ACROPARAESTHESIAE AND THE CARPAL TUNNEL

BY

T. B. S. DICK, M.D., M.R.C.P.
Consultant Physician

AND

F. R. ZADIK, F.R.C.S.
Consultant Orthopaedic Surgeon
Wigan and Leigh Group of Hospitals

The purpose of this paper is to describe the results of division of the transverse carpal ligament in 30 consecutive cases suffering from acroparaesthesiae. It was in 1893 that Schultze first used the term acroparaesthesiae to describe nocturnal attacks of severe pain and tingling that affected the hands of middle-aged women.

In our experience the patients are not always female and not always middle-aged, though usually they are both. In the great majority the pain and paraesthesiae are nocturnal—the patient waking from sleep with severe tingling in the thumb and fingers. The hand is usually described as swollen. There may be severe pain, burning or bursting sensation in the hand and digits, with a feeling of thickness or stiffness. The symptoms may be no more than a minor discomfort, but may be so severe as to prevent sleep, the patient getting up to pace the bedroom floor, rubbing and moving the hands and fingers. After several minutes of this treatment the symptoms tend to subside. Often the patient is completely free of symptoms during the day.

McArdle (1951) was the first to suggest that compression of the median nerve in the carpal tunnel by the transverse carpal ligament was the cause of this syndrome.

In 1945 Walshe propounded the view that it was due to stretching of the lower component of the brachial plexus over the first rib. He stated that wasting and sensory loss do not occur. In 1951 and 1955 he still adhered to the view that this is the cause in at least the great majority of cases. Ford (1956) called the condition the tired-arm syndrome, and suggested that it arose from an accumulation of metabolites in fatigued muscles. Martin and Elkington (1955) considered it to be an entity in itself but listed several differential diagnoses, including median and ulnar nerve compression, and said that acroparaesthesiae may occur in the lower limbs. The axillary inlet syndrome and cervical spondylosis are also conditions which have been considered possible causes of this syndrome.

On the other hand, Kremer *et al.* (1953), Garland *et al.* (1957), and Heathfield (1957) were all of the opinion that McArdle's view was correct, and described cases where the symptoms had been completely relieved by division of the transverse carpal ligament. It appears probable, therefore, that a difference of opinion still exists on the causation and treatment of this condition, and we feel that publication of the results of 30 cases in which the transverse carpal ligament has been divided is of value.

Results

Of the 30 patients 6 were male and 24 female. The ages of the men were 36, 74, 49, 62, 27, and 20. The ages of the

women were: 30–39, 4; 40–49, 11; 50–59, 7; 60+, 2. The youngest woman was 32 and the oldest 70. The following table gives details of the cases.

Symptoms	(a) Mainly or wholly at night	26
	(b) " " " in the day	4
Limbs affected	Right	13
	Left	7
	Both	10
Changes on C.N.S. examination, apart from affected arms		Nil
(a) Wasting in thenar muscles		4
(b) Slight but objective sensory impairment		13
(c) Pain referred above wrist to arm		14
X-rays cervical spine		28
Slight lippling		9
Well-marked osteoarthritis		4
Cases submitted to surgery		30
(a) Number of operations		34
(b) Immediate relief of symptoms		33
(c) Nerve examined		10
" compressed		6
" not examined		20

It will be seen that the great majority of our patients were women and that most of them were middle-aged. Division of the transverse carpal ligament was performed on 34 arms in 30 patients. In 33 relief of pain and paraesthesiae was immediate. Where wasting was present (4 cases) this took many months before it finally disappeared. The sensory impairment (13 cases) was in no case severe and tended to recover more quickly than the wasting.

Of the 10 bilateral cases, four had the operation done on both sides with complete success; two are awaiting operation on the other side. A further two did not consider the remaining symptoms severe enough to warrant having the second operation. Of the last two cases, one had immediate relief in the hand operated upon, and in a few days complete relief in the other hand as well. The second operation here was not unnaturally refused. It is interesting that definite wasting was still present in the thenar muscles of the hand not operated on 18 months later, though the patient was symptom-free and the thenar muscles of the other hand were normal.

