LATE RESULTS OF REMOVING THE MEDIAL HUMERAL EPICONDYLE FOR TRAUMATIC ULNAR NEURITIS

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In 1950 we reported sixteen operations for the relief of traumatic ulnar neuritis by excision of the medial epicondyle and adjacent supracondylar ridge of the humerus, to which the medial intermuscular septum is attached. This simple operation had provided early results that were gratifying. Pain was cured in all. Sensation and muscle power, although not recovering completely in the short period of observation, showed improvement. Smith-Petersen (1950) stated that he had been using this method independently for ten years and was pleased with the results.

The object of this paper is to report the late results in twenty patients in whom it was possible to follow the progress (Table I).

INDICATIONS FOR OPERATION

1. The epicondyle and adjacent supracondylar ridge were often removed as a preliminary to operations on the elbow such as arthrodesis or arthroplasty in order to mobilise the ulnar nerve, but these cases have not been reported here.

2. When the ulnar nerve has to be sutured a gain in length of up to an inch can be obtained by a preliminary removal of the epicondyle. If some legitimate stretching of the nerve is necessary in order to approximate the ends, as happens when the nerve has been injured near the wrist, the nerve continues to lie in a straight line and is not kinked as it may be when the nerve has been transposed in front of the intact epicondyle. These cases are not included in this paper.

3. There were examples of irritation of the nerve in the groove from such causes as epicondylitis (periosteal new bone), ununited fractures of the medial epicondyle or olecranon, local bursitis and other causes.

4. Cubitus valgus (seven patients) is perhaps the commonest cause of ulnar neuritis by stretching; there was no example of neuritis from cubitus varus.

5. There was no instance of epicondylectomy for recurrent dislocation of the ulnar nerve.

DISADVANTAGES OF TRANSPOSITION OF THE NERVE

Before embarking upon this new procedure it was necessary to consider any disadvantages of the older method of anterior transposition of the ulnar nerve in front of the medial epicondyle, which, on the whole, has given general satisfaction. Although the older operation has been described as an ideal one there appear to be some disadvantages.

1. If the nerve is implanted subcutaneously it is more exposed to injury by contusions and stretching, or it might even be severed in an accident (Murphy 1916). This criticism applies equally after excision of the epicondyle.

2. If the anteriorly transposed nerve is deeply buried in muscle in order to avoid the dangers of a subcutaneous implantation, there sometimes follows a cicatricial contracture with strangulation of the nerve and a corresponding increase of the ulnar neuritis, and a second operation may be necessary to relieve the strangulation (Rand 1944). Cairns (1948), Shaw (1934) and Hoets (1950) quoted six examples of post-operative increase of the ulnar neuritis from pressure when the nerve had been buried in the flexor muscles. If the medial intermuscular septum is not divided when the nerve is brought forward it may be kinked or irritated. Strangulation of the nerve has also been reported at the site of the division of the medial intermuscular septum.

TABLE I
CLINICAL DETAILS IN TWENTY CASES

Case number	Age (years)	Cause	Symptoms	Neurological signs	Date of operation	Result	
						Date	Motor
1	42	"Car elbow"; traumatic neuritis	Paraesthesia; weakness of hand	Marked paraesthesia	April 1942	May 1957	No pain; paraesthesia persists
2	45	Cubitus valgus; fracture at 18 months	Pain and weakness of hand	Marked paraesthesia; muscle wasting; complete adductor and interosseous paralysis	September 1945	June 1957	Slight paraesthesia to touch and prick
3	44	Fracture medial epicondyle 9 years before	"Pins and needles" in ulnar distribution 4 years	All interossei weak; grip weak	February 1946	July 1957	Normal
4	48	Old humeral fracture; recent blow on elbow	Paraesthesia and weakness	Tenderness behind epicondyle; wasting of ulnar-innervated muscles except F.C.U.	August 1946	June 1957	Normal
5	45	Fracture medial epicondyle at age 10 (united)	Tingling inner side of forearm and little finger	Tenderness behind epicondyle; paraesthesia ring and little fingers	November 1946. Adhesions present	—	Immediate improvement in symptoms. No reply to inquiry
6	67	Dislocation elbow at age 16; injury 6 months ago	Three attacks of neuritis; pain and paraesthesia ring and little fingers	Neuroma behind medial epicondyle, which was deformed from old injury	May 1948	June 1957	Normal
7	29	Cubitus valgus	Numbness of little finger; weakness in hand	Paraesthesia little finger; wasting of interosseous and hypothenar muscles	November 1948	July 1957	Normal
8	10	Cubitus valgus	Ulnar neuritis; pain	None	June 1949	February 1957	—
9	33	Ununited fracture of olecranon	Pain	None	November 1949	December 1949	—
10	50	Cubitus valgus since age 3	Pain behind elbow	Wasting in ulnar distribution; paraesthesiae ring and little fingers	February 1950	August 1957	Thenar muscles recovered; slight wasting of hypothenar muscles and weakness of interossei

