



Chronic anterior shoulder dislocation : Aspects of current management and potential complications

Filip VERHAEGEN, Ide SMETS, Marc BOSQUET, Peter BRYNS, Philippe DEBEER

From the University Hospital Pellenberg, Belgium

Chronic unreduced anterior dislocations of the shoulder are rare. Arterial and neurological complications in chronic glenohumeral dislocations are even less frequent. We report three cases of old anterior shoulder dislocations. Open reduction is indicated for most chronic shoulder dislocations. Arterial lesions require urgent intervention with reconstruction. Conservative treatment is advised for most neurological complications.

Keywords : chronic shoulder dislocation ; treatment ; arterial complication ; neurological complication.

INTRODUCTION

Under certain circumstances, anterior dislocation of the shoulder may go undiagnosed and may thus be left untreated for a variable length of time, ranging from a few days to several years, until the diagnosis is made fortuitously or because further symptoms manifest secondarily. It is impossible to estimate the true incidence in the context of all the glenohumeral dislocations. Although chronic anterior shoulder dislocations remain rare, virtually every orthopaedic surgeon will be confronted with this pathology (16).

Neurological and vascular complications may occur as a result of an acute anterior dislocation of the shoulder. Similar complications may also occur after a variable time interval in chronic unreduced

anterior dislocations. We present a small case series illustrating the late occurrence of such complications, and we discuss the diagnosis and management of this condition.

ILLUSTRATIVE CASES

Case 1

An 82-year old woman was referred to the emergency department by her general practitioner because there was an increased discomfort when manipulating her right upper limb. Communication with the patient was difficult because she had advanced Alzheimer disease. On clinical examination she was noted to have a slight bulge of the right

-
- Filip Verhaegen, MD, Resident.
 - Philippe Debeer, MD, PhD, Orthopaedic Surgeon.
Orthopaedic Department, University Hospital Pellenberg, Pellenberg, Belgium.
 - Ide Smets, Medical Student.
KU Leuven.
 - Marc Bosquet, MD, Orthopaedic Surgeon.
Departement of orthopaedic Surgery, Europe Hospitals, Brussels.
 - Peter Bryns, MD, UZ Leuven, Radiologist.
Department of Radiology, University Hospital Pellenberg, Belgium.

Correspondence : Filip Verhaegen, OIV Straat 82/201, 3020 Herent, Belgium. E-mail : filip_verhaegen@hotmail.com

© 2012, Acta Orthopædica Belgica.

The authors report no conflict of interest.

No benefits or funds were received in support of this study

Acta Orthopædica Belgica, Vol. 78 - 3 - 2012

upper arm and limited shoulder mobility. Anterior-posterior radiographs showed an anterior dislocation of the glenohumeral joint. An attempt to reduce the shoulder under intravenous sedation was unsuccessful. As the patient apparently did not suffer and had a history of limited functionality, the attending physician concluded that he was treating a chronic dislocation and further attempts to relocate the joint were not undertaken. Two weeks later the patient was seen again in the emergency department. Her right arm felt cold and had a white appearance; a haematoma was present over the right shoulder region. Pulses were absent at the level of the brachial artery and distally. Capillary refill of the limb was over 5 seconds. Neurological examination of the upper extremity was normal. A thrombosis and secondary rupture of the axillary artery was confirmed by Doppler ultrasound. The shoulder joint was approached through a classic deltopectoral approach with the patient in beach chair position. The humeral head was found perforating the subscapularis muscle and was locked in the muscle. The humeral head was reduced and the muscular defect was closed with resorbable sutures. Further exploration revealed that the axillary artery was ruptured. After a clavicular osteotomy to improve exposure, the vascular surgeon performed an angioplasty with a Dacron prosthesis. The postoperative course was uneventful. The patient was discharged 15 days after surgery. Radiographs demonstrated a stable relocation of the humeral head. At final follow-up the arterial repair remained functional with good arterial perfusion of the right upper limb and the patient was able to use her arm in daily life without an increased loss of function.