The single case recorded as a failure was one in which the operation was done with the faint hope that some relief might be obtained. The patient was a woman of 49 with pain and slight swelling and cyanosis of the fingers, hands, and feet. She was thought to have erythromelalgia (see Price, 1950), but had some worsening of the pain and paraesthesiae in bed at night. The condition was of long standing and gradual onset. The operation was performed on one hand with doubtful benefit and was considered to be not worth while repeating.

X-ray films of the cervical spine were taken in 28 patients. Thirteen were abnormal, nine showing slight changes and four considerable changes of osteoarthritis. In the light of the results of our treatment, these changes would appear to be fortuitous, not playing any part in the production of the symptoms.

In eight patients we found a local pathological condition which might originally have played some part in the onset of the condition. Three had osteoarthritis of the carpal and finger-joints (Kellgren and Moore, 1952), one was the patient with erythromelalgia, one had had a Colles fracture on the same side, one an ununited scaphoid fracture with some osteoarthritis, and two gave a history of hyperextension strain of the wrist. However, on examining this question of local disease more closely it really seems to have little bearing on the syndrome except in rare cases.

Reviewing our bilateral cases again, we found that two had had a wrist strain which in both cases was unilateral. One had a Colles fracture and another a fractured scaphoid; again in each case the possible local factor is unilateral in a bilateral case. Of the remaining four bilateral cases with local disease one was the case of erythromelalgia, previously mentioned, and one had osteoarthritis in the small joints of the hand on one side only; the other two had bilateral osteoarthritis of the small joints of both hands, but, whereas one had bilateral symptoms, the other, with equally severe osteoarthritis, had only unilateral symptoms.

We found pain referred to the arm above the wrist in 14 cases. It was on occasion felt as far up as the shoulder. The following is an illustrative case.

This patient had typical nocturnal paraesthesiae in the left hand. She also had wasting of the thenar muscles of moderate degree and impairment of sensation to pin-prick and light touch, not confined to the median area but extending up the radial side of the forearm almost to the elbow. An area of sensory impairment of this size seemed to rule out carpal tunnel compression, but in view of the typical symptoms the transverse carpal ligament was divided. The symptoms were immediately relieved; wasting and sensory impairment cleared up slowly over some months—eventually completely.

Garland *et al.* (1957) say that they compressed the anterior aspect of the wrist digitally for three minutes in five patients and reproduced typical acroparaesthesiae in three. One of us (F. R. Z.) used a similar test. Firm pressure over the transverse carpal ligament for one to three minutes reproduced the typical paraesthesiae in 22 out of 27 patients in this series. However, the most important single diagnostic feature was tingling often amounting to pain in the thumb and radial three fingers, worse in bed at night, and improving after the patient had been up and about for several minutes. Where this history was given, division of the transverse carpal ligament brought complete relief of symptoms even if the pain present in the arm had spread as far as the shoulder.

Discussion

From our experience and also from that of Kremer *et al.* (1953), Garland *et al.* (1957), and Heathfield (1957) it is clear that the original description must be widened to include cases which, while having the typical pain and paraesthesiae, also have wasting of the thenar muscles, impaired sensation in the median area, and pain spreading upwards from the hands even as far as the shoulder.

In 1947 Brain *et al.* described six cases of compression of the median nerve in the carpal tunnel. At least three of these cases had the typical acroparaesthesiae as well as wasting of the thenar muscles and sensory loss. It would appear that these represent more severe cases of the "acroparaesthesiae syndrome."

The onset of the syndrome is often associated with undue fatigue—for example, after carrying very heavy shopping baskets. It therefore seems possible that some form of compression of the venous return is taking place at the thoracic inlet, giving rise to undue swelling of the soft tissues distal to the carpal ligament.

Three years ago we saw a woman with typical acroparaesthesiae. The symptoms had been present only three weeks and cleared up completely with rest. Four months ago we again saw this patient with severe acroparaesthesiae in the right hand, much less in the left. She also had severe pain in the forefinger which was present day and night and prevented sleep. Instead of the normal joints and hands of three years before, she now had the typical early menopausal rheumatoid type of arthritis with a good deal of soft-tissue swelling in the hands and wrists. The pain was so severe that the right transverse carpal ligament was divided. There was immediate relief of the severe pain and paraesthesiae, though the rheumatoid process remained unchanged.

