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Case Report

Cubital tunnel compression with ulnar claw hand - A rare presentation of Primary elbow osteoarthritis

Rudra Prasad MS MBBS , DNB [1]

, Chandan Kulkarni MBBS , MS, FRGUHS (Pediatric Orthopedics) [2], Ravi Kumar Mukartihal [2]

, Puneet K. Pai MBBS , MS , FRGUHS (Pediatric orthopedics) [1]

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ABSTRACT

Background

Primary elbow osteoarthritis usually presents with pain and global restriction of range of motion and rarely presents with features of cubital tunnel syndrome . Ulnar claw hand is debilitating to the patient and interferes in the activities of daily living . Cubital tunnel syndrome is a rare presentation of primary elbow OA and can easily be missed . Medial osteophytes and loose bodies from the joints of the elbow (ulno-trochlear and radio-ulnar) can cause compression of the ulnar nerve at the cubital tunnel and present with features of ulnar nerve palsy without substantial symptoms in the elbow .

Case Report

We present a case of ulnar claw hand due to compression neuropathy in an undiagnosed case of primary OA of the elbow . The patient was thoroughly investigated for about an year for all possible etiologies of the Ulnar nerve palsy the cause of compression was not clearly identified . Radiologically the site of compression was identified to be at the cubital tunnel caused by a medial osteophyte and a loose body arising from the degenerated ulno humeral joint . After a thorough work up ulnar nerve decompression at the cubital tunnel was offered , which involved loose body and osteophyte excision with anterior transposition and debulking the ulno humeral joint . Patient had a good postoperative outcome with recovery of neurological symptoms and grip strength at 6 months , though the wasting persisted .

Conclusion

Primary OA of the elbow rarely presents as an ulnar claw hand and has to be kept in mind by the practicing clinician. Ulnar nerve decompression with anterior transposition with loose body excision gives good results .

Keywords

ulnar claw hand; Primary elbow OA; Medial osteophyte; Debulking; cubital tunnel

INTRODUCTION

Primary elbow osteoarthritis usually presents with pain and global restriction of range of motion and rarely presents with features of cubital tunnel syndrome. Ulnar claw hand is debilitating to the patient and interferes in the activities of daily living.

Guyon's canal compression, cervical spine pathologies, Hansen's disease and infective etiologies being the common causes of ulnar nerve palsy, may delay the diagnosis of ulnar nerve compression secondary to primary OA of the elbow. Medial osteophytes and loose bodies from the joints of the elbow (ulno-trochlear and radio-ulnar) can cause compression of the ulnar nerve at the cubital tunnel and present with features of ulnar nerve palsy without substantial symptoms in the elbow.

We present a case of ulnar claw hand due to compression neuropathy caused by a

medially located loose body and medial osteophytes in an undiagnosed case of primary OA of the elbow. The patient was thoroughly evaluated for over a year for all possible etiologies of Ulnar nerve palsy. Exhaustive investigations failed to reveal any abnormalities of the cervical spine or any cause of compression.

We also discuss the outcomes of anterior ulnar nerve transposition, debulking of the ulnotrochlear joint and loose body excision causing the compressive neuropathy.

CASE REPORT

A 65-year-old man presented with complaints of loss of sensation in the ring and little fingers of the left hand with difficulty in holding objects since 6 months. There was no history of trauma to the elbow or pain in the neck and associated radiculopathy . There were no associated constitutional symptoms. Patient complained of on and off pain in the left elbow, which did not affect his activities of daily living.

CLINICAL FINDINGS

There was obvious wasting of the hypothenar muscles of the left hand along with hollowing of the 1st dorsal web space .(Fig 1) This was associated with clawing of the ring and little fingers and loss of function of the interossei . There was loss of sensation in the volar and dorsal aspects of the little and ring fingers . Elbow examination revealed a fixed flexion deformity of 10 degrees with further flexion to 100 degrees. There was full range of supination and pronation. Neck and the shoulder examination was normal. He was diagnosed with ulnar claw hand . Patient complained of on and off pain in the left elbow, not affecting his activities of daily living.

