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Care Clinical Decision-Making Tool for Diagnosing and Managing Chronic Instability of the Shoulder Joint

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Abstract This article describes the treatment patients with chronic instability of the shoulder joint need a reliable diagnosis, and based on the identified pathological process of the shoulder joint, it is necessary to choose the tactics of surgical treatment. The purpose of the study is to substantiate the developed algorithm for choosing the tactics of diagnosis and surgical treatment of chronic instability of the shoulder joint. Based on the analysis of the main and current approaches to the diagnosis and treatment of instability of the shoulder joint, the author's "Program for choosing the tactics of surgical treatment of chronic anterior instability of the shoulder joint" was developed, which allows you to accurately assess the pathology of the shoulder joint, as well as determine the necessary tactics of surgical treatment. The developed algorithm makes it possible to carry out a minimally costly diagnostic procedure and choose the least traumatic and most anatomical method of surgical intervention.

Keywords Chronic instability of the shoulder joint, Treatment and diagnostic algorithm, ISIS instability index, HS on track / off track lesion

1. Introduction

Shoulder pain is a widespread condition and a major cause of morbidity and functional disability [1]. Some patients experience minor symptoms that last relatively short (ie, less than 3 months) [2]. Other patients show more severe symptoms, lasting for a long time (i.e. more than 12 months), with a chronic course and relapses, which is an actual problem [3,4]. Pain, stiffness and weakness in the shoulder often lead to chronic pain, disability and loss of performance, which affect the quality of life and burden both the patient and society [5,6]. Shoulder pain also results in a financial burden for both the patient and the healthcare system. Direct costs include physician services, additional and related medical procedures, home care, prescription drugs, inpatient and outpatient hospital care, outpatient services, and non-health sector costs [7]. Indirect costs include the cost of lost productivity due to disability as well as the cost of lost earnings [8]. From a health services perspective, shoulder pain is the second most common musculoskeletal (MS) complaint, a complaint at the primary care level, and the third most common site of MS pain in the population [9]. Patients with shoulder pain account for a third of all visits to primary care physicians [2,10]. These patients frequently return for follow-up consultations, further increasing the strain on public health resources. A significant number of patients also go to private health care clinics for shoulder treatment, although this scale becomes a skill challenge due to limitations in public-private communication. However, the prevalence of shoulder pain will only increase as the population ages [5].

Patients with shoulder pain need confident assessment, treatment, and appropriate therapies. However, current evidence suggests that many patients with shoulder pain do not receive such care at the primary care level. Instead, the current system suffers from process inefficiencies, overuse of diagnostic tests, inappropriate referrals, and underuse of appropriate therapeutic interventions; all this leads to a long waiting time and poor quality of service [12]. Management of shoulder pain at the primary care level is challenging, as many disorders share similar clinical features and lack consensus on diagnostic criteria and consistency in clinical evaluation [13]. Unfortunately, primary care physicians often lack the necessary training and self-confidence to properly treat shoulder pain. Many primary care physicians are routinely referred for costly investigations such as magnetic resonance imaging (MRI), which are usually unnecessary and do not provide a clear answer to the clinical question [10]. In addition, patients seeking primary health care are often referred to specialized care, resulting in long waiting times for specialist consultations. This is

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problematic because most patients do not require surgery but are referred to orthopedic surgeons when they could easily be treated at the primary care level with conservative treatment. [12]. Therefore, there is still a certain level of variation and inappropriateness in the treatment of shoulder pain at the primary health care level.

Decision making in primary health care is complex and can potentially affect the quality of care provided and patient outcomes. Patient-centered care requires a structured approach that supports evidence-based decision making in primary health care settings. Therefore, the goal of this project is to develop a clinical decision-making tool to standardize care and minimize uncertainty in the assessment, diagnosis, and treatment of patients seeking primary care for shoulder pain. The development of this clinical decision-making tool required two steps:

1) defining evidence-based clinical decision-making tools for shoulder pain; and 2) the creation of an algorithm for the evaluation, diagnosis and treatment of patients with chronic instability of the shoulder joint. This includes consensus on indications for diagnostic imaging and distinction between patients who are eligible for surgical and non-surgical treatment options.

2. Purpose of the Research

To substantiate the developed algorithm for choosing the tactics of surgical treatment of chronic instability of the shoulder joint.

Based on the analysis of the main and current approaches to the diagnosis and treatment of shoulder joint instability, the author's "Program for choosing the tactics of surgical treatment of chronic anterior shoulder joint instability" (Fig. 1) was developed, which allows to accurately assess the pathology of the shoulder joint, as well as determine the necessary tactics of surgical treatment.

The program received a certificate from the Intellectual Property Agency of the Republic of Uzbekistan No. DGU 09713 dated 11/19/2020.