Case 2

A 75-year-old woman with rheumatoid arthritis, diabetes mellitus and chronic renal insufficiency presented with a painful right shoulder after a fall 4 weeks earlier. The shoulder range of motion was decreased. Standard antero-posterior and lateral radiographs showed an anterior shoulder dislocation. Computer tomography (CT) scan of the shoulder showed a grade IV fatty infiltration of the cuff musculature according to the criteria of Goutallier

et al (7) and diffuse destruction of the glenohumeral joint. Due to the limited disability and her limited mental capacities, the limited pain and the normal neurovascular status we advised conservative treatment; prosthetic replacement or resection arthroplasty were not considered. A few months later, the patient experienced severe shoulder pain after a sudden movement. She was seen in the emergency department of another hospital. The diagnosis of an acute anterior shoulder dislocation was made and an attempt at closed reduction was done; it was unsuccessful. After this manoeuvre the patient developed increasing pain in the upper limb and developed an expanding haematoma over the shoulder region. A CT scan with intravenous contrast showed a pseudo-aneurysm of the axillary artery. She developed a hypovolaemic shock with haemoglobin of 5.8 g/dL and brachial plexus function was progressively lost. An urgent surgical exploration was performed. The laceration of the axillary artery was confirmed and an autologous venous patch was sutured in place. The brachial plexus was explored at the level of the arterial lesion and was found to be in continuity. The poor medical condition of the patient with a plexus lesion and an upper limb at risk prompted us to perform a resection arthroplasty of the humeral head instead of prosthetic replacement. Postoperatively the patient developed a superficial wound infection which was successfully treated with intravenous antibiotics. Postoperative electromyography confirmed the brachial plexus lesion. At final follow-up the vascular recovery of the upper limb was excellent but the patient had a paralysed, painless arm with very limited function.

Case 3

A 65-year-old patient consulted with a chronic shoulder dislocation since two months. Two previous attempts at closed reduction had failed. On clinical examination we noted a non-functional upper limb with normal peripheral pulses and normal sensory and motor examination of the arm. Radiographic examination with plain films and CT scan confirmed an anterior shoulder dislocation with a massive 'engaging' Hill Sachs lesion. Two weeks later a reverse arthroplasty with acromio-

clavicular resection was performed through a deltopectoral approach. A massive rupture of the rotator cuff was identified. Postoperative rehabilitation was uneventful. She achieved good function of her upper limb without pain but with weakness in rotational movements.

Diagnosis

The differential diagnosis with acute shoulder dislocation may be uneasy in a subpopulation of elderly demented patients, for whom medical assistance is not always directly sought in case of a traumatic shoulder dislocation. An acute shoulder dislocation may thus go undiagnosed, to be diagnosed only with some delay. Anamnestic clues are not always helpful, and retrospective anamnesis can be confounding. If there is any doubt radiological examination is indicated; an axillary view is helpful. A chronic shoulder dislocation is in general a disabling condition although some patients may have only mild discomfort, and limitation of range of motion can improve over time.

Management

The treatment of chronic anterior glenohumeral dislocations remains a challenge. As they tend to be more common in an elderly population, the attending physician is often facing a situation where the risks and benefits of an operation should be weighed. A non-surgical management can be preferred in patients with limited functional demands who have minimal discomfort and in patients with significant medical co-morbidities. Closed reduction can be considered in certain cases although it is not without risk (4) and is seldom successful if the dislocation has been present for more than 4 weeks or if there is a large impression fracture of the humeral head. Most chronic dislocations require an open reduction in combination with a procedure to restore stability of the glenohumeral joint. Numerous procedures are available: disimpaction and bone grafting, allograft reconstruction, tendon and bone transfers and capsulolabral soft tissue reconstruction. The general medical condition of the patient together with the type and size of the lesions will determine which procedure should be

undertaken. Recent reports show good result of open reduction (2,6). Rowe *et al* showed that it is not necessary to transfix the shoulder joint to prevent redislocation. When the articular defect on the humeral head exceeds 40% of the surface or if there is marked articular degeneration, prosthetic replacement is advised (17). In low-demand patients a resection arthroplasty procedure may be an alternative. After a resection arthroplasty the function of the shoulder is limited but the shoulder usually remains pain free (15).

