Bilateral median nerve compression at the level of Struthers’ ligament

Case report

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Struthers’ ligament syndrome is a rare cause of median nerve entrapment. Bilateral compression of the median nerve is even more rare. It presents with pain, sensory disturbance, and/or motor function loss at the median nerve’s dermatomal area. The authors present the case of a 21-year-old woman with bilateral median nerve compression caused by Struthers’ ligament. She underwent surgical decompression of the nerve on both sides. To the authors’ knowledge, this case is the first reported bilateral compression of the median nerve caused by Struthers’ ligament. The presentation and symptomatology of Struthers’ ligament syndrome must be differentiated from median nerve compression arising from other causes.

KEY WORDS • median nerve • peripheral neuropathy • Struthers’ ligament

The supracondylar process or spur of the humerus, described by Struthers in 1849, is a clinically significant entity and the ligament of Struthers usually runs from this process to the medial epicondyle. This anatomical variation is said to occur in 0.7 to 2.7% of the population and has been variously called “supracondyly,” “supracondyloid,” “supraepitrochlear,” or “epicondylic.” In climbing animals, the supracondylar process is normally present, forming a supracondyloid canal that protects the neurovascular bundle and provides muscular attachment for the round pronator muscle.

In human beings, this variation is usually asymptomatic. Occasionally, the round pronator muscle may have an anomalous origin at the bone spur, the ligament, or both. The median nerve, often accompanied by the brachial, radial, or ulnar artery, travels underneath the process or the ligament and may be compressed by either of them (Fig. 1). Bilateral compression of the nerve and/or the artery due to Struthers’ ligament is unusual. Here we present a case of bilateral median nerve compression caused by Struthers’ ligament.

Case Report

History. This 21-year-old woman was admitted to the hospital with progressively aching pain in both arms. She had experienced pain in the left arm for 4 years and in the right arm for 10 months. She also had noted a bony lump above her elbow on the left side.

Examination. The pain was aggravated by elbow flexion and radiated toward the wrist and forearm on the left side. On examination, a palpable bony mass was found above the elbow in the left arm. Pressure on this prominence or flexion of the elbow caused severe pain radiating toward the wrist. On the right side the bony process could not be detected by palpation. There was no motor weakness or sensory deficit in either hand, and there was no evidence of any vascular obstruction. Radiographs of the left elbow region confirmed the presence of a supracondylar spur arising from the medial aspect of the lower humerus (Fig. 2). Anteroposterior and lateral radiographs of the right elbow failed to demonstrate a spur, but instead revealed a prominence (Fig. 3). Electromyography revealed no abnormality in median nerve function in either extremity. Because of the patient’s severe pain, an operation was first planned on the left side.

First Operation and Postoperative Course. The supracondylar process and median nerve in the patient’s left arm were explored and the nerve was found to pass under the...
triangular ligament (Struthers’ ligament), which extended from the apex of the spur to the medial epicondyle of the humerus (Fig. 4). Originating from both the ligament and the spur was the round pronator muscle (Fig. 5). The spur was removed along with the periosteum, and the ligament was excised. Postoperatively, the patient immediately experienced some relief of pain and the pain disappeared 2 weeks later.

Second Operation and Postoperative Course. One month after the first operation, an intervention to the right arm was performed because the patient experienced similar symptoms. During this operation, a well-formed Struthers’ ligament was observed to extend from a supracondylar eminence to the medial epicondyle of the humerus. The ligament and the eminence with its periosteum were both resected. On this side, the median nerve passed under the ligament and the round pronator muscle had a normal origin. The brachial artery was located anterior to the ligament on both sides. The patient became symptom free immediately after the operation.

Discussion

The precise incidence of a supracondylar process and Struthers’ ligament is not known, but they probably occur in less than 2% of the population. The supracondylar process is usually unilateral, but there have been reports of a bilateral occurrence in which the processes differ in

Fig. 1. Diagrammatic representation of the supracondylar process (star) and Struthers’ ligament located at the lower end of the left humerus. The median nerve (a) and/or the brachial artery (b) or its branches (c) may run beneath the spur or the ligament and be compressed. ba = brachial artery; L = Struthers’ ligament; m = medial epicondyle; n = median nerve.

