



Case Series

Axillary artery and brachial plexus injury secondary to proximal humeral fractures: A report of 2 cases



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ABSTRACT

INTRODUCTION: Axillary artery and brachial plexus injuries have been reported to be associated with proximal humeral fractures. In this report, we present two cases of axillary artery and brachial plexus injury secondary to proximal humeral fracture.

PRESENTATION OF CASES: Case 1: An 88-year-old woman with cognitive impairment slipped and fell at home. The diagnosis was left proximal humeral fracture. The second day, paralysis of left upper arm due to left axillary artery occlusion appeared. Axillary-brachial artery bypass surgery was performed. After that, a radial artery pulse was palpable. Ten months have passed since the operation, but the neurologic deficit has not been restored. Case 2: A 74-year-old woman fell from a ladder. She was diagnosed with a right proximal humeral fracture and right axillary artery occlusion. Emergency axillary-brachial bypass surgery and osteosynthesis were performed. After reestablishing the blood flow, there have been no signs of blood flow disorders but paralysis has remained.

DISCUSSION: In neither of the two cases, were obvious findings of brachial plexus injury detected during surgery. The delayed onset of motor palsy implied that an ischemic factor was implicated in case 1. The acute onset of motor palsy might have been caused by a mechanical factor such as the dislocated of humeral head in case 2.

CONCLUSION: Axillary artery and brachial plexus injury secondary to proximal humeral fracture is rare but it can develop severe sequels. By identifying the high-risk patients, diagnosis and management of this vascular and plexus injury might lead to improvement.

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1. Introduction

Proximal humeral fractures constitute 4–5% of the total fractures in the body [1]. In epidemiological investigations looking at the number of fractures, proximal humeral fractures frequently occur in women older than 60 years and the incidence increases with age [2]. In 2010, 40,000 cases were reported in Japan, and it is predicted that the prevalence will exceed 50,000 cases by 2030 [3]. This is due to the increasing number of fractures associated with osteoporosis and minor trauma in patients over 80 years, with the background of the super-aged Japanese population.

Axillary artery and brachial plexus injuries have been reported to be associated with proximal humeral fractures, which are rare [4–8]. Menendez et al. reported that there was only 0.09% of patients with proximal humeral fractures with concomitant axillary artery injury [9]. Axillary artery injury is a serious complication that necessitates surgical repair in case of severe distal ischemia. The severity of injury to peripheral nerves varies from lesions in continuity, where spontaneous recovery is expected unless there is an ongoing insult, to lesions with loss of continuity, which require early surgical repair if there is to be any chance of recovery [7]. Therefore, cases that require surgical repair or decompression should be identified and referred early for specialist management. In this report, we present two cases of axillary artery and brachial plexus injury secondary to proximal humeral fracture.

This Case series has been reported in line with PROCESS criteria [10].

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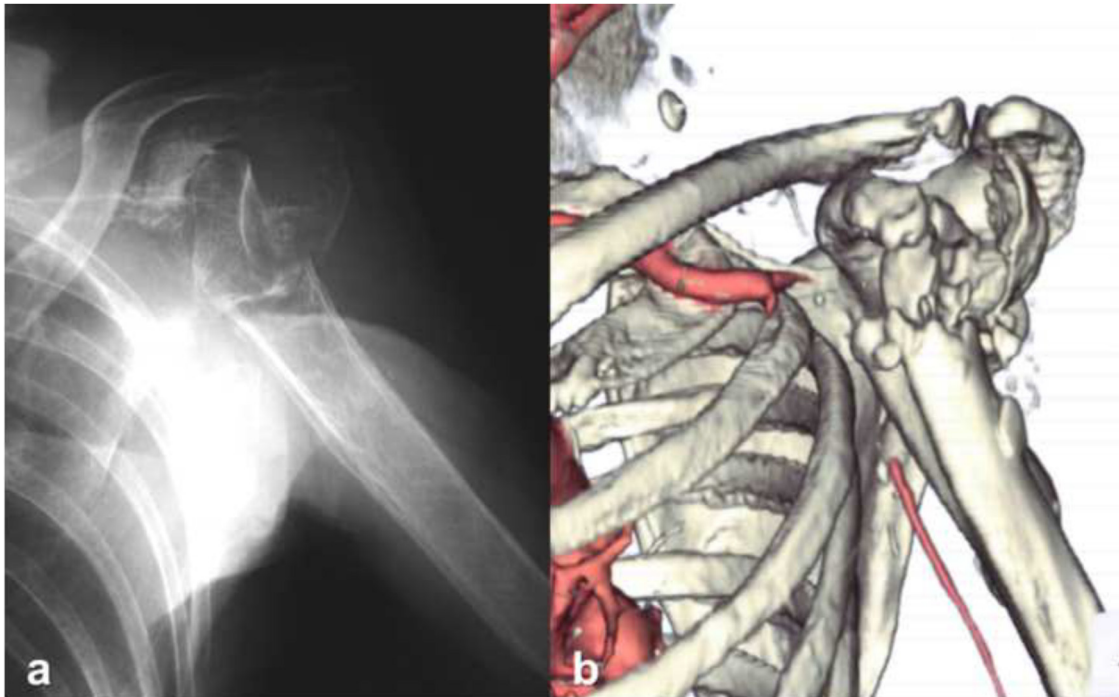


