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Case Report *Volume 8 Issue 1*

Ulnar Nerve Rupture Secondary to Advanced Elbow Arthritis; A Case Report and Review of Literature

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Abstract

A 74-year-old male presented with right elbow pain and weakness of the right hand of one year duration. He had longstanding polyarticular joint disease since childhood with bony ankylosis of the right elbow in flexion. Neurological examination revealed wasting of all intrinsic muscles of the right hand with hypoesthesia on ulnar nerve distribution. Plain radiographs confirmed advanced elbow osteoarthritis with bony ankylosis and osteophytes. Electrodiagnostic studies localized an ulnar nerve interruption at the level of the elbow. On surgical exploration, a fibro-fatty band was found constricting the nerve, which was found to be completely ruptured. Direct epineural repair with anterior subfascial transposition was performed. At one-year follow-up, the patient reported relief of elbow pain and improvement in hand numbness, though motor recovery did not occur, consistent with the delayed presentation. To our knowledge, this is the first reported case of complete ulnar nerve rupture secondary to primary elbow osteoarthritis.

Keywords: Ulnar Nerve Rupture; Elbow Osteoarthritis; Cubital Tunnel Syndrome; Nerve Repair; Anterior Transposition

Introduction

Primary elbow osteoarthritis (OA) is uncommon but may affect approximately 3% of the population [1]. Repeated traumatic stress to the joint is the most common etiology, and this was originally recognized in Japan to be a presentation of men with their dominant extremity involved in weight lifting, throwing, and manual labor [2]. Secondary elbow OA can be a result of joint injuries, various inflammatory processes, and congenital dysplastic disorders [3]. We present a case of a 74-year-old gentleman with advanced elbow osteoarthritis complicated by ulnar nerve compromise at the joint level.

Case Report

A 74-year-old male patient presented to the orthopaedic outpatient clinic with a history of right elbow pain and weakness of the right hand for approximately one year. The patient had been under treatment by the neurology team during that period to manage numbness and weakness by medical treatment and physiotherapy. On examination, he was found to have problems in other joints since childhood; his gait was abnormal due to limb length discrepancy and dorsolumbar scoliosis. The right hip was stiff, the left knee was in flexion and valgus deformity, and the left foot was in a rigid equinovarus position.

Local examination of the right elbow revealed joint enlargement and total ankylosis in flexion of approximately 90 degrees. Examination of the right hand showed evident wasting of all intrinsic muscles (Figure 1), along with hypoesthesia on ulnar nerve distribution. However, the patient retained a good hand grip and release.

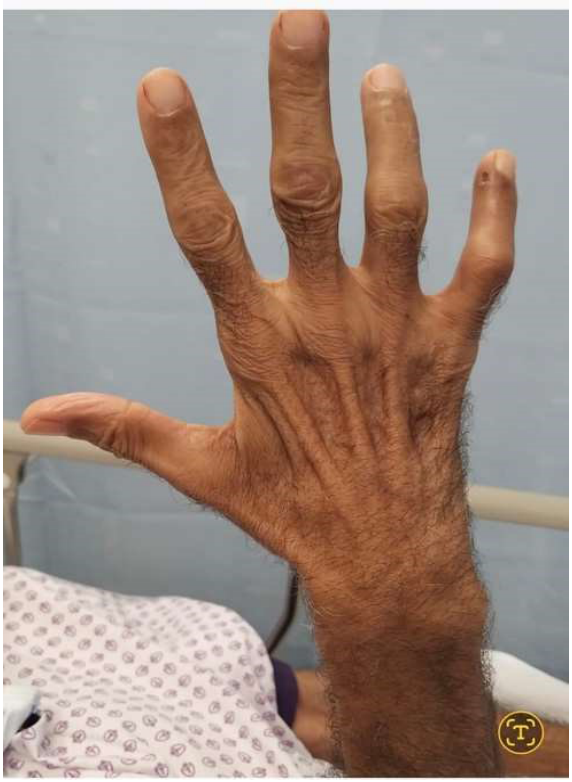

Figure 1: Marked intrinsic muscle atrophy with incomplete extension of the ulnar two fingers.

Plain radiographs showed right hip dysplasia and bony ankylosis, advanced osteoarthritis of the left knee, and right elbow bony ankylosis with osteophytes formation (Figure 2). Nerve conduction studies performed before orthopaedic referral demonstrated the presence of ulnar nerve palsy.