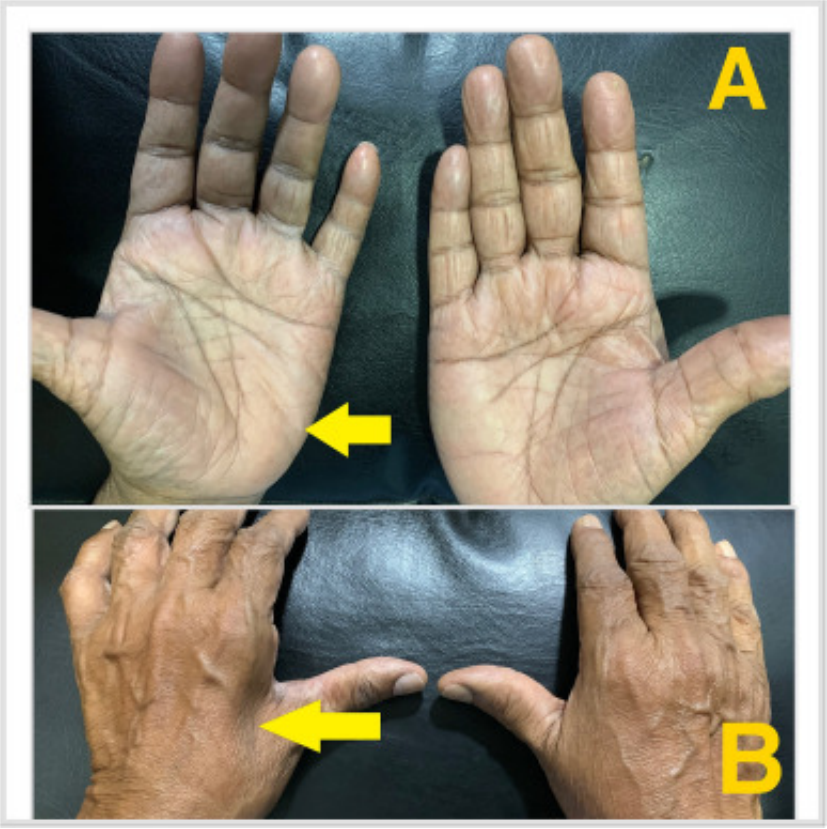

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Fig 1. A- Wasting of the muscles of the hypothenar eminence of the left hand , B- Hollow of the 1st dorsal web space

DIAGNOSTIC ASSESSMENT

To further evaluate the pathology at the elbow, Plain radiographs of the elbow revealed a decreased joint space and osteophytes around the ulno-trochlear joint - features pointing towards OA of the elbow. (Fig 2) Inflammatory joint pathologies were ruled out based on relevant clinical history and by lack of inflammatory markers on routine blood investigations. Further imaging studies were carried out to study the morphology of the osteoarthritic elbow.

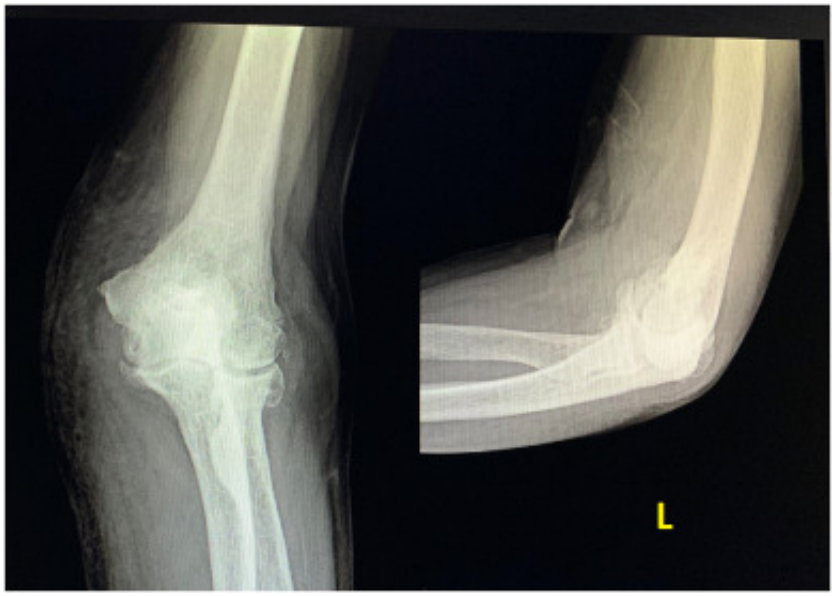

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Fig 2. Plain radiograph of the left elbow showing features of Osteoarthritis- Joint space narrowing, osteophytes

MRI with 3D reconstruction and CT elbow showed medial osteophytes from the ulnotrochlear joint and a loose body compressing the anteromedial aspect of the ulnar nerve.(Fig 3) There was a substantial soft tissue oedema along the course of the ulnar nerve in the cubital tunnel. The loose body was found to be directly compressing the ulnar nerve in the cubital tunnel located antero medial to the nerve. The loose body, medial osteophytes and the synovial hypertrophy were all postulated to contribute to the compressive neuropathy in the cubital tunnel. USG of the elbow revealed a hypoechoic bulky ulnar nerve (8mm) . NCS of the left upper limb revealed features of cubital tunnel nerve compression.