This case is not included in the above series as insufficient time has elapsed for a follow-up. It seems fairly clear in this case that soft-tissue swelling below and distal to the carpal ligament was to some extent responsible for undue pressure on the median nerve by the carpal ligament. Why, therefore, do we not see this syndrome more commonly in rheumatoid arthritis? Whether any such mechanism as this plays a part in producing symptoms in what appears to be an otherwise normal hand is at the moment speculative, but there can be no doubt that our results strongly support McArdle's (1951) original view.

Summary

In 30 cases of acroparaesthesiae the transverse carpal ligament has been divided in 34 wrists. In 33 there was immediate relief of pain and paraesthesiae. In the remaining case some other pathological condition was present.

Wasting of the thenar muscles, impairment of sensation, and pain referred to the arm, even as far as the shoulder, have been present in these cases—apparently successfully treated by division of the anterior carpal ligament.

REFERENCES

- Brain, W. R., Wright, A. D., and Wilkinson, M. (1947). *Lancet*, 1, 277.
 Ford, F. R. (1956). *Johns Hopk. Hosp. Bull.*, 98, 464.
 Garland, H., Bradshaw, J. J. P., and Clark, J. M. P. (1957). *Brit. med. J.*, 1, 730.
 Heathfield, K. W. G. (1957). *Lancet*, 2, 663.
 Kellgren, J. H., and Moore, R. (1952). *Brit. med. J.*, 1, 181.
 Kremer, M., Gilliat, R. W., Golding, J. S. R., and Wilson, T. G. (1953). *Lancet*, 2, 590.
 McArdle, M. J. (1951). Oral communication to the Association of British Neurologists, October, 1951.
 Martin, J. P., and Elkington, J. St. C. (1955). In *Price's Textbook of the Practice of Medicine*, 9th ed., p. 1581. Oxford.
 Price, F. W. (1950). *Textbook of the Practice of Medicine*, 8th ed., p. 1151.
 Schultze, F. (1893). *Dtsch. Z. Nervenheilk.*, 3, 300.
 Walshe, F. M. R. (1945). *Brit. med. J.*, 2, 596.
 — (1951). In A. Felling's *Modern Trends in Neurology*, chap. 17, p. 542. Butterworth, London.
 — (1955). *Diseases of the Nervous System*, 8th ed. Livingstone, Edinburgh.

Medical Memoranda

Fatal Case of Agranulocytosis Due to Chlorpromazine

Jaundice and photosensitization of the skin are well-recognized complications of chlorpromazine therapy. Neutropenia and agranulocytosis occur more commonly in cases treated with another phenothiazine compound, pectazine ("pacatal") (Mitchell *et al.*, 1957), but at least two fatal cases of agranulocytosis following treatment with chlorpromazine have already been reported (Tasker, 1955; Pollack, 1955). A brief account of yet another fatal case of agranulocytosis following treatment with chlorpromazine is given below.

CASE REPORT

The patient, a man of 47, was formerly a collier and later a pottery worker. He developed symptoms of schizophrenia while serving in Egypt in 1943, and was sent back to England shortly afterwards. He was an in-patient at St. Edward's Mental Hospital, Cheddleton, almost continuously since then. He was disturbed by visual hallucinations, laboured under various delusions, and attempted to commit suicide. No remission or improvement of his mental symptoms occurred. A blood count taken on March 29, 1957, was quite normal. Next day treatment with chlorpromazine was begun, starting with 75 mg. daily and gradually increasing to 300 mg. daily. On June 17, while still receiving the same dosage, he developed a sore throat and a pyrexia of 104° F. (40° C.). His white cell count was 250 per c.mm., with complete absence of neutrophils. A diagnosis of agranulocytosis was made, the drug withdrawn immediately, and treatment with penicillin instituted. As his general condition deteriorated he was transferred to the City General Hospital, Stoke-on-Trent, where on arrival on June 19 his blood count showed 105% haemoglobin (15.5 g./100 ml.), with a total white cell count of 300 per c.mm. and a complete absence of neutrophils. Jaundice and bronchopneumonia supervened 24 hours later, and he died on June 21, four days after the onset of symptoms.

Necropsy, performed 22 hours after death, revealed generalized icterus of skin, sclerae, and most of the internal