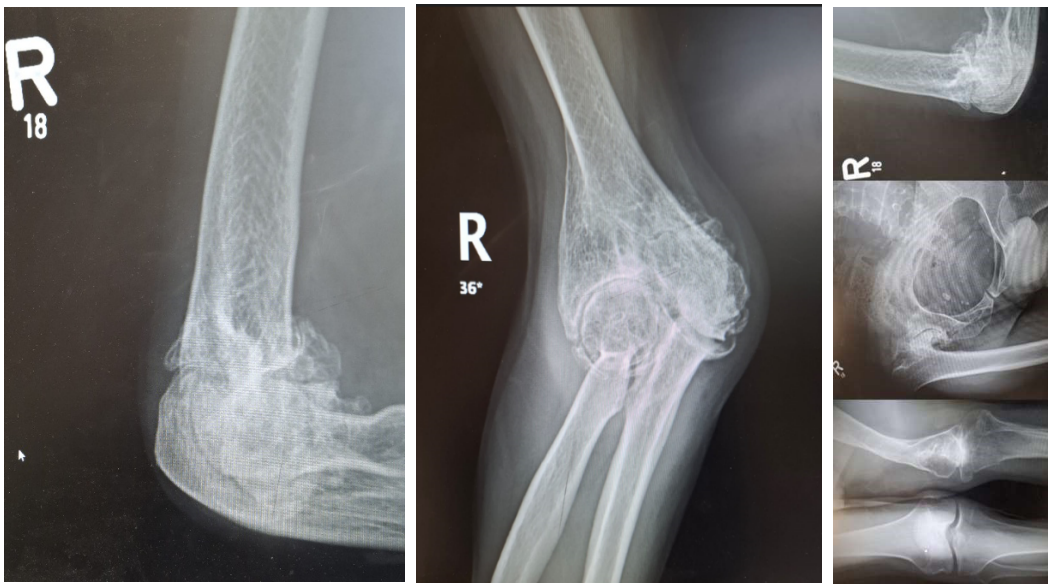

Figure 2: X-rays showing advanced OA of the right hip, left knee, and right elbow.

The patient had no symptoms related to the cervical spine and no radiating pain to the shoulder region or brachialgia. MRI of the cervical spine was performed to exclude cervical spine pathology as a cause of his neurological deficit. Electrodiagnostic studies were repeated to localize the site of ulnar nerve pathology, and demonstrated ulnar neuropathy above the take-off level of the dorsal ulnar cutaneous branch, with the nerve interrupted at the level of supply to the flexor carpi ulnaris muscle.

