



Arthroscopic Reduction of Irreducible Pulled Elbow in an Adolescent

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Abstract:

We report a case of irreducible pulled elbow in an adolescent treated by arthroscopy. A 13 year old girl presented at our emergency center with elbow pain after a basketball game. Arthroscopic observation via an anteromedial portal showed trapping of the annular ligament between the radial head and capitulum. Reduction of the annular ligament was performed successfully by mechanical pushing. Soon after the operation, pain was completely resolved and elbow motion recovered fully. Arthroscopic reduction appears to be a suitable method for repositioning of the annular ligament because annular ligament injury is not a concern for arthroscopy. Although care must be taken regarding complications, arthroscopic reduction of irreducible pulled elbow should be considered first in cases occurring in adolescence and beyond.

Key words: Arthroscopy, Dislocations, Elbow Joint, Pain, Basketball, Humans.

Introduction

Subluxation of the head of the radius, called “pulled elbow” is a common pediatric injury, caused by sudden traction on the forearm. Pulled elbow occurs mainly in younger children between 1 and 3 years old, and reduction is usually easy. In most cases, closed reduction can be performed by supinating the forearm and flexing the elbow [1]. If closed reduction fails, surgical treatment is necessary. Triantafyllou reported one child in their experience who required an open reduction [2]. An adult case of pulled elbow was reported by Kajiwarra, who reduced his annular ligament by the open reduction [3]. Recently, arthroscopic surgeries of the elbow have become common. The reports of surgical

treatment of pulled elbow were open surgery and arthroscopic reduction of pulled elbow was not reported yet. We report a case of pulled elbow in an adolescent treated by arthroscopic surgery. Since arthroscopic reduction was less invasive, it should be attempted first.

Case Report

A 13 year old girl presented at our emergency center with elbow pain after a basketball game. During the game, she fell and hit her left hand on the floor. At the same time, she was pushed by another player, leaving her left elbow extended and strongly twisted. She felt sudden pain in her left

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elbow, and could not move the forearm by herself. On initial examination, the forearm was maintained in slight flexion and pronation, with tenderness over the radial head. Although clicking was observed on pronation and flexion of the elbow by manual reduction, elbow motion remained restricted. Active flexion, extension, supination and pronation of the left elbow were 100°, -10°, 50° and 50°, respectively. Magnetic Resonance Imaging (MRI) demonstrated dislocation of the annular ligament to the radio-humeral joint [Fig.1]. The patient was taken to the operating room, where closed reduction was attempted under general anesthesia. However, no improvement of elbow range of motion was achieved, so arthroscopic surgery was performed. Arthroscopic observation via an anteromedial portal showed trapping of the annular ligament between the radial head and capitulum [Fig.2]. In addition, a synovial plica was seen extending from the annular ligament, and was shaved via the antero-lateral portal. Reduction of the annular ligament was attempted by shaver from postero-



Fig.1: Sagittal Magnetic Resonance Imaging (MRI) shows the annular ligament dislocated to the radio-humeral joint.

lateral portal. Annular ligament was reduced by partial excision and mechanical pushing for several times [Fig.3]. During reduction, the forearm was flexed 90 degree and slightly supinated. Soon after the operation, pain was completely resolved and elbow motion recovered fully. The patient was able to play basketball again without restriction 2 weeks postoperatively. Eighteen months later, she was able to move her elbow fully and play basketball without any pain.

Discussion

Pulled elbow is considered to be caused by radial head subluxation as a result of sudden traction on the extended elbow [3]. When traction is applied to the upper extremity while the elbow is extended and the forearm is pronated, a transverse tear of the annular ligament occurs at its attachment to the radial neck. The radial head, which has its narrowest diameter in the antero-posterior plane when

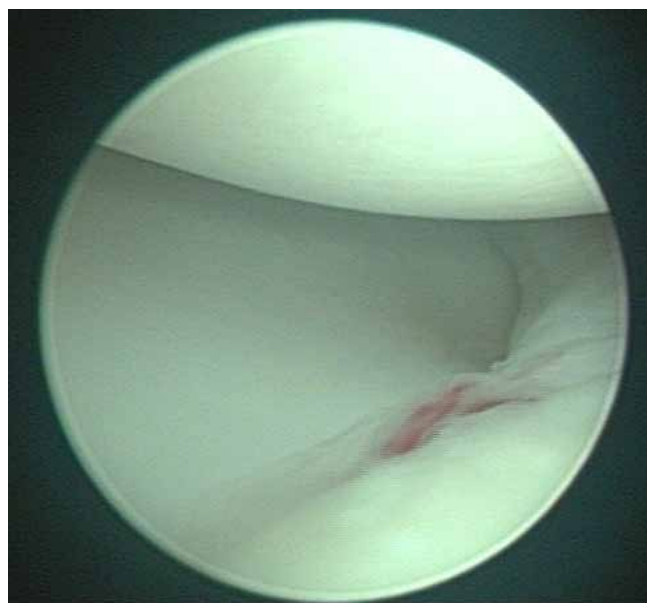


Fig.2: Antero-medial portal view. Annular ligament was trapped between the radial head and the capitulum. Synovial plica was extending from the annular ligament.

