

A Rare Case Report of Lateral Elbow Dislocation without a Major Fracture, Complicated by the Presence of an Ipsilateral Supracondylar Process

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Abstract

Introduction: Supracondylar processes are vestigial remnants in humans that are usually asymptomatic, serendipitous findings, but under certain conditions, they can complicate the clinical presentation of other pathological entities. We present the first case of an elbow dislocation and the complications arising from the presence of such a process.

Case Report: A 45-year-old female patient was admitted to our outpatient's department after a fall on her outstretched right hand. The patient's primary complaints were numbness and paresthesia mainly on her right thumb and index finger palmary, while she was also unable to perform any elbow movements. The elbow itself was edematous and painful on palpation. Radiographic evaluation revealed lateral dislocation of the elbow joint, accompanied by a chip fracture of the lateral condyle and a supracondylar process, 11 mm in length, over the medial epicondyle of the right humerus. Supplementary, a reduction in the radial pulse wave was noted. Reduction of the dislocated elbow was performed which restored the radial artery pulse wave, as confirmed by Doppler echography, but the neurological findings persisted. A posterior elbow splint was placed for 6 weeks, allowing gradually for acuter angle movements (90° in the 1st week, 45° in the 2nd week, 30° in the 3rd week, and full range of motion afterward). 6 months after the dislocation, the patient has a 10° extension lag, with full elbow joint stability restoration and is able to return to her occupation.

Conclusion: To the best of our knowledge, this is the first report in literature, of the involvement of a previously silent supracondylar process during a lateral elbow dislocation. Hereby, we advise the attending physicians to take into account such anatomical variations when considering diagnosis and treatment of elbow dislocations.

Keywords: Supracondylar process, humerus, lateral elbow dislocation, radial artery pulse wave, median nerve compression.

Introduction

The supracondylar process of the humerus is a congenital variation that is found in 0.6–2.7% of the general population [1], and in the majority of the cases, it remains asymptomatic [2]. In some cases, it may cause symptoms either due to fracture of the process [3] or due to pressure exerted on the median nerve [4] and the brachial artery [5] or in rare cases on the median nerve [6]. Herein, we present the case of a patient with lateral elbow dislocation, with accompanying decrease of the intensity of the radial pulse wave. We speculate that these neurovascular abnormalities were a result of the compression of the neurovascular bundle on the supracondylar process that is present on the ipsilateral humerus. To the best of our knowledge, the clinical significance of the supracondylar process as a cause for neurovascular disorders in a lateral elbow dislocation without a major fracture has not been reported.

Case Report

A 45-year-old female patient presented to our outpatients' department after a fall on an outstretched dominant, right hand. She was unable to perform any movement of the elbow joint, which had an edematous appearance and was painful on palpation. Severe bruising was noted on the medial side of the elbow joint. The patient was asymptomatic before the incident, with full use of the extremity. The radiographic evaluation that followed revealed a lateral dislocation of the elbow joint. A supracondylar process, 11 mm in length, over the medial epicondyle of the right humerus, was discovered on the same radiograph (Fig. 1, 2). Bruising was noted on the ulnar side of the elbow joint, which 2 days later developed blisters (Fig. 3). The patient complained of numbness and paresthesias mainly on her right thumb and index finger, palmary. Moreover, radial artery was not palpable nor could it be detected by echo-Doppler check. The reduction of the dislocated elbow was performed with mild traction from the forearm, with the elbow joint slightly flexed and simultaneous pushing of the radial head. After the reduction, the nervous and vascular control was repeated. The median nerve sensory abnormalities persisted, while there was a recovery of the radial artery pulse wave which could be normally palpated, a finding also confirmed by the echo-Doppler check. A computed tomography scan revealed a chip fracture on the lateral condyle, as a result of the shearing

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Figure 1: Anteroposterior radiograph of the pure lateral elbow dislocation. Note the supracondylar process of the humerus.

Figure 2: Laterolateral radiograph of the pure lateral elbow dislocation. Note the supracondylar process of the humerus.