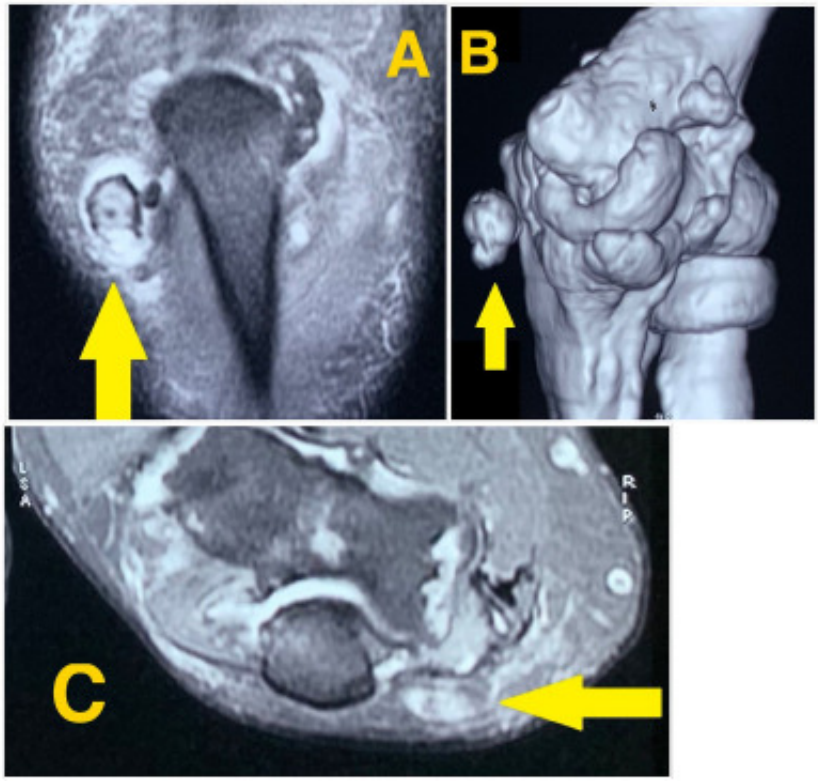

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Fig 3. A- T2 weighted Coronal section of the MRI depicting osteophyte at the cubital tunnel , in close proximity to the ulnar nerve and surrounding subcutaneous edema , B- 3DCT of the left elbow showing various osteophytes in proximity to the ulnotrochlear and elbow joint. A large osteophyte noted in close proximity to the medial epicondyle , C- T2 weighted Coronal, axial section of the MRI depicting osteophyte and surrounding edema

MRI Screening of the cervical spine was carried out to rule out cervical degenerative changes and nerve root compression etiologies, USG of the elbow and ulnar nerve was carried out to rule out Hansen's disease and plain radiographs of the elbow ruled out previous trauma causing bony morphological alterations causing cubital tunnel compression.

DIFFERENTIAL DIAGNOSIS (if any)

MRI Screening of the cervical spine was carried out to rule out cervical degenerative changes and nerve root compression etiologies, USG of the elbow and ulnar nerve was carried out to rule out Hansen's disease and plain radiographs of the elbow ruled

out previous trauma causing bony morphological alterations causing cubital tunnel compression.

THERAPEUTIC INTERVENTION

Ulnar nerve exploration, decompression with anterior transposition of the ulnar nerve, excision of the loose body and debulking of the ulnotrochlear joint was planned. A 12 cm long incision was made between the medial epicondyle and olecranon under tourniquet control and tissue dissection was done to expose the ulnar nerve.(Fig 4) A large loose body measuring 2x2cm was noted compressing the ulnar nerve and was found to be free from the nerve. A thin capsule found encasing the loose body was excised after careful retraction of the nerve.(Fig 5) A large medial osteophyte measuring 0.5x 0.5 cm found along the ulnotrochlear joint was also excised carefully , the ulnar nerve was decompressed proximally and distally and was transposed anteriorly into the submuscular plane.(Fig 6) Arthroscopic decompression was not considered in our case as the loose body and medial osteophyte excision was necessary for the decompression. Elbow flexion and extension was performed to confirm that there was no displacement of the ulnar nerve. The ulnohumeral joint was visualised and features of OA were identified with osteophytes and synovial hypertrophy. Debulking of the joint was done and full ROM of the elbow was confirmed intra operatively. An above elbow slab was applied for 1 week and mobilisation was begun thereafter.

