CARPAL TUNNEL SYNDROME IN CHILDHOOD

Report of a Case

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Wasting of the thenar muscles secondary to traumatic or degenerative lesions around the wrist joint has been recognised for over 100 years. In 1863 Sir James Paget described a patient whose median nerve was compressed by callus after a fracture at the wrist. Many examples of median nerve compression have since been reported where the capacity of the carpal tunnel has been reduced by osseous protrusions from the walls or swelling of its soft-tissue content (British Medical Journal 1961).

In 1913 Marie and Foix reported a post-mortem examination of an aged hemiplegic patient with bilateral thenar wasting and, after dissection and microscopy of the brachial plexus and spinal cord, showed that the median nerve was compressed beneath the anterior carpal retinaculum. They could not be sure of the exact mechanism of the compression, "strangulation or trauma," but suggested that division of the anterior carpal retinaculum might arrest the progress of the condition if carried out early enough. Thirty years passed before Cannon and Love (1946) demonstrated conclusively that carpal tunnel decompression dramatically relieved the pain and paraesthesiae in patients with objective evidence of median nerve compression.

In 1947 Brain, Wright and Wilkinson showed that compression of the median nerve in the carpal tunnel could occur spontaneously in the absence of any obvious reduction in the capacity of the tunnel or increase in volume of its contents. The pain, tingling and sensory impairment occurring in the hands of middle-aged women with thenar wasting, is now considered to be due to primary or spontaneous compression in the majority of cases. The condition is less common in men, is unusual before middle age, and is almost unknown in childhood. There appears to be only one account of median nerve compression occurring in children, that of Martin and Masse who recorded three cases in 1958. Personal enquiries from a number of leading neurologists and others interested in the condition have failed to bring any further cases to light.

All three of the children reported by Martin and Masse suffered from recurrent attacks of severe pain in the hand. The first, a girl aged six, had symptoms which failed to respond to a variety of treatments for more than two years before being permanently relieved by carpal tunnel decompression. The findings on examination were not described, but at operation the nerve was found to be oedematous, although no cause for the compression could be found. The second, a boy (age not recorded), had slight thenar wasting but no sensory impairment and no abnormality on electrical testing. The median nerve appeared normal at operation six months after the onset of symptoms, but decompression again gave complete relief. The third child, a seven-year-old boy, also had slight thenar wasting but no apparent sensory impairment. The electrical excitability of the median nerve was decreased but there was no increase in conduction time. Operation was not performed because the pain was relieved by oral cortisone.

CASE REPORT

An eleven-year-old schoolgirl complained of difficulty in picking up small objects with her right (non-dominant) hand. The child’s mother had first noticed that she did not use the right hand properly when she was about three years old. She was reassured by her general
practitioner and no further advice was sought for the next eight years. The child herself had been aware of clumsiness and lack of feeling in the hand for as long as she could remember and found handicrafts and needlework at school difficult. She could not recall any pain or

**FIG. 1**

Photograph to show the small size of the right index finger.

**FIG. 2**

Figure 2—The thenar muscles of the right hand are markedly wasted.

**FIG. 3**

Figure 3—Photograph illustrating the lack of true opposition of the right thumb.

tingling in the hand. At the age of eighteen months she had sustained a greenstick fracture of the proximal third of the right radius with minimal displacement, but there was no history of other injury to the hand or arm.

On examination the most striking feature was the small size of the index finger (Fig. 1). Wasting of the thenar muscles was obvious (Fig. 2) and the abductor pollicis brevis and
opponens pollicis muscles were completely paralysed. The short flexor of the thumb was active but the thumb could only be flexed and adducted across the palm, rather than opposed to the fingers (Fig. 3). No other motor weakness was detected in the upper limbs. There was hypoalgesia and hypoaesthesia of median nerve distribution, with complete anaesthesia and analgesia of the tip of the middle finger. There was no scarring or tenderness at the wrist and there was a full range of active and passive movements of the fingers, wrist and elbow. The reflexes were brisk and symmetrical.

Radiographs of the wrist and carpal tunnel and of the forearm were normal, with no evidence of the old injury.

**Operation**—The median nerve in the lower forearm was explored. Electrical stimulation of the exposed nerve in the lower part of the forearm produced no contraction of the muscles of the hand. The transverse carpal ligament was divided and found to be three millimetres thick and very tough. The median nerve was compressed into a pale, flat ribbon beneath it and was swollen immediately proximal to its edge. There was no increase in bulk of the soft-tissue contents of the tunnel (Fig. 4). Marked vascular dilation occurred at the junction between compressed and uncompressed nerve, leaving the compressed portion pale until flushing occurred after release of the tourniquet. Histologically the ligament consisted of dense collagenous tissue.

No recovery has occurred during the nine months since operation, but this is not unexpected in view of the long duration of the compression.

**DISCUSSION**

The fact that this child did not complain of pain or paraesthesiae might at first seem to conflict with the diagnosis of carpal tunnel syndrome. Stopford (1926) pointed out that progressive nerve compression, although initially giving rise to muscle weakness and pain, later resulted in anaesthesia and analgesia, by which time the pain had usually disappeared.
Nissen (1959) has pointed out that the mechanisms of production of nocturnal pain and paraesthesiae and of partial thenar atrophy are different, so that each may occur independently. In the the child reported here the condition had been present for many years and and the pain and paraesthesiae might have occurred before she could describe them.

The small size of the index finger is noteworthy. Atrophy of the soft tissues of the digits is found in association with approximately two-thirds of peripheral nerve injuries, and a tapered index finger is characteristic of median nerve palsy (Richards 1954). The marked atrophy here suggests a lesion of long standing.

There seems little doubt that the clinical findings in this case were due to compression of the median nerve in the carpal tunnel, but the cause of the compression is not clear. No increase in the soft-tissue content of the tunnel was seen, nor did radiographs show any abnormality of the bony walls. There remains only the fibrous roof. The carpal retinaculum is fusiform in cross-sections, and in adults is two millimetres thick at its thickest point (Robbins 1963). Three millimetres in a child might therefore be regarded as being excessively thick. Watson-Jones (1949) found a carpal retinaculum 1-2 centimetres thick in a twenty-year-old man with carpal tunnel syndrome associated with Léri's pleonosteosis, but there was nothing to suggest that condition in this case. Whether compression resulted from the unusual thickness of the transverse carpal retinaculum or whether it occurred "spontaneously" remains in doubt. This case demonstrates, however, that carpal tunnel syndrome can occur in childhood, and may be a rare cause of pain, thenar atrophy or sensory loss in the hand.

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This patient was presented at a Clinical Meeting of the Orthopaedic Section of the Royal Society of Medicine, London, in November 1964, and I would like to thank the Honorary Editors of the Proceedings of the Royal Society of Medicine for permission to publish this report here.

REFERENCES