Fig. 2. Anteroposterior (left) and lateral (right) radiographs revealing the supracondylar spur (asterisks) at the left elbow region.

Fig. 3. Anteroposterior (left) and lateral (right) radiographs demonstrating the supracondylar eminence (arrows) at the right elbow region.
size.7,15,17 A homolog of the process or spur is found in the same location on the humerus in primates, marsupials, and felines. In cats, it forms the wall of a foramen of the humerus through which the neurovascular bundle (the median nerve and brachial artery) normally passes.7,16 The ligament may be a vestige of the tendon of the latissimocondyloideus, a muscle that extends from the humeral attachment of the broadest muscle of the back to the medial epicondyle in certain climbing animals.7

In our case, only the median nerve was found to be compressed by the ligament of Struthers at both sides. In cases of high division, entrapment and compression of the brachial artery may occur above the elbow, but it is less frequent than compression of the median nerve.3 Ulnar nerve entrapment by the supracondylar process has also been reported.9 Entrapment neuropathy of the median nerve above the elbow is extremely rare. The median nerve may be compressed by lacertus fibrosus or by the supracondylar process together with Struthers’ ligament at this region. In a series of 228 median nerve entrapments, two cases of lacertus fibrosus (1%) and only one case of Struthers’ ligament syndrome (0.4%) were reported.5 On the other hand, Smith and Fisher11 reported a case in which the median nerve was compressed by Struthers’ ligament, which originated on the humerus in the absence of any bony process—the first such report since that of Struthers’ in 1881.15 In our case, there was minimal excrescence of bone, a supracondylar eminence, and a well-formed ligament arising from this eminence on the right side. In their cadaveric specimen, Gunther, et al.,6 found that Struthers’ ligament can exist in the absence of a real supracondylar process. In most reported cases,1,2,7,14,17 the round pronator muscle was observed to have a high origin, which is similar to the present case.

The first case of bilateral median nerve compression was reported by Al-Qattan and Husband.3 A 70-year-old woman presented with median nerve compression caused by a supracondylar process in the left arm. Twenty-five years earlier, similar symptoms in the patient’s right elbow had been treated by excision of a supracondylar process. The median nerve was accompanied by the brachial artery in the right arm, and there was no information about the course of the artery on the left side. The other case of bilateral compression in which the median nerve was in the right arm and the brachial artery in the left arm were compressed by supracondylar processes was reported by Kessel and Rang.7 Our case seems unique because the median nerve was bilaterally compressed by Struthers’ ligament instead of by the spur. In addition, our patient had no real spur in the right arm, which is rare.

In previous cases, extension of the elbow reportedly increased patients’ complaints and flexion decreased them.2,7,10,11,17 In our case, flexion increased the patient’s pain. However, there have been some cases in which flexion increased pain due to vascular entrapment involving radial and ulnar arteries.3,7 In our case, the development of pain seems more likely to be the result of local mechanical factors associated with the palpable spur during elbow movements and due to minor traumatic changes and soft-tissue inflammation.

Conclusions

Patients often present with symptoms of forearm claudication or median nerve dysfunction in cases of neurovascular entrapment. Examination may reveal a neurological deficit in a median nerve distribution. If routine anteroposterior and lateral radiographs of the elbow fail to reveal the spur, it may be necessary to obtain oblique views.4 Treatment consists of surgical excision of the ligament and resection of the bone spur together with its periosteum to prevent regeneration.5,8 Surgery results in relief of symptoms in most cases.

References

4. Blakeborough A, Chennells PM, Cape J: Case report: cellist’s

Fig. 4. Intraoperative photograph of the left elbow region. I = Struthers’ ligament. See Fig. 1 for explanations of symbol and other abbreviations.

Fig. 5. Drawing made intraoperatively showing a high origin for the round pronator muscle in the left arm. The broken line indicates the normal contour of the round pronator muscle. T = pronator teres (round pronator). See Fig. 1 for explanations of symbol and other abbreviations.

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