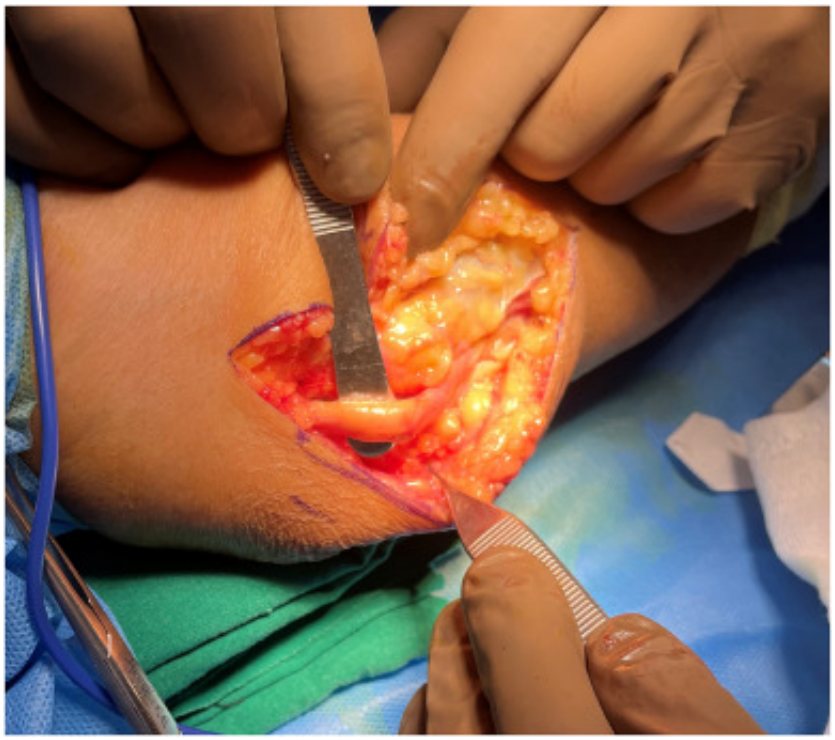

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Fig 4. Exposure of the ulnar nerve and decompression

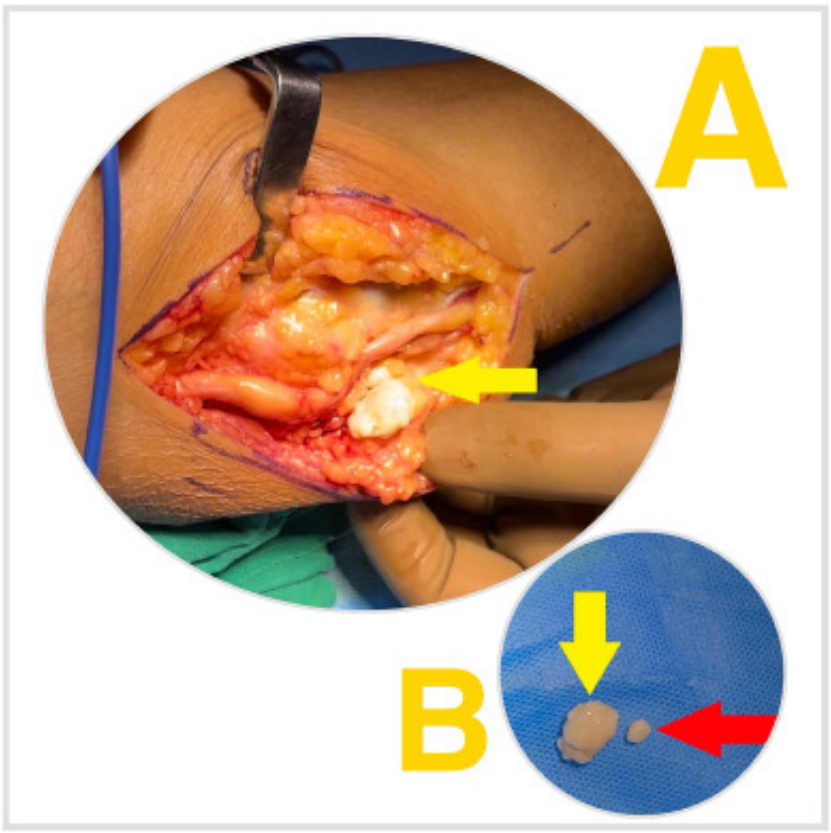

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Fig 5. A- The loose body was found to be directly compressing the ulnar nerve in the cubital tunnel located Antero medial to the nerve, it was not attached to the nerve and was free from the ulnotrochlear joint , B - Loose body measuring 2x2cm directly compressing the nerve excised (Yellow arrow), A medial osteophyte measuring 0.5x0.5 cm found along the ulnotrochlear joint was also excised carefully (Red Arrow)

