Acta orthop. scand. *48*, 164–167, 1977

COMPRESSION NEURITIS OF THE ULNAR NERVE TREATED WITH SIMPLE DECOMPRESSION

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The purpose of this investigation was to test the hypothesis submitted by Osborne (1957), which proposed that the symptoms of compression ulnar neuritis, in most cases, result from compression on the ulnar nerve at the proximal border of the aponeurosis of the flexor carpi ulnaris muscle. Thirty-two simple decompression operations were performed on 31 patients, diagnosed as suffering from compression neuritis of the ulnar nerve. They were subsequently examined over a period of 5 years. Relief from symptoms was achieved in 28 cases, whilst four patients derived no improvement from the operation. Three of the four unsuccessful cases were judged to have been incorrectly diagnosed and were not suffering from compression of the ulnar nerve in the elbow. A second operation was required in two patients, in one a second decompression and in the other anteposition. No surgical or post-surgical complications occurred.

Key words: ulnar neuropathy; nerve decompression; compression neuritis; elbow; surgery; operative treatment; long-term results

Accepted 26.i.77

Osborne in 1957 and Feindel & Stratford in 1958 proposed that the symptoms of ulnar neuritis, in most cases, result from compression of the nerve at the point where it descends below the aponeurosis which is stretched between the two heads of the flexor carpi ulnaris muscle, just distal to the sulcus nervi ulnaris. If this supposition is correct, Osborne pointed out that surgical treatment can be reduced to the simple procedure of cutting through the aponeurosis and widening the tunnel in which the ulnar nerve lies.

The objective of the work reported in this paper was to test the validity of the supposition and the surgical procedure proposed by Osborne.

MATERIAL AND METHODS

The investigation, begun in July 1970 and concluded in March 1975, was made on 33 patients, diagnosed as suffering from compression neuritis of the ulnar nerve. The patients were treated by simple decompression surgery at the Department of Orthopedic Surgery, Hjørring Hospital.

During this investigation period, five additional patients with the same diagnosis were treated by anteposition of the ulnar nerve. Two of these patients suffered from pronounced rheumatoid-arthritic changes of the elbow joint, one from elbow arthritis with corpus liberum articulare, and two from a thickened subluxating nerve. These five patients were not included in the results of the investigation.

Thirty-four decompression operations were carried out on 33 patients, one patient being operated on both sides. There were 25 men and 8 women, 18 to 73 years of age, with an average of 48 years. Prior to surgery the patients had

experienced symptoms of ulnar neuritis for periods varying from 14 days to 16 years. Fifteen of the patients had suffered for less than 6 months, seven for 6 months to 1 year and twelve for more than 1 year. The neuritis in 20 patients was located on the dominant side of the body, and on the non-dominant side in 14 patients.

Arthritic changes in the elbow joint were detected in X-ray photographs of five patients. Calcification just distal to the medial epicondyle of the humerus was found in one patient. Six patients suffered from acute elbow trauma: three from pressure on the nerve during surgery under general anesthesia and, in one patient, the impairment began as a result of several days unconsciousness in hospital, an etiology stressed by Mumenthaler (1961) and Wadsworth & Williams (1973). Two patients had chronic elbow trauma and one had slight rheumatoid arthritis of the elbow joint. Seventy per cent of the patients had earned their living by hard manual labor. Patient complaints and objective findings can be seen in Tables 1 and 2.

Table 1. Arm symptoms of 33 patients (34 arms) preoperatively.

Impeded work capacity	32
Paresthesia	33
Dyspraxia	21
Reduced strength	18
Pain	9
Cold sensations	6

Table 2. Preoperative objective observations of the arms of 33 patients (34 arms).