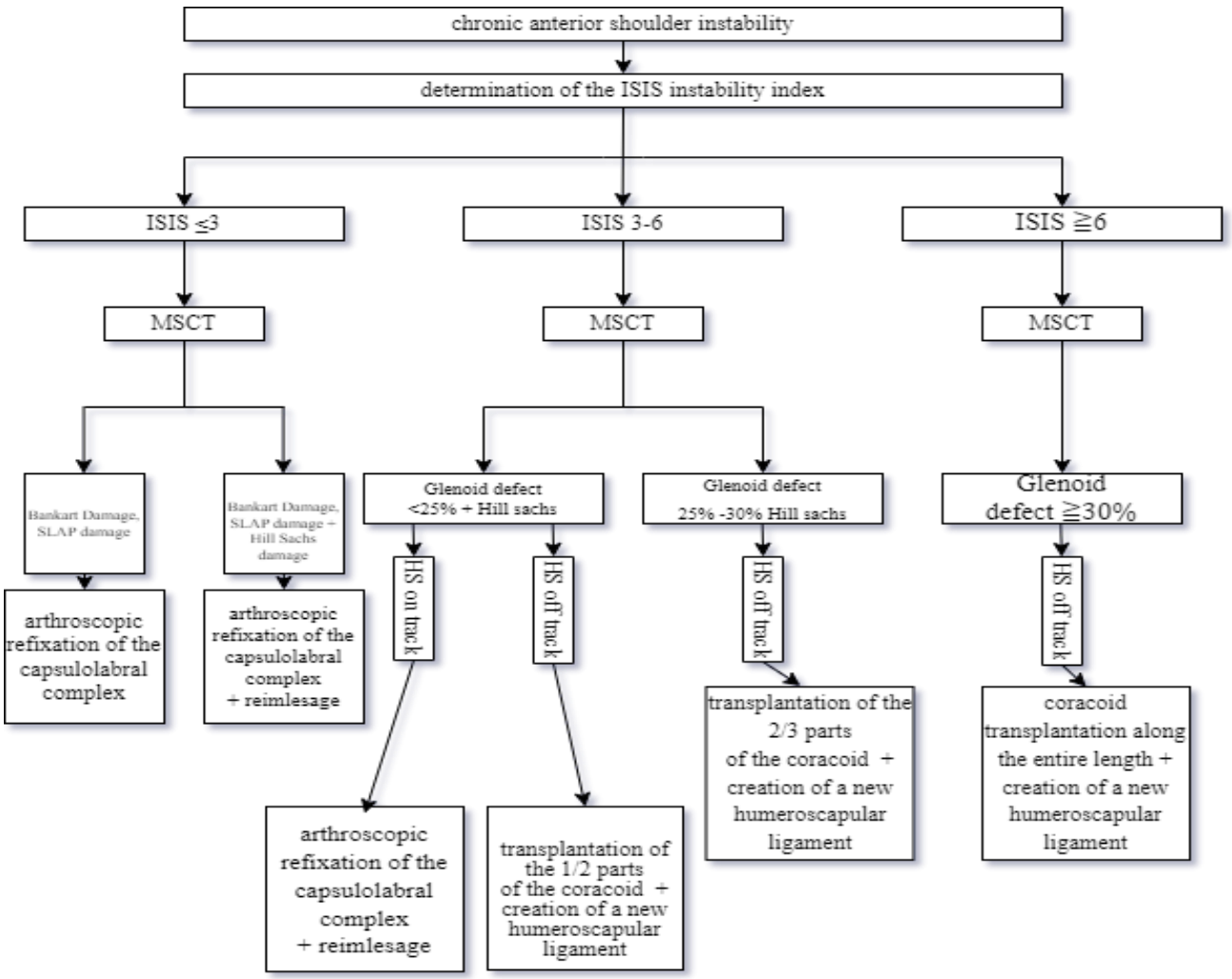


Figure 1. The program for choosing the tactics of surgical treatment of chronic anterior instability of the shoulder joint

To determine the degree of instability of the shoulder joint, a specialized ISIS scale was used, based on the results of a survey and clinical examination of the patient, as well as radiographic images in the direct-posterior projection in the position of internal rotation of the upper limb (Table 1).

Table 1. Determination of the ISIS instability index

№	Options	Score in points
1	Patient's age (less than 20 years)	+2
2	Daily sports activity Overhet + or contact sports	+1
3	Sports activity	+2
4	Hyperelasticity of the capsule	+1
5	Glenoid defect	+2
6	Hill Sachs damage	+2

The clinical assessment of the shoulder instability index (ISIS), proposed by F. Balg and P. Boileau in 2007, is by far the most appropriate diagnostic tool. Both in our country and abroad, in recent years, it is this scale that has significantly changed and simplified surgical approaches to the treatment of patients with shoulder joint instability.

The main advantage of the concept using the ISIS index has been and remains the simplicity of calculations. To implement it, the traumatologist-orthopedist, when collecting an anamnesis at the initial appointment, needs to ask only 3 questions:

1) how old are you? (if less than 20 years old + 2 points);
2) What is your daily sports activity? (the presence of "overhead" or contact sports + 1 point);
3) What is your level of sports activity? (competitive + 2 points).