the forearm is pronated, migrates distally as the annular ligament recedes into the radio-capitellar joint. With release of traction, the annular ligament becomes trapped between the radial head and capitulum. If the proximal edge of the annular ligament does not extend beyond the widest part of the radial head, reduction of the radial head to its normal position easily occurs by simple supination of the forearm and flexion of the elbow. Reduction of the pulled elbow is simple and often occurs when the extremity is manipulated in the radiology department to obtain a true antero-posterior X-ray film of the elbow [2]. Generally, children suffered from pulled elbow present with the arm held in pronation, slight flexion, and adduction. Reduction of the pulled elbow is easy and the prognosis of pulled elbow after reduction is usually excellent. Pulled elbow has been reported to not occur in older children because the capsular attachment of the annular ligament is thicker and thus less likely to tear [4]. However, some reports have described cases of pulled elbow in adolescents or beyond [5,6]. In these articles, injuries did not occur by the traction forces. One case was injured by falling and another was injured by arm-lock technique.

In cases occurring beyond adolescence, closed reduction is occasionally impossible. Radiographs or CT scan don't reveal any abnormal findings regarding pulled elbow in pediatric case. In this case, MRI demonstrated that the annular ligament intruded into the radio-humeral joint. MRI was useful for diagnosis of pulled elbow because MRI can detect annular ligament dislocated to the radio humeral joint. Irreducible pulled elbow is need for surgical treatment [5,6]. Triantafyllou reported one child in their experience who required an open reduction. The patients sustained a traction injury while swinging from his home gym set. Intraoperatively, partial excision of the entrapped portion of the annular ligament allowed reduction of the subluxated radial head and full restoration of ROM of the elbow [2]. An adult case of pulled elbow

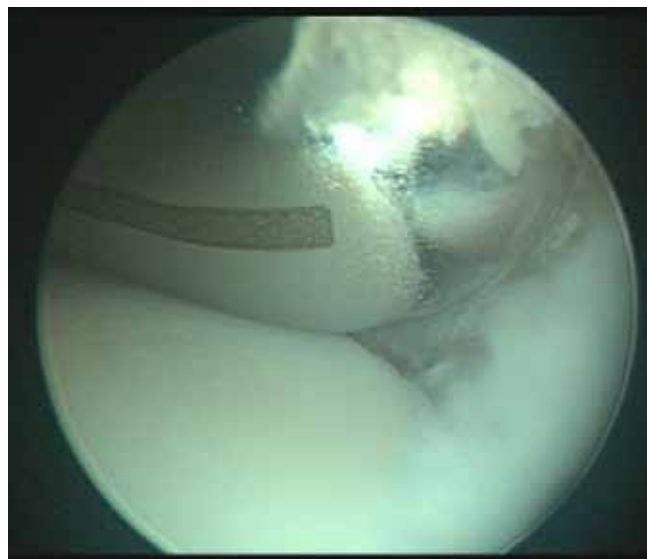


Fig.3: Antero-medial portal view. Annular ligament was reducing by the shaver.

was reported by Kajiwarra, who reduced the annular ligament by the open reduction [3]. The patients was injured when his left forearm was unexpectedly and strongly pulled and hyperextended with an arm lock technique by a friend. During surgery, the dislocated part of the annular ligament could not be reduced by forcible supination and flexion. The annular ligament was separated from the capsule and raised via forceps to reduce it to its original position [3]. Open reduction is effective treatment for the patient with irreducible pulled elbow. However, open surgery for pulled elbow may injure the annular ligament leading from the elbow joint capsule. This might causes symptomatic snapping elbow. Recently, arthroscopic surgeries of the elbow have become common [7], however, arthroscopic reduction for pulled elbow has not previously been reported.

Arthroscopic reduction appears to be a suitable method for repositioning of the annular ligament because annular ligament injury is not a concern for arthroscopy. On the other hand, major and minor complications of elbow arthroscopy have

been reported [7]. The operation is also difficult in cases with small joints. In this case, a normal surgical procedure was possible without any complications. Elbow arthroscopy for the small children is challenging, arthroscopic reduction is less invasive but effective for the patient with irreducible pulled elbow.

Conclusion

Although care must be taken regarding complications, arthroscopic reduction of irreducible pulled elbow should be considered first in cases occurring in adolescence and beyond.

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