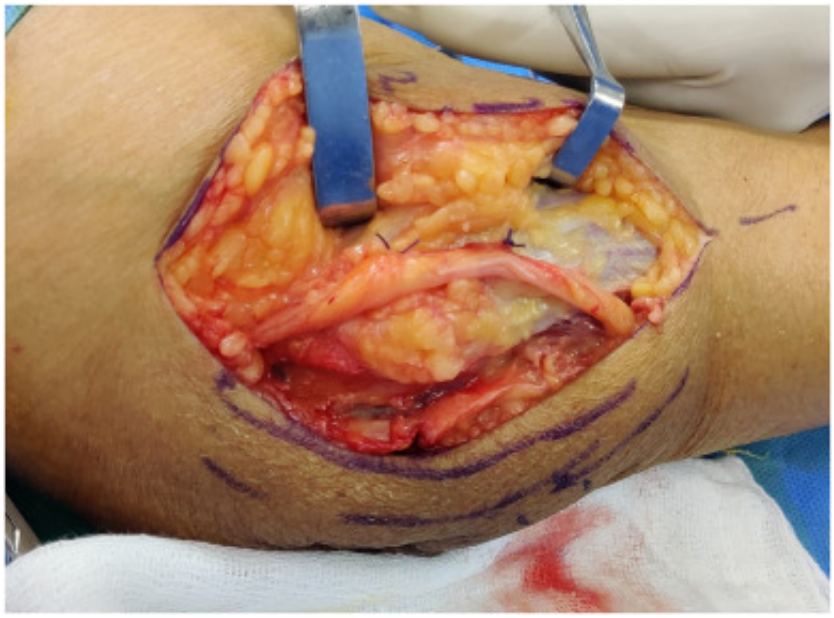

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Fig 6. Submuscular transposition of the ulnar nerve after adequate decompression

FOLLOW-UP AND OUTCOMES

Patient was regularly followed up and showed return of sensation in the fingers at 2 months. There was gradual improvement in power of the ring and little fingers by 3 months. Patient showed return of sensory and motor functions by 6 months. However, wasting in the hypothenar muscles persisted.

DISCUSSION

The elbow is an uncommon location for primary osteoarthritis. Ulnar nerve compression neuropathy secondary to primary osteoarthritis of the elbow is an uncommon presentation and has to be kept in mind by the practicing clinician. Medial osteophytes, synovitis causing cubital tunnel compression in a case of primary elbow OA has been previously reported in the literature (1). In our case it was found that along with the factors causing compression of the nerve in the cubital tunnel i.e. the medial osteophytes and synovitis, it was a loose body with a capsular covering, that was separate from the nerve, which was causing compression of the ulnar nerve.

The size and position of the medial osteophyte, flexion of the elbow reducing the space in the cubital tunnel leading to increased pressure, variations in the size of the cubital tunnel during flexion and extension of the elbow alongside synovitis secondary to elbow OA are contributing factors for ulnar nerve compression in the cubital tunnel(2). Though these are contributing factors for the cubital tunnel compression, in our case the primary cause of compression was the loose body located antero-medial to the ulnar nerve causing direct compression in all range of motions of the elbow.

Antero medial osteophytes are more contributory to the ulnar nerve compression at the cubital tunnel as compared to the posteriorly placed osteophytes. This is postulated to be due to impaction against the trochlea and the medial coronoid process in varying degrees of elbow flexion. (3)

The ulnohumeral joint is more prone to degeneration and production of osteophytes compared to other joints in the elbow. This is attributed to disproportionate axial load bearing ranging from two times the body weight through the ulno humeral joint on lifting even 2 kg weights.(4) The osteophytes are located medially along the cubital tunnel and cause an ulnar nerve compressive neuropathy as in our case.

