ACQUIRED CONTRACTURE OF THE INFRASPINATUS MUSCLE A CASE REPORT AND REVIEW OF THE LITERATURE

by E. VAN HOLSBEECK*, J. DE RIJCKE*, M. MARTENS*, J. VERSTREKEN**, G. DECLERCQ** and G. FABRY*

Congenital contracture of the infraspinatus muscle has been reported by K. Kitano *et al.* (1988). We describe a patient with an acquired contracture of the infraspinatus muscle causing posterior subluxation of the glenohumeral joint.

Keywords : shoulder ; posterior subluxation ; contracture ; infraspinatus muscle.
Mots-clés : épaule ; luxation postérieure ; muscle sous-épineux.

SAMENVATTING

E. VAN HOLSBEEK, J. DE RIJCKE, M. MARTENS, J. VERSTREKEN, G. DECLERCQ en G. FABRY. Verworven contractuur van de supraspinatus, een gevalstudie en overzicht van de literatuur.

Congenitale contractuur van de supraspinatus is beschreven door K. Kitane in 1988. Wij bespreken een patiënt met verworven contractuur van de supraspinatus en met secundaire posterieure schoudersubluxatie.

RÉSUMÉ

E. VAN HOLSBEEK, J. DE RIJCKE, M. MARTENS, J. VERSTREKEN, G. DECLERCQ et G. FABRY. Contracture acquise du sous-épineux, cas clinique et revue de la littérature.

La contracture congénitale du sous-épineux a été décrite par K. Kitano en 1988. Les auteurs présentent un cas de contracture acquise du sous-épineux avec subluxation postérieure de l'épaule.

INTRODUCTION

The contracture syndrome of various muscles is well known in the literature. Contracture of the deltoid muscle is best known and can be a cause of anterior subluxation of the shoulder.
In analogy with anterior shoulder subluxation due to deltoid contracture, infraspinatus muscle contracture can give rise to posterior shoulder subluxations.
Other possible causes for posterior shoulder instability are avulsion of the capsule from the rim, excessive laxity of the capsule, Hill-Sachs lesion, fracture of the glenoid rim, variations in glenoid tilt and muscle ruptures.
To our knowledge contracture of the infraspinatus muscle has not been reported as a possible cause for posterior subluxation of the shoulder.

CASE REPORT

A 22-year-old woman was referred to our department with restricted and painful mobility of the

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left shoulder. Three years before she had fallen with the arm extended while playing volleyball, resulting in a progressive limitation of shoulder motion, especially internal rotation. After some months adduction and internal rotation had become almost impossible, which seriously interfered with daily living activities. The posterior aspect of the joint was painful and on palpation. Conservative treatment was unsuccessful. Clinically she showed no internal rotation. Passive abduction was normal; terminal active abduction was impossible. Scapulothoracic rhythm and passive translation of the gleno-humeral joint were disturbed. There was mild atrophy of both infra- and supraspinatus muscles.

Radiographs were normal. CT scan showed a glenoid with normal anatomy, a normal tilting angle and no obvious intra-articular pathology. MRI and arthrography were initially interpreted at first as normal. Electromyography of the infra- and supraspinatus muscles was normal. A second review of the MRI disclosed on abnormal density in the infraspinatus muscle (fig. 1).

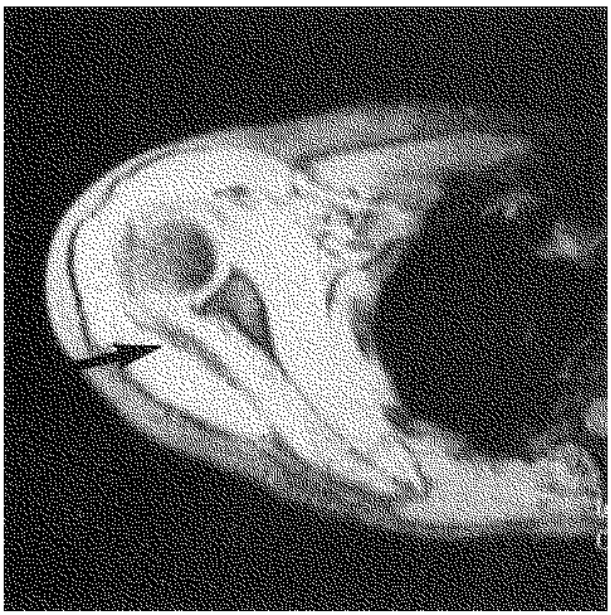

Fig. 1. — MRI of the left shoulder showing an abnormal band in the infraspinatus muscle.