TABLE 1—continued
CLINICAL DETAILS IN TWENTY CASES

Case number	Age (years)	Cause	Symptoms	Neurological signs	Date of operation	Result	
						Sensory	Motor
11	40	Cubitus valgus	Pain in forearm; weakness in hand 11 years; contracture of little finger	Tenderness behind epicondyle; clawing of ring and little fingers; fourth dorsal interosseous weak; slight hypothenar wasting	August 1950	Normal	Normal
12	47	Ununited fracture of ulna	Numbness and tingling 4 years	Weakness of all intrinsic muscles supplied by ulnar nerve	May 1951	Normal	Normal
13	47	Cubitus valgus; fracture at age 7	Sensory symptoms for 4 years	Paraesthesia ring and little fingers. Weakness and wasting of all intrinsic muscles supplied by ulnar nerve	September 1954	Temporary relief; recurrence of symptoms	No improvement; arthrodosis of elbow
14	26	Cubitus valgus	Weakness in hand and altered sensation	Paralysis of all intrinsic muscles and of F.C.U. and F.D.P. to ring and little fingers; anaesthesia ring and little fingers	May 1955	Symptoms slightly diminished	All muscles recovered except adductor, abductor and three dorsal interossei
15	34	Fracture involving elbow 10 years ago	Pain, paraesthesia and loss of power	Slight wasting of hypothenar eminence	August 1956	Normal	Normal
16	54	Friction against enlarged epicondyle	Pain in ring and little fingers; weak grip	Wasting of all ulnar-innervated muscles; neuroma behind epicondyle; paraesthesia in ulnar distribution	September 1956	No pain; slight hypo-aesthesia little finger	Muscle bulk nearly normal; slight wasting first dorsal interosseous; grip nearly normal
17	57	Friction neuritis; increased carrying angle; large epicondyle	Pain and numbness in hands for 3 months	Weakness of muscles and paraesthesia in ulnar nerve distribution	January 1957	Normal	Nearly normal
18	57	Same as 16	Pain and numbness in hands for 3 months	Weakness of muscles and paraesthesia in ulnar nerve distribution; disc degeneration C.5-6	January 1957	Occasional pain and slight sensory loss	Hand slightly weaker than normal
19	34	Traumatic ulnar neuritis; injury 4 years ago; enlargement of medial epicondyle	Paraesthesia; weakness of grip; unable to straighten fingers	Neuroma; clawing of hand; weakness and wasting of interosseous and hypothenar muscles; typical sensory loss	April 1957	No pain; minimal sensory changes	Clawing improved; some weakness persists, but improving
20	62	Traumatic neuritis; epicondyle enlarged	Typical paraesthesia, pain and weakness	Neuroma; paraesthesia in fingers, hand and forearm; weakness	May 1957	Some numbness in ulnar area of hand	Improvement in power began within few days of operation; now normal function

3. After anterior rerouting, the nerve lies in a sinuous course in front of the epicondyle and it seems more logical and simple to remove the epicondyle so that the nerve can roll forward and remain in a straight line.

4. In order to transplant the nerve in front of the epicondyle about four inches of the nerve has to be mobilised by dislodgement from the groove. The nerve is held in the loop of a tape and retracted forward. The nerve supply to the flexor carpi ulnaris has to be carefully preserved. The superior ulnar collateral artery and other anastomotic vessels are likely to be injured. This handling of the nerve causes increased pain after operation and delay in recovery. If the epicondyle is removed the nerve and sheath roll forward and are not handled at all in many cases. There is less pain after operation and recovery is more rapid (Table I).

TECHNIQUE OF OPERATION

A tourniquet is not essential because bleeding is not severe in the anterior approach. The arm rests on a small table at right angles to the trunk and with the forearm supinated. The medial epicondyle and the supracondylar ridge of the humerus are exposed through a

FIG. 1

FIG. 2

Figure 1—The medial epicondyle is exposed by an antero-medial incision but the nerve is not dislodged from the groove behind the epicondyle. Figure 2—After the epicondyle and part of the medial supracondylar ridge of the humerus have been removed the nerve rolls forward to the new bed provided by the aponeurosis from the flexor and pronator muscles.

five-inch antero-medial incision (Fig. 1). The aponeurotic origin of pronator teres and the flexor muscles of the forearm is incised over the front of the epicondyle at the base and raised from the front and medial side of the epicondyle with a knife or chisel. This aponeurotic sheet is used later to cover the raw bone that remains after excision of the epicondyle, and thereby reattaches the origin on the muscles to the bone and provides a smooth bed for the nerve (Fig. 2). Up to this point in the operation the ulnar nerve is out of danger because it is lying in the concavity behind the epicondyle and is protected by an anterior band of the ulnar collateral ligament, which passes on to the inner side of the coronoid process. This band must now be peeled from the distal and front part of the epicondyle. With blunt scissors or artery forceps the distal part of the ulnar nerve is exposed just before it passes behind the epicondyle and the proximal part of the nerve is likewise exposed beyond the upper edge of the epicondyle. The nerve and sheath usually need not be further disturbed, but if the nerve and sheath are thickened the sheath should be split after the epicondyle has been excised so that the nerve may be inspected. The epicondyle and one or two inches of the medial supracondylar ridge are removed either by nibbling forceps or by a small chisel. The raw bone surface is smoothed with a Luer forceps. The nerve now rolls forwards and rests in front of

the former site of the epicondyle (Fig. 2). The split aponeurosis is sutured over the raw bone surface to provide a smooth surface for the nerve. The appearance of the elbow before and after operation is illustrated in Figures 3 to 5.

FIG. 3
Case 8—Child of ten. Figure 3—Cubitus valgus resulting from removal of head of radius two years before. Figure 4—Appearance after operation. Note the removal of the supracondylar ridge. Figure 5—Opposite elbow for comparison.

RESULTS

Sensory symptoms and signs—Pain disappeared in all except one patient. There was complete recovery of sensibility in eleven patients (55 per cent), incomplete recovery in seven (35 per cent) and no recovery in two (10 per cent).

Motor loss—This was present in all sixteen patients before operation. After operation there was complete recovery in eight (50 per cent), incomplete recovery in seven (44 per cent) and no recovery in one.

CONCLUSIONS

The operation has the advantage of simplicity, and it avoids the slight danger of secondary cicatricial contracture of the nerve when it is transplanted anteriorly and implanted in muscle. There is a slight hazard from external injuries because the nerve is unprotected by the epicondyle.

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