Rupture of Deltoid Muscle Belly with Tear of Rotator Cuff

A Case Report

by

Kazuhiro Yamaguchi, Nobuyuki Ito, Masao Eto
and Katsuro Iwasaki

Department of Orthopaedic Surgery,
School of Medicine, Nagasaki University
Nagasaki, Japan

Noritami Akeshima

Akeshima Orthopaedic Clinic,
Nagasaki, Japan

Abstract

A case of an 69-year-old female who could not abduct her shoulder due to rupture of the deltoid muscle and tear of the rotator cuff is reported.

Tear of the rotator cuff could be present before a episode of trauma. The rupture of the deltoid muscle can be related to hydrocortisone injections into the shoulder girdle. It is concluded that the combination of the rotator cuff tear with the deltoid muscle rupture result in conspicuous limitation of shoulder abduction.

Introduction

The shoulder abduction mechanism has been studied by many authors (2, 4). The traction force for the humeral head to the glenoid is necessary at the beginning of the shoulder abduction. After that, the abduction is achieved by the contraction of the deltoid muscle.

From the experience of a case with rupture of the deltoid muscle and tear of the rotator cuff, the role of the rotator cuff and the deltoid muscle was discussed in this paper.

Case Report

A 69 years old, female, farmer had suffered from both shoulder pain since 1987. She had been treated with lidocaine hydrochloride and hydrocortisone injections into the gleno-humeral joint and subacromial bursa. Both shoulder abduction became possible to 160 degrees for a few weeks after each injection. In August 1991, after she bumped left shoulder against the wooden wall, the shoulder abduction became impossible. She visited our hospital in May 1992.

On physical examination, marked prominence of acromion and greater tuberosity of the left humerus were observed, and the active and passive abduction of left shoulder were 20 degrees and 160 degrees. There is no neurological abnormalities.

Arthrography showed the radiopaque leak into the subdeltoid bursa in both shoulders (Fig.1). The discontinuity of the deltoid muscle was observed at the lateral side of the greater tubercle by MRI and ultrasonogram (Fig.2). From the findings above, rupture of the deltoid muscle belly and rotator cuff tear has been revealed definitely in left shoulder.

Fig. 1 Radiological findings.
Anteroposterior view of left shoulder (a).
Arthrography of right and left shoulders demonstrates the radiopaque leak into the subdeltoid bursa (b) (c).

Fig. 2 MRI (a) and Ultrasonogram (b) of left shoulder demonstrate the discontinuity of the deltoid muscle at the lateral side of the greater tubercle.

Fig. 3 Humerus head was observed after the incision of skin and subcutaneous tissue (a). Rotator cuff tear was observed in intraspinus tendon and supraspinatus tendon (b).

Surgical procedure disclosed the deltoid rupture and rotator cuff tear. A tear of the deltoid muscle belly, 5cm in length, at 2cm distal to the acromion, was observed (Fig.3). A tear of rotator cuff, 6cm in width, was observed in supraspinatus tendon and infraspinatus tendon. Necrotic lesion around the rotator cuff tear was resected, and the distal end of the rotator cuff was sutured to the humerus according to the McLauling's procedure. The necrotic edges of the ruptured deltoid muscle was resected and end to end suture of the muscle was performed.

The patient's left arm and trunk were placed in a cast for three months with shoulder 120 degrees of abduction. By motion exercise and abduction muscle strength exercise, 160 degrees of left shoulder abduction was gained 6 months after the operation.

Discussion

In the present case, it was considered that the rotator cuff tear had been present before the trauma in 1991, because the patient had been suffered from both shoulder pain for a few years and arthrography of both gleno-humeral joints revealed the leak of the radiopaque substance into the subdeltoid bursa.

Summuel et. al. described a case of deltoid muscle rupture, which was occurred in 65-year-old female (5). She had several hydrocortisone injections for the shoulder joint pain without a history of trauma. Although the injection sites are not clear in this paper. Summuel's case has similarity with our present case from the view point of age, sex, and hydrocortisone injection. The other drug injections to the muscle have been reported to cause myopathy around the injection sites (3). Furthermore, some reports suggested that the hydrocortisone injection may cause degenerative change of the tissue (1). The effect of the mechanical injuries by the repeated injections and the pharmacological effect of the hydrocortisone to the local tissue is unclear, but these may be one of the factors to cause rupture of the deltoid muscle.

Physical examination faithfully shows these situation, that is to say, extreme muscle atrophy of shoulder girdle and limited shoulder abduction. Arthrographic, ultrasonographic, and MRI findings of the rotator cuff and deltoid muscle were consistent with the macroscopic findings of them during surgical procedure. Shoulder abduction may be possible by the action of the supraspinatus muscle in complete paralysis of deltoid muscle, while it may be also possible by the

action of the trapezius and anterior serratus muscle in complete paralysis of supraspinatus muscle. However, in paralysis of both deltoid and supraspinatus muscle, shoulder abduction can be impossible. In this case, it is concluded that combination of the tear of rotator cuff with deltoid muscle rupture, which is very rare, resulted in conspicuous limitation of shoulder abduction.

References

- 1) Benhery, G. and Goodfellow, J.W.: Disorganization of the knees following intra-articular hydrocortisone injection. J. Bone Joint Surg, 51-B : 498-502, 1969.
- 2) Ito N.: Biomechanics of shoulder. In Bessatsu Seikeigeka, 6 : 2-7. Edited by Yamamoto R., Japan, Nankodo, 1984.
- 3) Oh, S.J., Rollins, J.L. and Lewis, I.: Pentazocine-induced fibrous myopathy. JAMA, 231 : 271-273, 1975.
- 4) Poppen, N.K. and Walker, P.S.: Forces at the glenohumeral joint in abduction. Clin. Orthop, 135 : 165-170, 1978.
- 5) Samuel, J., Levernieux, J. and de Seze, S.: A propos d'un cas de rupture du deltoide. Rev. Rhumat., 42 : 769-771, 1975.

腱板断裂を伴う外傷性三角筋断裂を生じた一例

長崎大学医学部整形外科

山口 和 博・伊 藤 信 之
衛 藤 正 雄・岩 崎 勝 郎

明島整形外科

明 島 淳 民

我々は外傷性三角筋断裂と腱板断裂を合併した1例を経験した。症例、69歳、女性、職業：農業。現病歴、1987年頃より両側の肩関節痛とこれに伴う運動制限が出現し、近医で局麻剤とsteroidの注射を肩甲上腕関節および肩峰下滑液包に数回受けていた。局注射後は両側とも160度外転可能であった。1991年10月すべって左肩を木壁で打撲し、左肩痛と著明な左上肢挙上制限が生じたため、1992年6月当科を初診した。

初診時、肩峰及び大結節の異常突出を認めた。自外転運動は20度（他動運動は160度）であった。三角筋断裂と腱板断裂と診断し三角筋縫合術と腱板縫合術を行った。術中、三角筋は肩峰より約2cm遠位部筋腹で断裂し、また棘上筋腱と棘下筋腱の大断裂を確認した。

腱板断裂がある場合、外転運動における三角筋の重要性を示した例と考えた。