Fig. 1. Case 1. An 88-year-old woman who had a large hematoma on the anterior part of the left shoulder. The proximal humeral fracture was severely displaced (a). CT angiography revealed disruption of the axillary artery blood flow at the level of distal of thoracoacromial artery (b).

2. Report of the cases

2.1. Case 1

An 88-year-old woman with cognitive impairment slipped and fell at home. She complained of left shoulder and hip pain and was unable to step, and visited an orthopedic clinic on the next day. History taking was difficult because of the poor verbal communication and short-term memory loss secondary to cognitive impairment. Physical examination revealed a large hematoma on the anterior aspect of the left shoulder. Active range of motion of the left shoulder was severely limited due to pain, while motor function was intact distal to the elbow. Radial pulse was palpable. Radiographs showed fracture dislocation of the shoulder, which was classified as C3 according to the Arbeitsgemeinschaft für Osteosynthesefragen (AO) classification. The proximal humerus was broken into 4 major parts, which were the greater and lesser tubercles, humeral head displaced inferior to the glenoid, and proximal humeral metaphysis angulated valgus at the fracture site (Fig. 1a). She complained of left hip pain that was caused by the intertrochanteric femoral fracture, and therefore she was admitted for surgery.

On the second day of hospital stay, cyanosis was noted in the fingers of the left hand and SpO₂ decreased to 82%. Active motion of the left elbow, wrist and fingers was completely lost and the withdrawal reflex was not elicited upon painful stimulation of the lateral side of the upper arm, forearm or hand. An angiogram revealed defective blood flow through the left axillary artery and inflow of contrast agent into the brachial artery through the collateral circulation. Computed tomography (CT) angiography revealed that the blood flow through the axillary artery was disrupted distal to the origin of the thoracoacromial artery (Fig. 1b). The brachial artery was enhanced distally from the level of the proximal one-fourth of the humeral shaft.

Surgical repair of the left axillary artery occlusion was performed by vascular surgeons under general anesthesia. A deltopectoral approach was used to expose the fracture and the neurovascular injury site. The outer membrane of the axillary artery

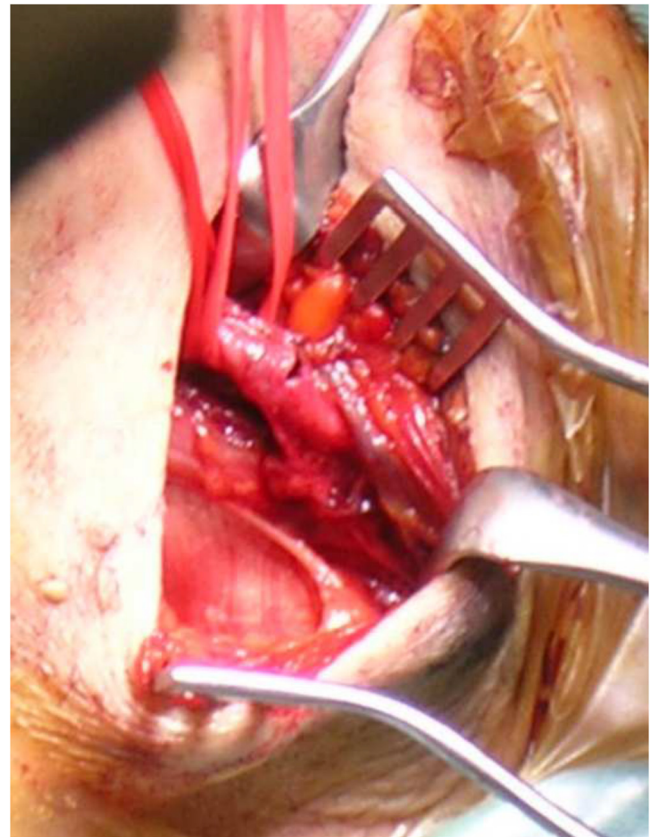


Fig. 2. Injury of the outer membrane of the axillary artery was found.

was injured (Fig. 2) and a thrombus was formed inside. The brachial plexus was identified and appeared intact. The injured segment of the axillary artery was left in situ and a bypass to the brachial artery was created using an artificial blood vessel (Gor Tex® EPTFE graft

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