Examination under anesthesia with an image intensifier was performed. Internal rotation and adduction caused a posterior subluxation that could be reduced by external rotation and abduction. With forced internal rotation, the scapula and humeral head moved as one entity. Arthroscopic investigation showed a minimal defect of the anterior labrum. No other pathology was found.

Because of the lack of intra-articular pathology an open exploration was carried out through a posterolateral approach, and a fibrotic infraspinatus muscle was found. A Z-plasty lengthening procedure was done in order to enter the capsule. Very surprisingly, the posteriorly subluxed shoulder was reduced with this maneuver, and complete range of motion was restored. Postoperatively a routine shoulder rehabilitation program was initiated. Follow-up of this patient confirmed the normal kinetics of the shoulder joint.

DISCUSSION

K. Kitano (1988) described a congenital contracture of the infraspinatus muscle. An abnormal band depresses the growth of the posterior part of the glenoid. The combination of the band and the tilted glenoid causes a posterior subluxation of the shoulder. Stabilization in his patient was achieved by resection of the abnormal band, osteotomy of the glenoid and a reverse Putti-Platt procedure.

Pettit (1980) described an infraspinatus muscle contracture syndrome in dogs, a phenomenon that apparently occurs only in mature sporting and working dogs 2-3 weeks after vigorous activity. The hypothesis is that the infraspinatus muscle is partially ruptured by forceful stretching during contraction.

Intramuscular injections have been implicated as inducing muscle fibrosis especially in deltoid contracture. Contracture has also been described in the quadriceps muscle (Williams, 1968), the gluteal muscle (Hang, 1979) and the tensor fascia lata (Mehta, 1972).

Due to the contracture the patient is unable to bring the arm to the side. Contracture of the deltoid muscle may be misdiagnosed as paralysis of the axillary nerve or as traumatic rupture. T.

Kutsama *et al.* (1984) presented 79 cases of deltoid contractures (involving 116 shoulder joints). All the patients had some history of intramuscular injections into the deltoid muscle during infancy or childhood. Surgery (resection of a fibrous band and detachment of the lateral and posterior fibres) was carried out in 83 joints with satisfactory results. Anterior subluxation of the shoulder was observed in 80% of the cases, caused by the fibrous band acting as a check rein mechanism. Resection of the band was sufficient to reduce the deformity. Similar reports were published by Wolbrink *et al.* (1973) and Hill *et al.* (1967). A similar mechanism of contracture of the infraspinatus muscle may account for the posterior subluxation.

Because our patient received several steroid injections in loco dolenti we suspect that collagen necrosis and perhaps the sequelae of the trauma resulted in the fibrotic contracture. During sports-activities infraspinatus and teres minor muscles undergo eccentric contraction in order to stabilize the glenohumeral joint. This is especially true in the throwing mechanism. A partial rupture by forceful stretching during contraction giving rise to an acquired contracture of the infraspinatus muscle may have the same mechanism as the syndrome described in dogs.

CONCLUSION

Acquired contracture of the infraspinatus muscle is a possible cause of posterior subluxation of the shoulder. The causal mechanism may be fibrosis following collagen necrosis due to steroid injections or posttraumatic fibrosis.

REFERENCES

1. HANG Y. S. Contracture of the hip secondary to fibrosis of the gluteus maximus muscle. *J. Bone Joint Surg.*, 1979, *61-A*, 52-55.
2. HILL N. A., LIEBLER W. A., WILSON H. J., ROSENTHAL E. Abduction contractures of both glenohumeral joints and extension contracture of one knee secondary to partial muscle fibrosis. A case report. *J. Bone Joint Surg.*, 1967, *49-A*, 961-964.
3. KITANO K., TADA K., OKA S. Congenital contracture of the infraspinatus muscle. A case report. *Arch. Orthop. Trauma Surg.*, 1988, *107*, 54-57.
4. KUTSUMA T., TERAYAMA K. *Results of surgical treatment for deltoid muscle contracture. In Surgery of the shoulder*, by J. E. Bateman and R. P. Welsh, The C. V. Mosby Company, London, 1984, 259-268.
5. MEHTA M. H. Bilateral congenital contracture of the iliotibial tract. *J. Bone Joint Surg.*, 1972, *54-B*, 532-534.
6. PETTIT G. D. Infraspinatus muscle contracture in dogs. *Modern Veterinary Practice*, 1980, 451-452.
7. WILLIAMS P. F. Quacriceps contracture. *J. Bone Joint Surg.*, *50-B*, 278-284.
8. WOLBRINK A. J., HSU Z., BIANCO A. J. Abduction contracture of the shoulder and hips secondary to fibrosis bands. *J. Bone Joint Surg.*, 1973, *55-A*, 844-846.

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