

Axillary artery injury with proximal humerus epiphyseal separation: a rare case report

Alireza Jalili¹, Farid Najd Mazhar², Mohamad H Ghahramani³
Mehrdad Bahrabad⁴

Department of Orthopedic Surgery, Shahid Mohammadi Hospital, Hormozgan University of Medical Sciences, Bandarabbas, Iran.

Received: 18 April 2012

Revised: 20 June 2012

Accepted: 23 June 2012

Abstract

Fracture of the proximal humerus associated with vascular injury has rarely been reported in children, and only two cases have been reported in the literature. In adults this combination has been reported more frequently. We present the case of a 14 year old boy with proximal humeral epiphyseal separation and axillary artery injury.

Keywords: Axillary artery injury, Epiphyseal separation.

Introduction

Axillary artery injury caused by blunt trauma to the shoulder is uncommon and its association with fracture of the neck of the humerus is rare. Fracture of the proximal humerus with absent distal pulses is extremely rare in children.

Case report

A 14 year old boy was referred to the hospital with pain, tenderness and deformity of the left shoulder following a motor vehicle accident. The results of a general physical examination were normal except for the left arm, where the examination revealed pain, tenderness, and swelling in the left shoulder. The range of motion on the left shoulder was severely limited. Distal radial, ulnar and brachial pulses were not palpable and could not be detected by Doppler sonography despite

the behavior of the normothermic the extremity. Capillary refill times were 4 seconds in the left and 3 seconds in the right arm. The patient was unable to extend his wrist, thumb or fingers.

The injury was closed and there was no ecchymosis. Radiography of the left shoulder revealed a Salter-Harris type I proximal humeral epiphyseal separation (Fig 1).

Closed reduction of the physal injury was performed in the operating room under general anesthesia to reduce compression on the axillary artery. However, distal pulses were not palpable following the anatomic reduction and we could not detect any change in vascular status. A vascular surgeon was consulted. Angiography of the left arm revealed disruption of arterial flow in the axillary artery (Fig 2). The patient was taken to the operating theatre for an arterial repair or graft. Intra-operative findings included a hemato-

1. (Corresponding author), Associated professor, Hormozgan University of Medical Sciences, Bandarabbas, Iran. alirezajalili.jalili@gmail.com

2. Associated professor, Tehran University of Medical Sciences, Shafa Hospital, Tehran, Iran. fnajdmazhar@yahoo.com

3. Associated professor, Tehran University of Medical Sciences, Shafa Hospital, Tehran, Iran. mhqahremani@yahoo.com

4. Associated professor, Hormozgan University of Medical Sciences, Bandarabbas, Iran. bahrabadimehr@yahoo.com

ma and arterial contusion, but no active bleeding or axillary artery laceration was not located. The axillary artery was contused and thrombosed, and the brachial plexus was intact on inspection.

After resection of the contused segment of the axillary artery a reverse saphenous vein interposition graft was performed.

The patient was monitored for 3 days in the intensive care unit, where his radial and ulnar pulses remained palpable. The Patient was discharged with a sling and swath. After 4 weeks, radial innervated muscle weakness resolved, the sling was removed, and rehabilitation for regaining shoulder and elbow motion was started. The muscle power of wrist and hand extensors returned to normal condition after 3 months.

Discussion

Axillary artery injury caused by blunt trauma to the shoulder is uncommon and its association with fracture of the neck of the humerus is rare (1-4).

Yagubyan (5) presented 4 cases of axillary artery thrombosis from humeral neck fracture. His review of the literature revealed 24 cases of axillary artery injury associated with humeral neck fracture. In all reviewed cases, the mean age was 66.6 years and fall the most common mechanism of injury the (79%). Some 46% of patients presented with a neurologic deficit and acute ischemia was present in 68% of patients. Physical examination predicted the arterial injury in all but 1 patient. Vascularization by an interposition graft was the most common repair proce-



Fig 1. Severly displaced proximal humeral epiphyseal separation.

dure. All grafts and reanastomoses were patent and led to limb salvage. Three amputations were performed out of 9 primary repairs.