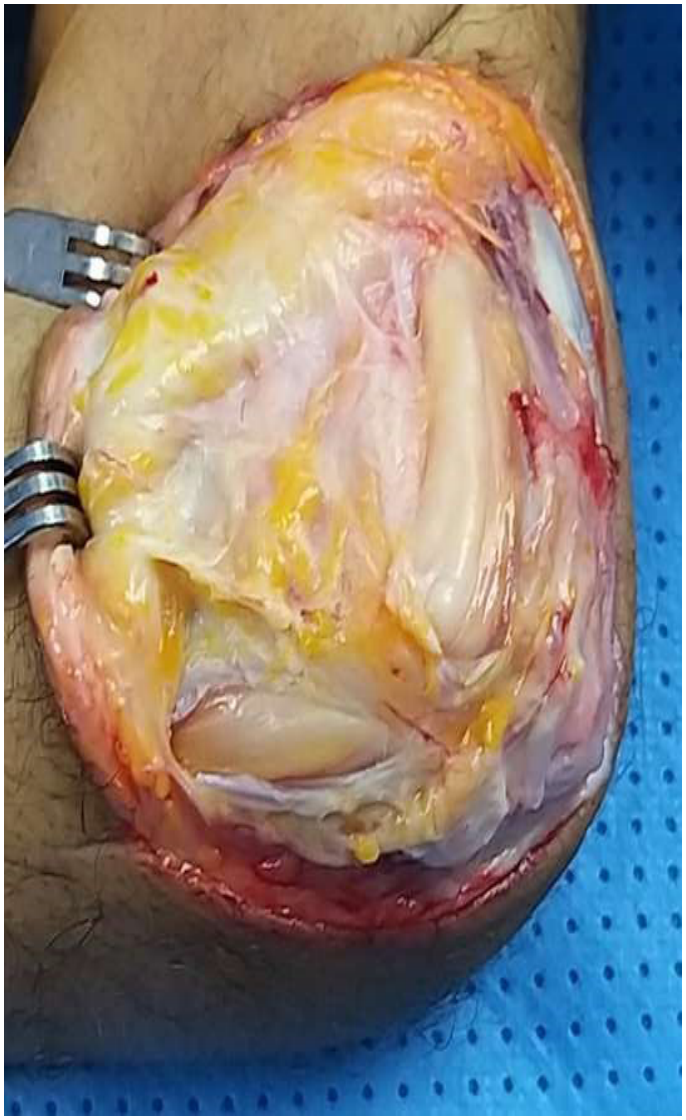

Figure 3: Fibro-fatty band overlying the ulnar nerve at the medial epicondyle.

It was decided to explore the ulnar nerve at the right elbow via medial exposure, under tourniquet on the upper arm and general anesthesia. After dissection of the superficial tissue layers, a fibro-fatty band was found overlying and constricting the nerve as it passed exactly posterior to the medial epicondyle (Figure 3). The band was divided and the nerve was found to be interrupted (Figure 4). The nerve was dissected out of its position, the edges were trimmed to expose the nerve bundles, and intraoperative electrical nerve stimulation confirmed discontinuity between the proximal and distal neural segments. Direct epineural suture was possible with anterior subfascial nerve transposition (Figure 5). The wound was closed in layers and the joint was not splinted externally, as there was already no range of motion before surgery.

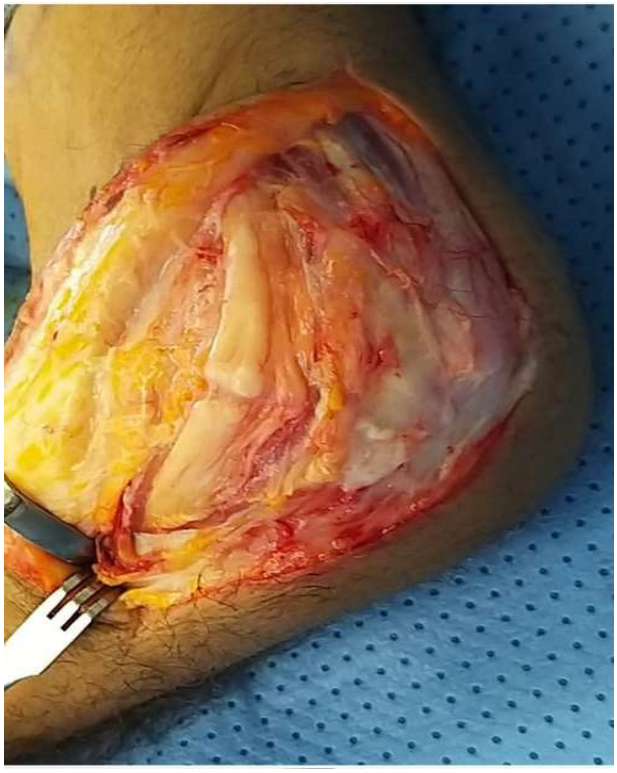

Figure 4: Complete disruption of the ulnar nerve.

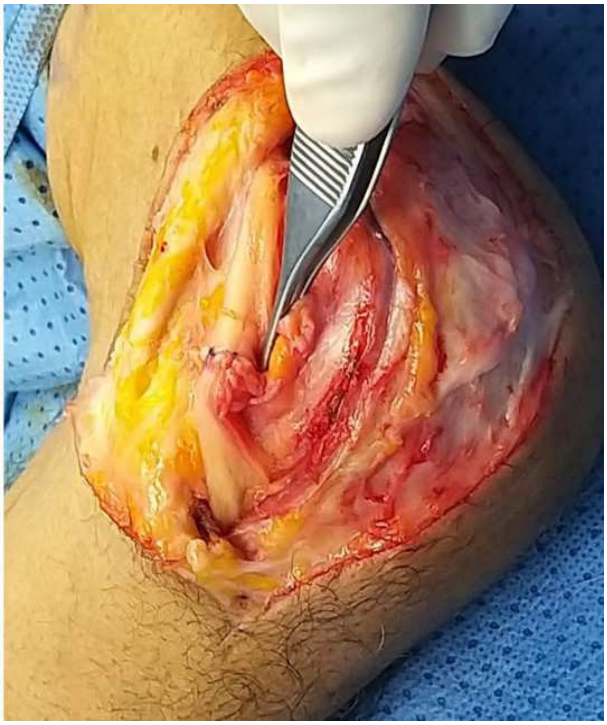

Figure 5: Ulnar nerve suture with anterior subfascial transposition.