Figure 3: Photograph of the medial side of the elbow. Severe bruising and blistering were observed 2 days after the dislocation.

force during the dislocation (Fig. 4). After the reduction, a posterior elbow splint was placed for a week, maintaining the elbow joint in 90° of flexion and the forearm in supination. The splint was then changed to a functional elbow brace allowing a range of motion up to 45° of flexion for the 2nd week, followed by an up to 30° flexion for the 3rd week, and full range of motion from the 4th week onward. The functional brace was removed after the 6th week, while full bearing of the elbow joint was allowed after the 3rd month. The median nerve sensory abnormalities were resolved 2 weeks after the dislocation. 6 months after the dislocation, the patient has a 10° extension lag, with no instability of the elbow joint and is able to maintain her original occupation.

Discussion

Supracondylar process of the humerus is an osseous protrusion located on the humeral anteromedial side, 4–8 cm above the medial epicondyle [7] and heading distally, medially, and anteriorly [3]. Its length may vary from a few millimeters to 2 cm [8]. It is present in 0.6–2.7% of the general population, while most papers estimate its presence at 1–1.5%. It is more common in women, often located on the left upper limb, while it is usually unilateral [7]. Most commonly, its apex is connected to the medial epicondyle through a ligament, called Struthers ligament, from where the auxiliary part of the pronator teres originates [9]. Embryologically, the supracondylar process is a standard anatomical finding in all climbing animals and

lower mammals, while the ligament of Struthers is a remnant of the tendon of the residual muscle origination from the insertion area of the latissimus dorsi muscle and inserting onto the medial epicondyle (latissimocondyloideus muscle) [10]. The first recording of this vestigial remnant in humans was in 1818 by Tiedemann, while Knox in 1841 and Struthers in 1849 elaborated on it [11]. The shaft of the humerus, the supracondylar process, and the ligament of Struthers form an osseoligamentous tunnel through which the brachial artery and the median nerve pass. In rare anatomical variations, the ulnar artery (in case of high division of the brachial artery) [11] and the musculocutaneous nerve (within the median nerve) [12] pass through the tunnel or the neurovascular bundle pass out of the tunnel over the ligament of Struthers. Their presence is usually asymptomatic, often identified as incidental findings; however, sometimes, disorders may be caused by compression of the median nerve or fracture of the process resulting in pressure on the median nerve and/or the brachial artery. Pressure of the median nerve may cause paresthesias and numbness that worsen when extending the elbow joint and supinating the forearm [2]. Muscle weakness and atrophy may appear in advanced stages while electromyogram may appear normal [15]. In extremely rare conditions, the median nerve may be compressed when passing through the auxiliary portion of the pronator teres muscle which originates from the ligament of Struthers [16]. Compression of the brachial artery causes ischemia and decreases of the intensity of the radial or ulnar pulse wave [2], while embolism of the digital arteries has been reported due to blood clots formed by the aforementioned compression [17]. Even more rarely, complications due to the supracondylar process have been reported that includes the simultaneous compression of both median and ulnar nerves [18, 19] or the compression of the ulnar nerve alone [6, 20]. In the case, we are presenting, a formerly asymptomatic supracondylar process has gained clinical significance not to be overlooked, following dislocation of the ipsilateral elbow joint. Under these circumstances and especially when the elbow dislocation is purely lateral, as in our case, the supracondylar process acts as a fulcrum where the neurovascular structures are compressed. A research in the available literature for similar cases has revealed an incidence where a patient exhibited compression of the median nerve 24 h after the open reduction and internal fixation of an intra-articular fracture of the distal humerus, due to supracondylar process [21]. Nevertheless, to the best of our knowledge, no case with clinical significance and participation of the supracondylar process during a lateral elbow dislocation, without a major fracture has ever been reported.



Figure 4: Computed tomography scan film. Notice the small body flake (white arrow) from the lateral condyle, arising as a result of the shearing force during the dislocation.

Conclusion

As a concluding remark, we would like to stress the importance of the attending physician's alertness when treating elbow dislocations with supracondylar process in the ipsilateral humerus since they could result in neurovascular complications. The possibility of the surgical removal of the supracondylar process, during an open reduction of a dislocated elbow, is still an issue under dispute with regard to the putative benefit for the patient.

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