Arterial complications

Arterial lesions are uncommon but well-known complications after an acute shoulder dislocation (14). The risk increases with age and more aggressive attempts at closed reduction. Arterial complications in chronic glenohumeral dislocations are rare. We could only find one case report in the literature (11). Most lesions involve the axillary artery just distal to the subscapular artery with haemorrhage and ischaemia due to distal thrombosis (5). The anteriorly dislocated humeral head is very close to the neurovascular structures. Over time adhesions and scarring to these structures may develop (8). Elderly patients are particularly at risk for vascular lesions after reduction of shoulder dislocations, most likely due to a diminished elasticity of atherosclerotic vessels (5). Up to one third of all patients confronted with a vascular complication have a history of previous joint dislocations, suggesting arterial incarceration in scar tissue, which may render the vessel more susceptible to injury during a subsequent dislocation or late reduction manoeuvre. Recognizing vascular lesions after glenohumeral dislocation remains difficult. A pathognomonic triad consisting of shoulder dislocation, reduction in amplitude of the radial or brachial pulse and an expanding axillary mass has been described (10). The presence of peripheral pulses can be misleading because a collateral vascular network may have developed (1). The presence or absence of peripheral pulses may not be considered as a definitive proof of either an intact or of a compromised vascularisation. Therefore the physical examination alone is generally regarded as

unsatisfactory for the diagnosis of peripheral vascular injury in extremity trauma (3). A diagnostic work-up with CT angiography for every traumatic shoulder dislocation is not realistic. The emergency physician in charge of these patients must rely on his clinical experience to recognize patients that are at risk. A good screening tool in case of doubt is the 'arterial pressure index' (API). The API is the ratio of the Doppler arterial pressure distal to the injury to the Doppler arterial pressure in the uninvolved arm. An API value of < 0.9 was found to have a sensitivity of 95% and specificity of 97% for a major arterial extremity injury (11). When in doubt, an angiography is indicated. In case of complete transection an end-to-end anastomosis or the use of an interposition graft is indicated.

Neurological complications

Brachial plexus injury after anterior shoulder dislocation is rare. Initial neurological examination can be difficult to perform. A high index of suspicion in case of arterial injury is warranted, as a plexus injury is associated with 60% of cases of arterial injury (9). The mechanism of injury is traction of the nerves over the dislocated head. An electromyographic evaluation 3 to 4 weeks after injury is important to confirm the diagnosis and assist in differentiating between a pre- or post-ganglion injury. With root avulsion, there is no potential for spontaneous recovery or functional restoration without surgical intervention. CT-myelography is currently regarded as the most accurate means of identification of root avulsion injury, and should be performed no earlier than 3 to 4 weeks following injury (13). The literature suggests that recovery can be expected for most infraclavicular lesions. Peripheral nerve injury is a frequent complication in shoulder dislocation. The axillary nerve is most involved. Neurapraxia is the most common form of nerve injury, with which spontaneous recovery can be expected. If no clinical or electromyographic improvement is noted, surgery may be appropriate. The results of operative repair are best if surgery is performed within 3 to 6 months from the injury. The results of repair of axillary nerve injuries have been good compared with treatment of other peripheral nerve lesions (18). Neurological surgery

is not recommended in longstanding lesions. In these cases muscle transfers become an option to improve shoulder function.

CONCLUSION

An unrecognized, chronic anterior shoulder dislocation can be a disabling condition. The three cases reported here demonstrate that they can give rise to serious arterial and neurological complications, especially in elderly patients. We believe that most chronic anterior dislocations require an open reduction and if necessary a procedure to restore stability of the glenohumeral joint. Temporary transfixation of the shoulder joint can be necessary if adequate stability cannot be achieved with other means. In cases where the humeral head is severely damaged or in case of severe degenerative changes an arthroplasty (anatomical or reverse shoulder prosthesis) can be performed. In low-demand patients with severe destruction of the glenohumeral joint, a resection arthroplasty may have to be performed. Arterial lesions require urgent intervention with reconstruction. For most neurological complications a conservative treatment is advised.

