

DIAGNOSTIC AND THERAPEUTIC APPROACH IN PAINFUL SHOULDER

FLORINA LIGIA POPA¹, ADELINA BANCIU², MARIA ROTARU³

^{1,3}“Lucian Blaga” University of Sibiu, ²Neuropsihiatric Hospital of Sibiu

Keywords: painful shoulder, impingement syndrome, rotator cuff

Abstract: Introduction: Shoulder pain is recognized as a frequent physical complaint, rotator cuff representing the main source. Shoulder impingement syndrome is the common cause of pain and determines a significant disability. Aim: The evaluation of methods and limits of diagnosis and treatment of painful shoulder, based on review of the latest data from international literature. Material and methods: authors present information obtained from studies published in 2009-2012. Results: shoulder impingement syndrome can usually be diagnosed based on clinical examination. X-rays can detect shoulder joint and bone pathology. Ultrasonography and magnetic resonance imaging may reveal rotator cuff pathology. Treatment is usually conservative, but sometimes an arthroscopic or classic surgery is required. Discussions and conclusions: in the diagnosis of painful shoulder clinical tests should be corroborated with imaging data, in particular ultrasound. Physiotherapy is the main option of treatment, proving to be effective in most patients.

Cuvinte cheie: umărul dureros, sindrom de impingement, coafa rotatorilor

Rezumat: Introducere: durerea de umăr este recunoscută drept o acuză fizică frecventă, coafa rotatorilor reprezentând principala sursă. Sindromul de impingement al umărului este cauza comună a acuzelor algice și determină o disabilitate semnificativă. Scopul lucrării: relevarea modalităților și limitelor de diagnostic și tratament ale umărului dureros, pe baza analizei datelor recente din literatura internațională de specialitate. Material și metodă: autorii prezintă informațiile obținute din studii de actualitate publicate în perioada 2009-2012. Rezultate: sindromul de impingement al umărului poate fi diagnosticat uzual pe baza examenului clinic. Radiografia umărului poate detecta o patologie articulară și osoasă. Ultrasonografia și rezonanța magnetică pot evidenția patologia coafei rotatorilor. Tratamentul este de obicei conservator, dar uneori este necesară intervenția chirurgicală artroscopică sau clasică. Discuții și concluzii: în stabilirea diagnosticului umărului dureros, testele clinice trebuie coroborate cu datele imagistice, în special ultrasonografice. Opțiunea principală de tratament este fizioterapie, dovedindu-se eficientă la majoritatea pacienților.

Shoulder pain is a common problem faced in medical practice. Due to the complexity and biomechanics particularities shoulder is one of the joints most prone to pathology.

Shoulder impingement syndrome (SIS) is the most common cause of shoulder pain. It can be defined as a clinical syndrome attributed to compression of structures around glenohumeral joint and determined by a whole spectrum of pathological conditions. SIS is a complex of clinical findings and no lesion of specific structures.(1)

Rotator cuff (RC) plays an important role in shoulder function and represents a common source of shoulder pain. It is composed of four muscles: supraspinatus, infraspinatus, small round (teres minor) and subscapularis. The action of these muscles is to ensure lowering and centralization of the humeral head in the glenohumeral joint. Malfunctioning of RC allow superior migration of humeral head due to the opposing action of the deltoid muscle.(2)

Risk factors for SIS are represented by repetitive activities over the shoulder or head during various works (painting, chargers) or sports (tennis, throwing weights), aging, glenohumeral joint or scapula instability, inflexibility of upper extremity, anatomical particularities of the acromion.(1)

Modern **classification** describes four types of SIS. In **the primary impingement** (external subacromial) is affected

the upper region or rotator cuff tendon (RCT) bursa by inflammation or rupture. RCT runs through a space between the acromion and the humeral head that can be narrowed by: degenerative changes of the acromion, acromioclavicular joint or coracoacromial ligament and morphological variant III (Bigliani) of the acromion. Other causes of primary SIS: hypotonia/hypotrophy of RC determining the rise of humeral head, subacromial bursa inflammation and suffering, pronounced kyphosis.(2)