The cubital tunnel is a narrow space located between the medial epicondyle and the olecranon process of the humerus. The roof is formed by the cubital retinaculum straddled between the two structures and the floor by the posterior band of the medial collateral ligament and the joint capsule. (5) The ulnar nerve traverses this small facial tunnel and is prone to compressive neuropathy in elbow flexion, especially when there is a synovial hypertrophy or osteophytes and loose bodies causing further reduction in the tunnel space.

Traumatic injury to the elbow in childhood can lead to elbow deformities leading to tardy ulnar nerve neuropathy, known as tardy ulnar nerve palsy. Supracondylar fractures, medial epicondyle fractures, radial head fractures and dislocations of the elbow commonly lead to cubitus varus and lateral condyle fractures commonly lead to cubitus valgus, which may present as a tardy ulnar nerve palsy in children.(6) The bony deformities causing an altered anatomy lead to stretching of the nerve in the cubital tunnel and may present as a compressive neuropathy. Trauma to the elbow can lead to post traumatic degenerative arthritis and may present with restriction of elbow movements, pain and features of cubital tunnel syndrome.

Cubital tunnel syndrome is the second most common compressive neuropathy after

carpal tunnel syndrome. The causes of compressive neuropathy in the cubital tunnel besides medial osteophytes include ganglions, loose bodies, bony deformities post trauma, accessory muscle and infections. Hansen's disease is the most common cause of ulnar neuropathy in the Indian subcontinent. The nerve can also be injured at the elbow from repetitive subluxation or dislocation. (7)

Clinically weakness of the flexor digitorum profundus and superficialis of the ring and little finger combined with sensory loss of volar and dorsal aspects of medial one and half fingers with a weak grip strength point to a high ulnar nerve palsy, the pathology not being secondary to a Guyon's canal compression. Our patient did not have any previous history of trauma to the elbow, nor did he present with an on-off elbow pain affecting his daily routine, restriction of movement of the elbow or a deformity in the elbow leading to a tardy ulnar nerve palsy. Hence localisation of the pathology at the elbow could have been overlooked clinically since elbow is an uncommon location for primary OA. High index of suspicion is needed in these cases as this presentation is uncommon.

Imaging modalities like MRI with CT cuts of the elbow helped us in localising the site of compression. The medial ulno humeral osteophytes and loose bodies located around the cubital tunnel were postulated to be the main cause of extrinsic ulnar compressive neuropathy alongside the synovitis around the elbow in our case. The MRI findings revealed edema around the cubital tunnel secondary to extensive synovitis due to the OA. USG along the direction of the nerve revealed a bulky nerve proximal to the cubital tunnel with edema around the tunnel and dynamic assessment of the nerve could also be done in flexion and extension of the elbow.

In patients with characteristic features of extrinsic compressive neuropathy due to loose bodies or osteophytes, surgical decompression of the ulnar nerve with loose body/osteophyte excision and anterior sub muscular transposition of the ulnar nerve is the treatment of choice and gives good results. In patients with mild to moderate symptoms, endoscopic release of ulnar nerve in cubital tunnel, debridement of the osteophytes and synovectomy has also been tried with promising results. (8,9) Arthroscopic decompression was not considered in our case as there was a need for loose body and medial osteophyte excision along with ulnar nerve decompression and anterior submuscular transposition.

In few cases medial epicondylectomy has also been described in literature for the decompression of the nerve, but is not recommended routinely as it leads to elbow stiffness and instabilities post operatively. (10)

CONCLUSION

In an elderly patient presenting with high ulnar nerve palsy without history of trauma to the elbow or any symptoms pertaining to the elbow, primary OA causing ulnar nerve compressive neuropathy must be kept in mind by the practising clinician.

Though primary OA is uncommon, it can rarely present with ulnar nerve compression at the cubital tunnel, loose bodies, medial osteophytes and synovitis contributing for the same. Imaging modalities like dynamic USG and MRI with CT cuts can diagnose and localise the site of compression. Treatment is usually surgical, involving decompression in the cubital tunnel and anterior transposition of the nerve in the sub muscular plane. Our patient was followed up for a period of 6 months, where there was significant recovery of motor and sensory functions.

AUTHOR CONTRIBUTION

The first author was the first assistant to the second author during the surgery and collected the references and wrote all the aspects of the manuscript . The Third author participated in proof reading and made minor changes to the manuscript . The fourth author helped in collection of the images and also contributed to the proofreading and grammatical correction of the manuscript .

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NIL

INFORMED CONSENT

Informed consent for usage of clinical photographs taken from the patient .

Declaration of interests

☒ The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

□ The authors declare the following financial interests/personal relationships which may be considered as potential competing interests:

NIL

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None

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