Tenderness and paresthesia released from aponeurosis	32
Hypesthesia or dysesthesia	30
Atrophy of hand muscles	17
Paralysis of hand muscles	15
Claw posture	2

Operative procedure

The operation was performed as described by Osborne (1970). An incision exposed the ulnar nerve from the middle of the sulcus to about 6 cm distal to the sulcus. The overlying aponeurosis between the two heads of the flexor carpi ulnaris muscle was cut through completely. The procedure differed from Osborne's in so far as we judged it unnecessary to suture the sectioned aponeurosis profound to the nerve; only the subcutaneous and skin layers were sutured.

At surgery no morphological abnormalities were observed in or around the ulnar nerve in 18 patients. A structural change in the nerve (a flask-shaped bulge), distally limited by the proximal border of the aponeurosis, was found in 12 patients. Fibrous adhesions around the nerve in the sulcus were seen in four patients. No wound complications or clinical deterioration of nerve function were detected in any of the patients.

RESULTS

The follow-up of 31 patients who had undergone 32 operations was carried out after a period of 7 months to 5 years. One of the original patients died and one could not be located, but in both cases the first examination indicated pronounced improvement. The results of the 32 decompression operations appear in Tables 3 and 4.

Ninety per cent of the patients had recovered completely or were considerably improved in their work capacity. Sixteen patients reported complete freedom from symptoms of neuritis, thirteen patients obtained varying degrees of improvement and three patients complained of no improvement from the operation. During surgery, however, no ulnar compression was observed in these three patients, and the ulnar nerves appeared normal, but all three suffered from additional neurological diseases, two from cervical disc collapse and one from massive post-traumatic reflex dystrophy.

A second operation was required in two patients. One suffered symptom-recurrence 6 weeks after primary surgery and during the second decompression operation a compressing fibrous coat was found surrounding the nerve in the cubital tunnel. The patient reported significant improvement 16 months later. In the second patient the secondary surgery was anteposition of the ulnar nerve, because only slight symptom-relief resulted from decompression. However, during secondary surgery fibrous adhesions in

Table 3. Postoperative improvement in symptoms in the arms of 31 patients (32 arms) related to preoperative complaints.

	Preop.	Complete recovery	Considerable improvement	Some improvement	No improvement
Impeded work capacity	31	23	5	1	2
Paresthesia	31	16	9	3	3
Dyspraxia	19	12	3	2	2
Reduced strength	16	5	6	1	4
Pain	9	6	0	2	1
Cold sensation	6	4	1	1	0

Table 4. Postoperative objective observations of the arms of 31 patients (32 arms) related to the preoperative condition.

	Preop.	Complete recovery	Considerable improvement	Some improvement	No improvement
Tenderness and paresthesia released from aponeurosis	31	25	4	2	0
Hypesthesia or dysesthesia	28	14	7	6	1
Atrophy of hand muscles	15	5	2	4	4
Paralysis of hand muscles	12	1	6	4	2
Claw posture	2	0	0	0	2

the sulcus nervi ulnaris were discovered. These had not been detected at the first operation. The patient reported complete recovery 2½ years later. These two patients were included in the results of the investigation, the first patient after and the second patient before the second operation.

DISCUSSION

Relief from symptoms by decompression surgery was obtained in 28 of the 32 cases, whilst four patients derived no improvement from the operation. In the author's judgment three of these four patients were incorrectly diagnosed, since the symptom picture was masked by other neurological difficulties. Decompression surgery for the fourth patient, as far as could be determined, was not performed in a standard manner and anteposition was subsequently performed.

The results of these operations correspond quite closely with other decompression investigations. Vanderpool et al. (1968) reported that 32 out of 36 patients obtained relief from symptoms (observation time not recorded); however, the patients in that study were selected to exclude all long-term cases of ulnar neuritis. Wilson & Krout (1973), with an observation period of 1 month to 2 years, found improvement in 16 out of 16 patients (8 excellent, 4 good, 4 fair), with one patient who required secondary surgery for scar-tissue irritation. Feindel & Stratford (1958) reported improvement in three out of three patients with an observation time of 1 to 1½ years.