Secondary impingement involves inability to maintain the humeral head centered in the glenoid fossa during movement. The cause is a "functional instability" determined by RC weakness combined with congenital laxity of the glenohumeral capsule and ligaments. It appears in coracoacromial space by anterior translation of the humeral head. Chronic secondary SIS determines rupture of RCT or labrum.(2)

Internal impingement (glenoid) occurs intraarticular between RCT and the posterior-superior zone of glenoid fossa and labrum, in shoulder extension movement combined with abduction and external rotation of the arm. The retroversion of humerus is mentioned as predisposing factor. Long evolution determines an anterior capsular instability.(2)

¹Corresponding author: Florina Popa, Str. Lucian Blaga, Nr. 2A, Sibiu, România, E-mail: florina.popa@yahoo.com, Tel: +40269 212320
Article received on 09.04.2013 and accepted for publication on 16.07.2013
ACTA MEDICA TRANSILVANICA September 2013;2(3):362-364

Subcoracoid impingement appears in the subcoracoid space (normal: 8.4-11mm; pathological under 6mm) located between the coracoid process and the humeral head. SIS occurs in shoulder flexion associated with abduction and internal rotation of the arm. Subscapularis tendon can be damaged, thus necessitating coracoplastia.(2)

Positive diagnosis requires: history, clinical examination and laboratory investigations. **The clinical examination** involves evaluation by inspection and palpation of the anatomical structures involved in SIS. Is performed the shoulder joint and muscle balance. SIS will be highlighted by provocative clinical tests. SIS patients may experience: normal cervical spine, sensitivity in the subacromial space or in the posterior region, shoulder with atgetic limited mobility, special tests positive for pain reproduction, normal muscle strength or muscle hypo/atrophy in cases with long evolution. Chronic and untreated SIS can be complicated by an adhesive capsulitis, accompanied by a significant reduction in shoulder mobility.(1)

Clinical diagnosis can be established on the basis of specific clinical tests.(3) Is confirmed if there are 3-5 positive tests and is excluded under 3 positive tests (4) (Table no.1).

Table no. 1. Specific clinical tests for SIS (4)

Clinical test	Primary SIS	Secondary SIS	Internal SIS	Subcoracoid SIS
Neer	+		+	
Hawkins	+		+	+
Jobe	+			
Gerber	+			+
Rezistive abduction	+			
Sulcus sign		+		
Clung sign			+	
Relocation test		+	+	
Release test		+		
Apprehension test		+		
Posterior SIS sign			+	
Coracoid SIS sign				+

Plain x-rays of the shoulder are not necessary for the initial evaluation of SIS. It may be useful in evaluation of: acromion morphology, distance between acromion and humeral head, acromioclavicular joint and tendon calcifications.(1)

Musculoskeletal ultrasound allows the evaluation of tendons, muscles and bursae lesions. Dynamic examination may reveal the site of impingement and tendons involved. Clinical studies have shown a correlation between clinical and ultrasound diagnosis of 80.5%.(5) It was found that Neer test is the most sensitive (72.2%) and Hawkins (95.3%) and Jobe tests (90%) are specific for subacromial impingement.(6)

Magnetic resonance imaging (MRI) is performed in the following circumstances: conservative treatment failure, uncertain diagnosis after initial evaluation, suspected RC or labrum tear, in athletes if needed a quick confirmation of the diagnosis. RM arthrography with intraarticular injected gadolinium may be useful when the diagnosis remains unclear after standard RM. It can detect the labrum pathology, small or partial tears of RC.(2)

For **differential diagnosis** excluding other conditions that cause shoulder pain: glenohumeral osteoarthritis by seeking lower humeral head bone spurs; suprascapular nerve palsy requiring electromyography for diagnosis and MRI for evaluating the cause; cervical radiculopathy which can be frequently associated with SIS; algesic complex regional syndrome; cancer with bone metastasis, pain referred from: aperture chest syndrome, pulmonary diseases, coronary heart disease, peptic ulcer.(1)

