POSTERIOR INTEROSSEOUS NERVE PARALYSIS CAUSED BY A GANGLION AT THE ELBOW

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Compression of peripheral nerves by simple ganglia is well recognised. In a review of thirteen cases Brooks (1952) described compression of the ulnar nerve at the elbow and wrist, the median nerve at the wrist, and the lateral popliteal and tibial nerves. Other cases have been reported by Seddon (1952), Maróttoli and Didier (1953) and by Mallett and Zilkha (1955).

Hustead, Mulder and MacCarty (1958) reviewed sixteen cases of non-traumatic, progressive paralysis of the posterior interosseous nerve and added two more. Exploration was carried out in seven cases; the lesion was found to be a benign tumour in four, diseased bursae in two and an anomalous course of the nerve in one. Barber, Bianco, Soule and MacCarty (1962) described compression of peripheral nerves by soft-tissue tumours. They listed nine cases of radial nerve palsy (though not mentioning the posterior interosseous nerve) but none of these was caused by a ganglion. Posterior interosseous palsy may also be caused by compression of the nerve at the neck of the radius by a parosteal lipoma (Richmond 1953, Campbell and Wulf 1954, Moon and Marmor 1964). Whiteley and Alpers (1959) described a neuroma of the nerve and Goldsztajn (1960) found no abnormality in the one case he explored.

In our case a cystic lesion in the substance of the supinator muscle was found, compressing the posterior interosseous nerve. This lesion, which had the macroscopic and microscopic appearances of a simple ganglion, may have arisen from an osteoarthritic elbow. No similar case has been found in the literature.

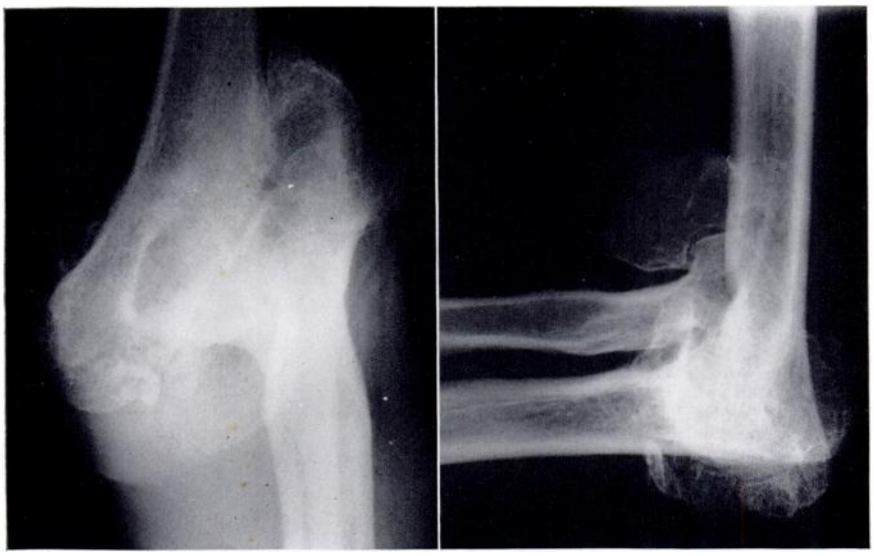

FIG. 1

Radiographs of the left elbow showing an old ununited intercondylar fracture of the humerus with degenerative change in the joint.

CASE REPORT

A man of fifty-seven complained of weakness of grip and inability to extend the fingers of his left hand. He had first noticed this twelve days before when he had been cutting tiles.

Two days before coming to hospital he had fallen, injuring the left wrist. There was a history of old injury to the left elbow when he was eight years old.

On examination there were 30 degrees of valgus of the elbow. Flexion was full but extension was limited by 45 degrees; pronation was full but supination was absent. There was bruising and oedema over the dorsum of the wrist. Sensation was normal. The extensor muscles of the fingers were completely paralysed and the radial extensors of the wrist were weak, but there was no other weakness. No lump was felt. There was no abnormality of the central nervous system and the Wassermann reaction was negative. Radiographs of the elbow showed an old ununited intercondylar fracture of the humerus with marked degenerative change (Fig. 1). Radiographs of the wrist showed a small flake fracture of the back of the lower end of the radius. At first the extensor weakness was ascribed to local trauma to the extensor tendons at the wrist. However, the weakness increased during the next two weeks and localised tenderness was found over the posterior interosseous nerve.

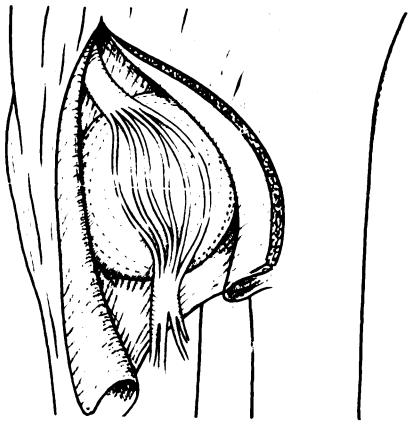

FIG. 2

Diagram of posterior aspect of left elbow showing the findings at operation. The superficial part of the supinator muscle was divided and turned back. The swelling was seen lying on the deep part of the muscle, with the posterior interosseous nerve stretched over it.

Operation—The posterior interosseous nerve was explored through a vertical incision in the upper half of the forearm. Through the interval between the extensor digitorum communis and extensor digiti minimi muscles the nerve was found at the lower border of the supinator muscle and its branches were identified. The superficial part of the supinator was incised in the line of its fibres. The nerve was found to be flattened and splayed out over a well defined cystic swelling one and a half inches (3·75 centimetres) in length. This lay between the superficial and deep parts of the muscle, extending medially as far as the bicipital tuberosity of the radius (Fig. 2). The nerve was dissected off the cyst, which was then excised.