Epiphyseal fracture of the proximal humerus in childhood is a relatively uncommon, injury, accounting for less than 5% of all pediatric fractures. Most of those that do occur are Salter-Harris type I or type II injuries (6).

Fracture of the proximal humerus with absent distal pulses is extremely rare in children.

In a review of 57 proximal humeral epiphyseal fractures, Baxter and Wiley (2) reported only one case with an associated vascular problem. The patient had a completely displaced Salter-Harris type II fracture and presented with a cool, pulse-less arm. Moreover angiography revealed interruption of the brachial artery in the axillary region.

The combination of the extensive mobility of the glenohumeral joint and the significant

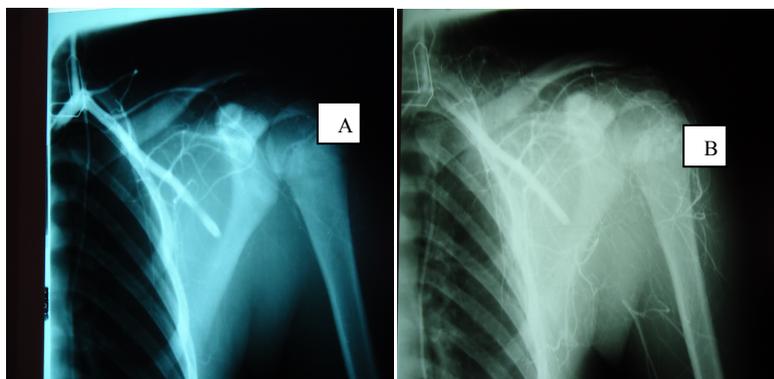


Fig. 2- A. Disruption of blood flow in axillary artery angiography.
B. Some blood flow through collateral circulation.

contribution of the proximal physics to overall humeral growth allow these injuries to be treated nonsurgically in most cases (7). The goal of treatment was to stabilize the fracture and ensure the child's comfort until healing occurs. There are a few limited indications for surgical intervention in the proximal humeral epiphyseal separation (8). In the case presented here, because of the stability achieved after reduction, we decided to treat this fracture non-operatively. We believe that the patient's wrist and hand extensor weakness was the result of a neuropraxia of the posterior cord of the brachial plexus.

An enlarged hematoma within the common sheath may explain a progressive or delayed neurologic deficit (1).

A pulseless upper extremity may indicate a complete vascular disruption, and when the vascular integrity of the extremity was in question, an emergency arteriogram performed followed by surgical repair if necessary.

Acknowledgments

We thank Dick Edelstein (author aid in the Eastern Mediterranean) for improving the use of English in the manuscript.

References

1. Wera GD, Frioss DM, Getty PO, Armstrong DG, et al. Fracture of the proximal humerus with injury to the axillary artery in a boy aged 13 years. *J Bone Joint Surg (Br)* 2006; 188 (11): 1521-3.
2. Baxter MP, Wiley J. Fracture of the proximal humeral epiphysis, their influence on humeral growth. *J Bone Joint Surg (Br)* 1986; 68: 570-3.
3. Zuckerman JO, Hugsted Du, Tenz CC, King HA. Axillary artery injury as a complication of proximal humeral fractures two case reports and a review of the literature. *Clinic Orthop* 1984: 34-7.
4. McLaughlin JA, Light R, Lustrin I. Axillary artery injury as a complication of proximal humerus fractures.
5. Yagubyan M. Axillary artery injury from humeral neck fracture: A rare but disabling traumatic Event. *Vascular and Endo Cascular Surgery*, 2004; 38: 175-184.
6. Beringer DC, Weiner DS, Noble JS, Bell RH. Severely displaced proximal humeral epiphyseal fractures: a follow up study. *Journal of Pediatric Orthopedics*, 1998; 18(1): 31-37.
7. Burgos- Flores J, Gonzalez- Herranz p, Lopez Mondejary A. Fractures of the proximal humeral epiphysis. *International Orthopedics*, 1993; 17(1): 16-9
8. Sherk HH, Probs TC. Fractures of proximal humeral epiphysis. *Orthopedic Clinics of North America*, 1975; 6(2): 401-13.