There is little evidence on the **management of SIS**. Will be referred to orthopedics from the very beginning the patients with the clinical suspicion of RC or labrum rupture and adhesive capsulitis. If in these cases the disability is minimal, conservative treatment is started consisting primarily of physical therapy.(1)

Acute SIS treatment consists of: cryotherapy to reduce swelling and inflammation and induce analgesia; rest; anti-inflammatory drugs in short course of 7-10 days; infiltration with glucocorticoid intraarticular injections; physical therapy. If improvement is achieved in a few weeks, will continue the rehabilitation treatment and activities will be resumed gradually. In case of failure of conservative treatment imaging investigations are necessary. Musculoskeletal ultrasound is initially performed, then shoulder x-ray in case of persistent symptoms over 3-6 weeks. MRI is indicated in referred cases.(2)

Depending on the imaging results, there are three options: surgery for RC or labrum ruptures and adhesive capsulitis; continuing several months of conservative treatment and combination with corticosteroid intraarticular injection in case of RC tendinopathy and subacromial bursitis; surgical treatment after 3-6-9 months of ineffective conservative treatment.(1)

Physical therapy correctly set is effective in most patients with SIS and must be applied before surgery as suggested by available evidence and clinical experience. The results of several randomized trials reported no differences between patients treated with physical therapy and those treated surgically with subacromial decompression.(7) It is recommended low and medium frequency electrotherapy, ultrasound therapy, magnetic therapy, laser therapy and shockwave therapy.(2)

Kinetherapy is essential in the treatment of SIS. An effective rehabilitation program includes exercises to increase joint mobility, mobilization of the glenohumeral joint with the use of specific maneuvers for capsular structures, muscle toning exercises for RC and scapular stabilizers.(7)

Intraarticular injections with corticosteroids or viscous and elastic substances bring short-term benefits. Relieving symptoms increase adherence to physical therapy, but there is little evidence to support their use (several small randomized trials).(1)

Surgical treatment is indicated: after 3 months of conservative treatment without significant improvement, in the case of RC or labrum tears and in adhesive capsulitis. The techniques used are arthroscopy or open surgery. Interventions consist in acromioplasty, coracoplasty, debridement, restoring RC or labrum, capsuloraffia.(2)

Conclusions:

SIS is the main cause of shoulder pain. The diagnosis requires the use of clinical tests in combination and their corroboration with imaging data, first ultrasound. Physical therapy is the first option in the SIS and proved effective in most patients. Orthopedic evaluation is recommended after 3 months of conservative treatment without improvement.

REFERENCES

1. Simons SM, Kruse D, Dixon JB. Shoulder impingement syndrome. *www.uptodate.com*. 2012; Oct 23.
2. DeBerardino TM, Young CC, Chang WK. Shoulder impingement syndrome clinical presentation. 2012; Nov 29. [Medscape Reference].
3. Alqunaee M, Galvin R, Fahey T. Diagnostic accuracy of clinical tests for subacromial impingement syndrome: a systematic review and meta-analysis. *Arch Phys Med Rehabil*. Feb 2012;93(2):229-36.
4. Beaudreuil J, Nizard R, Thomas T, Peyre M, Liotard JP, Boileau P, et al. Contribution of clinical tests to the diagnosis of rotator cuff disease: a systematic literature review. *Joint Bone Spine*. 2009 Jan;76(1):15-19.
5. Mayerhoefer ME, Breitensteiner MJ, Wurnig C, Roposch A. Shoulder impingement: relationship of clinical symptoms and imaging criteria. *Clin J Sport Med*. 2009;19:83.
6. Hegedus EJ, Goode AP, Cook CE, Myer CA, Myer DM, Wright AA. Which physical examination tests provide clinicians with the most value when examining the shoulder? Update of a systemic review with meta-analysis of individual tests. *Br J Sports Med*. 2012;46(14):964-78.[PubMed]
7. Kromer TO, Tautenhahn UG, de Bie RA, Staal JB, Bastiaenen CH. Effects of physiotherapy in patients with shoulder impingement syndrome: a systematic review of the literature. *J Rehabil Med*. 2009;41:870-880.