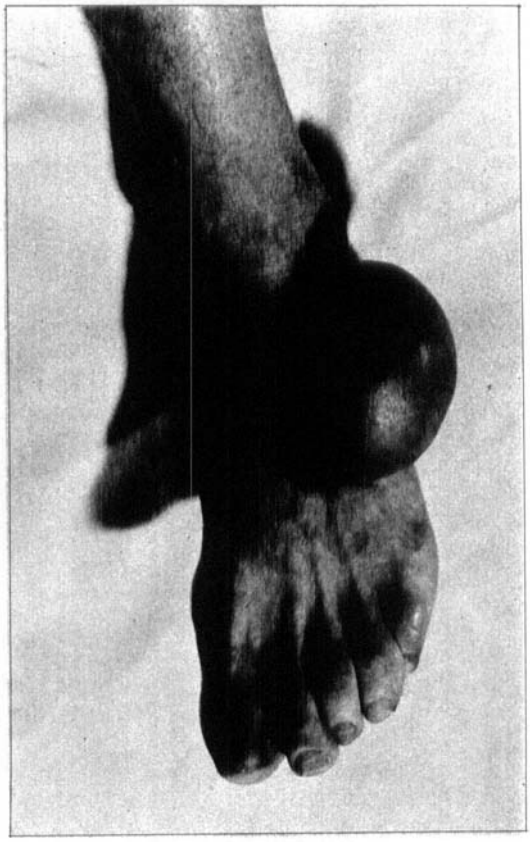


Figure 4.

and show histologically organized elements: Antoni cells A, which are typically arranged in palisades, and Antoni cells B, constituting a tissue poorer in cells, which are of a myxoid type without any special arrangement, and containing "microcysts" which sometimes fuse into larger cysts, and may occupy a large part of the tumor. These large cysts contain a gelatinous material. According to Stout neurilemmomas never become malignant. Soule (1949) states that neurilemmomas are never larger than 6 cm in length, but Seddon (1954) says that they may be from 5 to 10 cm in size. In our Case 1 the length of the tumor was 10 cm, and in one neurilemmoma of the dorsal region of the foot (Figure 4) the size was even greater.

In the extremities, these tumors usually appear on the flexor aspect (Buck-Gramcko 1958, White 1967), especially the flexor aspect of the

larger joints, such as the elbows, hip joints and wrist joints. Only rarely do neurilemmomas appear in bones (Buck-Gramcko 1958, White 1967). In a few patients there seems to be a tendency for more than one tumor to develop, sometimes even along a single nerve (Seddon 1954, White 1967). In our series, 3 patients had several neurilemmomas, one of them with 3 of the tumors along the radial nerve. They may also occasionally appear together with neurofibromas (Stout 1946).

These tumors may appear at any age (in our series the age range was from 26 to 82 years) and men and women are equally affected (Buck-Gramcko 1958, White 1967). They grow slowly and usually are accompanied by pain and paresthesia or tenderness. According to Stout (1949), however, they are usually detected by accident and not because of these symptoms. Seddon (1954) too states that "The neurilemmoma was infrequently diagnosed clinically because it rarely, if ever, interrupted conduction."

In the series of White (1967), there was pain, local tenderness or paresthesia in 28 out of 32 patients. In our series, all except one presented one or all of these symptoms. White (1967) reported that the time lapse between detection of the tumor and excision was from one month up to 22 years. In our series this interval ranged from a few months up to 15 years. According to Buck-Gramcko (1958), there are practically no motor disturbances. In our series, however, there were two cases with such disturbances, in one of which there was no post-operative improvement. In one of the cases in White's series there were also motor disturbances which disappeared after the operation.

Sensory disturbances are rare (Buck-Gramcko 1954). Neurilemmomas are more frequently found in the upper extremities. In Barrett's series (1963) 11 out of 22 were located in an upper extremity. In Buck-Gramcko's series 6 patients had neurilemmomas in an upper extremity vs. one patient with the tumor in a lower extremity. In our series, in contrast, 4 were in upper extremities and 10 in lower extremities. Barret (1963) had 3 patients with neurilemmomas of the brachial plexus accompanied by motor disturbances, most of which disappeared after the operation.

The reason for the dramatic course in our Case 1 is not clear. It is noteworthy, however, that among these 3 cases of neurilemmomas of the lateral peroneal nerve at the neck of the fibula, there was a motor deficit in two of them, in one permanent. When we compare these findings with those in other series, we can see that this is unusual for neurilemmomas. Comparison is not really possible, however, since neurilem-

momas at the neck of the fibula are very rare. It is possible that the location is responsible, as it is well known that the lateral peroneal nerve is very susceptible even to minor trauma or pressure (bandages, P.O.P., etc.) at this site.

Barrett (1963) described in his series 4 cases of intraneural cysts (ganglia) of the external popliteal nerve, all of which presented motor disturbances and most of which recovered. He does not agree with Sultan (1921) and Gurdijan et al. (1965) that intraneural cysts "represent cystic degeneration in neurilemmomas."

It is possible that had our patient consulted a doctor earlier, when only paresthesias were present, the dropfoot might have been prevented. Here we should like to stress the point that although neurilemmomas are rare they should be looked for in all cases of pain and paresthesias of the leg and foot.

Treatment today consists of surgical excision (Seddon 1954, Buck-Gramcko 1958, White 1967), i.e. enucleation of the tumor without damaging the nerve fibers. This is easily done. If any difficulty is encountered, the tumor is probably a neurofibroma and not a neurilemmoma (Buck-Gramcko 1958). There are no neurological complications after the operation and complete relief is usually attained.

SUMMARY

A series of 9 patients with 14 neurilemmomas is presented. Three patients with neurilemmomas of the lateral popliteal (common peroneal) nerve located near the head of the fibula are presented in detail because of the rarity of this site and one case is presented having bilateral involvement of the posterior tibial nerve. The irreversible motor damage in one case, which is very unusual for neurilemmomas, is thought to be due to the location and the unusual susceptibility of the peroneal nerve at this site.

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