The results from decompression surgery closely resemble those from anteposition surgery. For example, Zachariae (1967), in a follow-up after 2 to 10 years, reported that 41 out of 46 patients were improved, four were unchanged and one had aggravated symptoms following ante-

position. Jensen (1959), based on an observation period of 1¾ years to 9½ years, reported that 30 out of 39 patients obtained relief from symptoms, six gained slight improvement, two were unchanged and one had aggravated symptoms.

The results of decompression are also quite similar to those obtained from epicondylectomia medialis humeri. Based on a follow-up period which ranged from 1 month to 15 years, King & Morgan (1959) reported improvement in 18 out of 19 patients. Neblett & Ehni (1970), with an observation period of 4 months to 9 years, obtained improvement in 13 out of 14 patients.

Wadsworth & Williams (1973), employing a combination of anteposition and intra- and extraneural lysis, observed improvement in only 4 out of 12 patients after an observation time of 6 months to 15 years.

Pechan & Juliś (1975) proposed that the reason for the more or less similar results obtained from all of the above-mentioned methods is due to the fact that the primary tension developing from elbow flexion is exerted from the flexor carpi ulnaris aponeurosis and, in addition, causes lengthening of the ulnar nerve, each contributing about one-half of the directly-measured increase in pressure on the ulnar nerve.

Jensen (1959) and Zachariae (1967) proposed that the degree of surgical success in symptom-alleviation is inversely proportional to the preoperative symptom-duration in patients. This hypothesis was not supported by the results of the present investigation, since 8 of the 16 patients who obtained the greatest improvement had preoperative ulnar neuropathy for more than 1 year, one for 16 years and three for 5 years.

In most cases diagnosis of compression neuritis of the ulnar nerve is not difficult to make, and only rarely is a case seen which is complicated and uncertain. Simple decompression is an operation which is so free of complications that it can be utilized with great latitude, for example, as a "diagnostic operation" in cases with uncertain diagnosis.

The operation is most often successful when the site of maximal tenderness and paresthesia is located at the proximal border of the aponeurosis of the flexor carpi ulnaris muscle. Unquestionably, there are cases where anteposition is the most suitable operation, particularly when there are pronounced changes in or around the elbow joint.

REFERENCES

Feindel, W. & Stratford, J. (1958) Cubital tunnel compression in tardy ulnar palsy. *Canad. med. Ass.* **78**, 351–353.

Jensen, E. (1959) Ulnar perineuritis. *Acta psychiat. scand.* **34**, 205–221.

King, T. & Morgan, F. P. (1959) Late results of removing the medial humeral epicondyle for traumatic ulnar neuritis. *J. Bone Jt Surg.* **41**-B, 51–55.

Mumenthaler, M. (1961) *Die Ulnarisparesen.* pp. 203–219. Georg Thieme Verlag, Stuttgart.

Neblett, C. & Ehni, G. (1970) Medial epicondylectomy for ulnar palsy. *J. Neurosurg.* **32**, 55–62.

Osborne, G. V. (1957) The surgical treatment of tardy neuritis. *J. Bone Jt Surg.* **39**-B, 782.

Osborne, G. V. (1970) Compression neuritis of the ulnar nerve at the elbow. *The Hand* **2**, 10–13.

Pechan, J. & Juliś, J. (1975) The pressure measurement in the ulnar nerve. *J. Biomech.* **8**, 75–79.

Vanderpool, D. W., Chalmers, J., Lamb, D. W. & Whiston, T. B. (1968) Peripheral compression lesions of the ulnar nerve. *J. Bone Jt Surg.* **50**-B, 792–803.

Wadsworth, T. G. & Williams, J. R. (1973) Cubital tunnel external compression syndrome. *Brit. med. J.* **1**, 662–666.

Wilson, D. H. & Krout, R. (1973) Surgery of ulnar neuropathy at the elbow. *J. Neurosurg.* **38**, 780–785.

Zachariae, L. (1967) Antepositio n. ulnaris. *Ugeskr. Læg.* **35**, 1104–1106.

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