REFERENCES

1. **Adovasio R, Visintin E, Sgarbi G.** Arterial injury of the axilla : an unusual case after blunt trauma of the shoulder. *J Trauma* 1996 ; 41 : 754-756.
2. **Akinci O, Kayali C, Akalin Y.** Open reduction of old unreduced anterior shoulder dislocations : a case series including 10 patients. *Eur J Orthop Surg Traumatol* 2010 ; 20 : 123-129.
3. **Bravman JT, Ipaktchi K, Biffi WL, Stahel PF.** Vascular injuries after minor blunt upper extremity trauma : pitfalls in the recognition and diagnosis of potential "near miss" injuries. *Scand J Trauma Resusc Emerg Med* 2008 ; 25 : 16.
4. **Calvet E, Leroy J, Lecroix F.** [Dislocations of the shoulder and vascular lesions.] (in French). *J Chir (Paris)* 1941 ; 58 : 337-346.
5. **Gates JD, Knox JB.** Axillary artery injuries secondary to anterior dislocation of the shoulder. *J Trauma* 1995 ; 39 : 581-583.
6. **Goga IE.** Chronic shoulder dislocations. *J Shoulder Elbow Surg* 2003 ; 12 : 446-450.
7. **Goutallier D, Postel JM, Bernageau J, Lavau L, Voisin MC.** Fatty muscle degeneration in cuff ruptures : pre- and postoperative evaluation by CT scan. *Clin Orthop Relat Res* 1994 ; 304 : 78-83.

8. **Jardon OM, Mood LT, Lynch RD.** Complete occlusion of the axillary artery as a complication of shoulder dislocation. *J Bone Joint Surg* 1973 ; 55-A : 189-192.
9. **Johnson SF, Johnson SB, Strodel WE, Barker DE, Kearney PA.** Brachial plexus injury : association with subclavian and axillary vascular trauma. *J Trauma* 1991 ; 31 : 1546-1550.
10. **Kelley SP, Hinsche AF, Hossain JFM.** Axillary artery transection following anterior shoulder dislocation : classical presentation and current concepts. *Injury Int J Care Injured* 2004 ; 35 : 1128-1132.
11. **Lynch K, Johanssen K.** Can Doppler pressure measurement replace exclusion arteriography in the diagnosis of occult extremity arterial trauma. *Ann Surg* 1991 ; 214 : 737-741.
12. **Orecchia PM, Calcagno D, Razzino RA.** Ruptured axillary pseudo aneurysm from chronic shoulder dislocation. *J Vasc Surg* 1996 ; 24 : 499-500.
13. **O'Shea K, Feinberg JH, Wolfe SW.** Imaging and electrodiagnostic work-up of acute adult brachial plexus injuries. *J Hand Surg Eur* 2011 ; 36 : 747-759.
14. **Perron AD, Ingerski M, Brady WJ, Erling BF, Ulmann EA.** Acute complications associated with shoulder dislocation at an academic emergency department. *J Emergency Med* 2003 ; 24 : 141-145.
15. **Rispoli DM, Sperling JW, Athwal GS, Schleck CD, Cofield RH.** Pain relief and functional results after resection arthroplasty of the shoulder. *J Bone Joint Surg* 2007 ; 89-B : 1184-1187.
16. **Rowe CR, Zarins B.** Chronic unreduced dislocations of the shoulder. *J Bone Joint Surg* 1982 ; 64-A : 494-504.
17. **Sahajpal DT, Zuckerman JD.** Chronic glenohumeral dislocation. *J Am Acad Orthop Surg* 2008 ; 16 : 385-398.
18. **Steinmann SP, Moran EA.** Axillary nerve injury : diagnosis and treatment. *J Am Acad Orthop Surg* 2001 ; 9 : 328-335.