Progress—The muscles supplied by the posterior interosseous nerve recovered slowly during the next six months and reached power 4 (Medical Research Council Grading). The patient now regards his left hand as normal.

Histology—Histological examination showed a cystic lesion with a fibrous wall and a lining of flattened cells of endothelial type. These appearances were considered to represent a simple ganglion.

DISCUSSION

The origin of ganglia is still disputed and in the context of peripheral nerve compression was discussed by Brooks (1952). In the case recorded here the cystic lesion appeared to be a simple ganglion. The elbow was the seat of degenerative arthritis and the ganglion may have arisen from it. Weinberger (1939) reviewed the literature and suggested that the posterior interosseous nerve could be compressed by bursae near the elbow. He discussed anatomy in detail and noted that the nerve passed close to the interosseous and bicipito-radial bursae. In evidence he quoted a case of Agnew (1863) in which a bursal tumour was found to be compressing the median nerve anteriorly and the posterior interosseous nerve posteriorly. This lesion appeared to communicate with the bicipito-radial bursa. Weinberger also described two patients with posterior interosseous palsy and tenderness over the bursae, but as both refused operation his opinion was unconfirmed. In our patient the cystic lesion was found on the postero-lateral aspect of the radial neck well away from the usual site of bursae.

Nerve compression by simple ganglia is most common in the ulnar and lateral popliteal nerves. Compression is most likely where a nerve passes through a confined space (Brooks 1963). The course of the posterior interosseous nerve through the supinator muscle round the neck of the radius resembles that of the lateral popliteal nerve round the neck of the fibula. It is therefore reasonable to expect a similar compression of the posterior interosseous nerve. The frequent movements of pronation and supination may compress or irritate the nerve further. Valgus or varus at the elbow could increase distortion of the nerve.

In our patient nerve compression was caused by a cystic lesion. This may have been a simple ganglion, a ganglion arising from an osteoarthritic joint, or an enlarged bursa. The appearances at operation and the histological evidence suggest a simple ganglion.

SUMMARY

1. A case of posterior interosseous nerve palsy from compression in the supinator muscle by what appeared to be a simple ganglion is described.
2. Surgical decompression led to an effective cure.
3. The course of the nerve through this muscle invites compression.
4. Rotation of the forearm, especially with super-added deformity of the limb, may increase the compresssion.

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REFERENCES

AGNEW, D. H. (1863): Bursal Tumour Producing Loss of Power of the Forearm. *Transactions of the Pathological Society of Philadelphia, American Journal of the Medical Sciences*, **46**, 404.

BARBER, K. W., Jun., BIANCO, A. J., Jun., SOULE, E. H., and MACCARTY, C. S. (1962): Benign Extraneural Soft-Tissue Tumors of the Extremities Causing Compression of Nerves. *Journal of Bone and Joint Surgery*, **44-A**, 98.

BROOKS, D. M. (1952): Nerve Compression by Simple Ganglia. A Review of Thirteen Collected Cases. *Journal of Bone and Joint Surgery*, **34-B**, 391.

BROOKS, D. M. (1963): Nerve Compression Syndromes. *Journal of Bone and Joint Surgery*, **45-B**, 445.

CAMPBELL, C. S., and WULF, R. F. (1954): Lipoma Producing a Lesion of the Deep Branch of the Radial Nerve. *Journal of Neurosurgery*, **11**, 310.

GOLDSZTAJN, M. (1960): Nieurazowe uszkodzenie nerwu promieniowego glebokiego. *Neurologia, Neurochirurgia i Psychiatria Polska*, **10**, 397.

HUSTEAD, A. P., MULDER, D. W., and MACCARTY, C. S. (1958): Nontraumatic, Progressive Paralysis of the Deep Radial (Posterior Interosseous) Nerve. *Archives of Neurology and Psychiatry*, **79**, 269.

MALLETT, B. L., and ZILKHA, K. J. (1955): Compression of the Ulnar Nerve at the Wrist by a Ganglion. *Lancet*, **i**, 890.

MARÓTTOLI, O. R., and DIDIER, A. (1953): Lesiones nerviosas en los quistes sinoviales. *Anales de Cirugia*, **18**, 49.

MEDICAL RESEARCH COUNCIL (1942): *War Memorandum No.* 7; *Aids to the Investigation of Peripheral Nerve Injuries*. London: His Majesty's Stationery Office.

MOON, N., and MARMOR, L. (1964): Parosteal Lipoma of the Proximal Part of the Radius. *Journal of Bone and Joint Surgery*, **46-A**, 608.

RICHMOND, D. A. (1953): Lipoma Causing a Posterior Interosseous Nerve Lesion. *Journal of Bone and Joint Surgery*, **35-B**, 83.

SEDDON, H. J. (1952): Carpal Ganglion as a Cause of Paralysis of the Deep Branch of the Ulnar Nerve. *Journal of Bone and Joint Surgery*, **34-B**, 386.

WEINBERGER, L. M. (1939): Non-Traumatic Paralysis of the Dorsal Interosseous Nerve. *Surgery, Gynecology and Obstetrics*, **69**, 358.

WHITELEY, W. H., and ALPERS, B. J. (1959): Posterior Interosseous Palsy with Spontaneous Neuroma Formation. *Archives of Neurology*, **1**, 226.