The patient was reviewed in the outpatient clinic until suture removal and at 3, 6, and 12 months postoperatively. He reported relief of chronic elbow pain and improvement of hand numbness; two-point discrimination at the tip of the right little finger improved from 12 mm to 7 mm. However, the sense of hand weakness compared to the normal side persisted.

Discussion

Elbow primary osteoarthritis is not as common as OA of large joints such as the hip and knee [4]. The usual presentation is pain and stiffness, and in rare cases patients might present with ulnar nerve palsy secondary to compression or rupture. Although unusual, this complication should be considered when managing such cases. At the elbow joint, the ulnar nerve passes between the medial epicondyle and the olecranon process, then enters the forearm between the two heads of the flexor carpi ulnaris muscle. In this narrow space the cubital tunnel the nerve is liable to compression by medial osteophytes or synovial hypertrophy in elbow OA.

This had been reported before by Prasad et al [5], who described ulnar nerve compression by a medially located loose body and medial osteophytes in primary elbow OA of a man aged 65 years. They decompressed the nerve with anterior sub-muscular transposition. The authors noted gradual improvement and restoration of power and sensation after six months. This favorable outcome can be explained by the earlier presentation of six months when compared to our patient, who presented after more than one year of symptoms, with significant muscle wasting that did not recover.

Ulnar nerve palsy with claw hand was the presentation in a case described by Spalkit et al [6]. The patient was a 59-year-old woman referred for weakness, paresthesia, and numbness with clawing of the little and ring fingers for two years. The authors used ultrasonography and MRI to demonstrate medial osteophytes, elbow joint effusion, and a stretched, thinned ulnar nerve in the setting of elbow OA. The management was ulnar nerve decompression and anterior sub-muscular transposition. The patient was satisfied regarding pain relief and improvement of compression symptoms, but motor function recovery was not assessed as postoperative follow-up was only three months. Another report of cubital tunnel syndrome was published by Kato, et al [7], who described 38 cases of medial ganglia associated with elbow OA. Ganglion excision and anterior subcutaneous transposition resulted in recovery of sensory and motor function. However, in our case no further imaging studies were needed beyond plain radiographs, given the clear clinical and radiological picture.

Attrition rupture of the ulnar nerve at the elbow was described by Ochi et al [8] in a patient with rheumatoid arthritis. Similar to our case, their patient had elbow pain and numbness with impaired sensation of the ulnar fingers for more than two years. The elbow was severely damaged with instability and valgus deformity. The patient declined total elbow arthroplasty, and on exploration the nerve was found to be partially ruptured. Anterior transposition resulted in improvement of numbness postoperatively. To our knowledge, our case is the first to describe complete rupture of the ulnar nerve secondary to primary elbow OA.

Delayed diagnosis was responsible for the severe wasting of the small muscles of the hand; after one year, restoration of muscle power cannot be achieved [9]. Recovery of sensory function up to two years after injury was described by Sunderland [10], who noted that return of function in distal muscles is poor when nerve suturing is late. Barrios et al [11] reported their experience with secondary repair of the ulnar nerve in 24 cases at the elbow level or proximal forearm. They concluded that repair within the first three months can result in recovery of satisfactory motor and sensory function; only one-quarter of patients resumed motor function when repair was performed within six months; and after one year, no motor recovery was achieved mirroring our results.

Advanced imaging studies with arthroscopic procedures can serve as an adjuvant modality in mild or moderate cases of elbow OA when improvement of elbow stiffness is aimed at together with treatment of ulnar nerve pathology. However, these techniques were not required in our case.

In summary, the reported case highlights an important complication of advanced elbow arthritis: ulnar nerve impairment. Ulnar nerve pathology compression, attrition, or rupture can be a presentation of advanced elbow OA. Clinical, radiological, and electrophysiological studies are of paramount importance in localizing and confirming the pathology. Surgical treatment is always required to manage such cases, after appropriate patient counseling regarding surgical outcomes.

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