ENTRAPMENT NEUROPATHY OF THE SURAL NERVE

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Entrapment neuropathies have been known for many years. The larger peripheral nerve entrapment lesions such as that of the ulnar nerve at the elbow (Paget 1864), carpal tunnel syndrome (Learmonth 1933) and more recently tarsal tunnel syndrome (Keck 1962, Lam 1962) and the entrapment of the radial nerve in the persistent “tennis elbow” (Roles and Maudsley 1972) have all been described. Neuropathies from pressure of ganglia, as on the deep motor branch of the ulnar nerve (Seddon 1952) and on the lateral popliteal nerve (Parkes 1961), have been reported.

Recently we have become aware of the condition of entrapment of the sural nerve at the lateral side of the ankle and foot. This condition has not to our knowledge been previously reported and we feel it worth while presenting four cases.

CASE REPORTS

Case 1—A woman aged sixty was first seen in June 1970 for pain around the medial malleolus spreading to the plantar surface and toes of the right foot, and pain with numbness along the lateral border of the right foot for several months. Tarsal tunnel decompression in July 1970 relieved the pain and hypoesthesia in the foot apart from its lateral border and fifth toe. It was noticed that there was still considerable tenderness on the lateral side of the proximal part of the foot.

At operation in September 1970 the lateral side of the foot was explored. The sural nerve was freed from the surrounding tissues. No clear abnormality was noted at the time of operation. When seen a month later she had gained complete relief of symptoms in the foot. When reviewed thirty-one months after operation she was still completely symptom-free and sensation in the foot was normal.

Case 2—A man aged sixty-one was seen in May 1971 after an accident in which his left foot was run over by a truck. There were fractures of the proximal phalanges of the great, second, third and fourth toes and a fracture at the base of the fifth metatarsal bone. Despite prolonged physiotherapy he continued to complain of pain in the foot for over a year; the pain was of burning type, worse at night. Examination showed tenderness at the lateral aspect of the heel along the course of the sural nerve, and pressure over the nerve reproduced the pain.

At operation the sural nerve was explored on the lateral aspect of the foot. A thickened band of soft tissue was found across the nerve, compressing it. The nerve was decompressed and widely mobilised. When reviewed nine months after the operation he reported that the symptoms had been completely relieved.

Case 3—A man aged forty-seven was seen in August 1972, with hypoesthesia and pain along the lateral border of the right foot extending into the little toe. Examination showed that he had congenital talipes equinovarus with an unstable right ankle. The patient admitted to frequent minor inversion injuries in the past. There was diffuse swelling and tenderness behind and below the lateral malleolus, and pressure in this area caused increased discomfort along the lateral border of the foot.

At operation a large compound ganglion arising from the peroneal tendon sheath and extending about four centimetres along to the tip of the lateral malleolus was identified. The
Case 4—Photographs taken at operation. Figure 1 shows the sural nerve trapped on the lateral aspect of the left foot by a ganglion which has infiltrated it. Figure 2 shows the sural nerve being dissected from the ganglion. Figure 3 shows the completed neurolysis. The nerve is narrowed at the site of compression.
ganglion was in close contact with the sural nerve and seemed to be compressing it. The ganglion was removed. Two weeks later there was complete relief, and four months later he was still free from symptoms. Sensibility in the foot was unimpaired.

Case 4—A woman aged fifty-nine was seen in November 1972. Four months previously she had first noticed a numb feeling along the lateral border of the left foot, and for about six weeks she had felt discomfort below the lateral malleolus with a dragging sensation and a burning pain shooting across the lateral side of the dorsum of the foot. This pain was not aggravated by walking but was worse at night.

Examination showed swelling on the lateral aspect of the foot in relation to the calcaneo-cuboid joint. Pressure over the swelling increased the discomfort in the foot. Forced inversion of the foot caused shooting pain in the distribution of the sural nerve. There was loss of light touch and pin-prick sensibility along the distribution of the sural nerve.

At operation a tense ganglion was found immediately under the skin; it infiltrated the nerve sheath constricting the nerve (Figs. 1 to 3). The ganglion was removed with part of the capsule at the origin of the ganglion from the calcaneo-cuboid joint.

When she was seen three months after operation the patient reported that the dragging sensation and burning pain had disappeared and the anaesthesia had altered to hypoesthesia. She was able to distinguish pin-prick in the affected area.

ANATOMY

The sural nerve, the cutaneous branch arising from the medial popliteal nerve in the distal half of the popliteal fossa, descends between the heads of the gastrocnemius and pierces the deep fascia in the middle third of the posterior surface of the leg. It is then usually joined by the peroneal communicating branch of the common peroneal nerve and passes on to the tendo calcaneus, giving branches to the posterior and lateral aspects of the distal third of the leg.

At the ankle it lies posterior to the peroneal tendons, giving lateral calcaneal branches to the ankle and heel. In the foot, the nerve lies superficially and gives off articular branches to the ankle and tarsal joints and supplies the skin on the lateral border of the foot and the fifth toe as far as the terminal interphalangeal joint. In the foot the sural nerve communicates with the superficial peroneal (musculo-cutaneous) nerve and it varies with the size of that nerve. It may extend on to the dorsum of the foot for a considerable distance, and may either reinforce or replace the branches of the musculo-cutaneous nerve to the intervals between the fourth and fifth and the third and fourth toes.

DISCUSSION

Four cases of sural nerve entrapment are reported here. From the case records there was no definite abnormality noted on the lateral side of the ankle and foot in Case 1. At this stage we were not aware of the condition. In retrospect it is apparent that the sural nerve was trapped on the lateral side of the ankle by fibrous tissues and neurolysis produced complete symptomatic relief. Since then we have encountered three other cases with a similar condition. Two, Cases 3 and 4, had a ganglion along the course of the sural nerve on the lateral aspect of the ankle and foot. In Case 3 the ganglion came from the synovial sheath of the peroneal tendon and trapped the sural nerve, to give the typical symptoms of pain and paraesthesia which were completely relieved by the operation. In Case 4 the ganglion, which came from the calcaneo-cuboid joint, encircled the nerve for about two centimetres and compressed it.

In Case 2 an injury caused soft-tissue damage on the lateral aspect of the ankle and foot, with the resulting fibrous tissue compressing the sural nerve. There had also been a tarsal tunnel syndrome in the same foot and the pain and sensory disturbance along the distribution
of the medial and lateral plantar nerves was relieved by decompression but the symptoms on the lateral side of the dorsum of the foot over the distribution of the sural nerve were not relieved. Subsequent neurolysis of the sural nerve completed the cure.

From the study of these cases we have no doubt that there is a small group of people who suffer from sural nerve entrapment on the lateral side of the ankle and foot. The diagnostic features are acute localised tenderness over the sural nerve itself and reproduction of symptoms by gentle pressure on the nerve. The presence of diminished sensation with or without paraesthesia along the distribution of sural nerve in the foot is also helpful. The presence of tender ganglia in this region suggests the diagnosis of a sural nerve entrapment lesion.

SUMMARY
1. Four cases of sural nerve entrapment lesions in the ankle and foot are reported.
2. All the patients gained complete relief of symptoms following neurolysis.
3. The presence of a ganglion in relation to the sural nerve in the ankle and foot is a helpful sign in the diagnosis of this condition.

REFERENCES