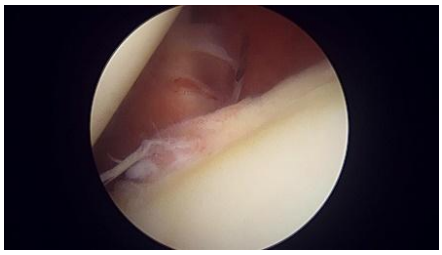
The clinician then needs to conduct a clinical examination for signs of capsular hyperelasticity (+1 point) and carefully examine visualization of bony lesions of the glenoid (+2 points) and head of the humerus (+2 points).

After summing up the number of accumulated points, the patients were divided into 3 groups. Group I included those observed with an ISIS value of less than 3 points, group II - 3-6 points, group III - more than 6 points. Patients from group I underwent MRI examination of the damaged shoulder joint, and groups II and III underwent MSCT examination with 3D reconstruction.

On MRI study of patients of group I, in which only capsular-labral damage was determined, arthroscopic refixation of the complex was performed. In patients with capsulo-labral and with Hill-Sachs injury, arthroscopic refixation of the capsulo-labral complex + reimplessage was performed (Fig. 2). In the case of hyperelasticity of the capsule, the operation was supplemented by capsular plication.

Patients of group II, depending on the results of MSCT, were divided into 2 subgroups: IIA - patients in whom the size of the bone defect of the glenoid scapula was up to 25% of the width, IIB - from 25 to 30%.

To determine the size of the glenoid defect, the method of H. Sugaya (2003) was used, as a percentage of the anatomical width of the articular cavity (Fig. 3).



a

b

Figure 2. a - Arthroscopic picture of the Bankart injury, b - arthroscopic picture of refixation of the capsular-labral complex

b (defect size) / A (glenoid diameter) x 100 = defect size in percent

Figure 3. Estimation of the size of the glenoid defect on a computed tomogram in the 3D reconstruction mode

The presence of Hill-Sachs lesion and its type were diagnosed by the method described by E. Itoi et al. [14]. It was determined that not the entire glenoid, but only 83% of its diameter is in contact with the head of the humerus, in different degrees of abduction of the shoulder. Therefore, the glenoid pathway (GP) was 0.83 of the diameter for an intact glenoid: GP = (0.83 × glenoid diameter in mm) – defect size in mm. Whether Hill-Sachs is within the glenoid pathway was determined by comparing 2 values - the width of the HS and the GP. In the conclusion of the MSCT study, the nature of shoulder joint instability, the degree of Bankart, the dimensions of Hill-Sachs (width and depth), the conclusion «HS on track / off track lesion» were indicated.

Patients of subgroup IIA, in turn, underwent various types of surgery based on the Hill Sachs “on track/off

track" concept: on track - arthroscopic refixation of the capsular-labral complex + reimplessage; off track - coracoplasty of ½ of the coracoid process with the creation of a new humeroscapular ligament.

Corocoplasty of ½ of the coracoid process with the creation of a new shoulder-scapular ligament is also our own development. Surgical technique: osteotomy of 2/3 of the lateral part of the coracoid process, keeping 1/3 of its medial part.

The isolated bone graft, together with the tendon of the short head of the biceps muscle, is fixed at the site of the glenoid bone defect with two screws. To improve the stabilizing effect of corocoplasty, the formation of a new shoulder - the scapular ligament, by duplicating the short head of the biceps muscle, creating a tendon-muscle flap 5 mm wide and 4.5 - 5.0 cm long. The base of the isolated flap is in the bone graft. The selected flap is fixed transossally to the lesser tubercle in the position of 450 abduction and 450 external rotation of the upper limb. (Fig. 4)

In group IIB, the glenoid bone defect ranged from 25 to 30%, and Hill-Sachs lesions were diagnosed in patients. In this case, a corocoplasty of the ⅔ lateral part of the coracoid process was also performed with the creation of a new humeroscapular ligament. (Fig. 5)

Group III included patients with a glenoid defect greater than 30% + Hill-Sachs damage. This group of patients underwent coracoplasty along the entire width of the coracoid process + the creation of a new humeroscapular ligament (Fig. 6).

Figure 4. Scheme of the technique of the surgical method of complex stabilization of the shoulder joint with the creation of a new shoulder-scapular ligament. (Patent of the Republic of Uzbekistan (UZ) No. FAP 01729)

a b

Figure 5. a, b. Computed tomography of the shoulder joint after glenoid plasty with a bone autograft from ½ of the lateral part of the coracoid process

a b

Figure 6. a, b. Computed tomography of the shoulder joint after plastic surgery of the articular process of the scapula

3. Discussion of the Obtained Results

The developed algorithm suggests that a comprehensive preoperative examination to identify underlying and concomitant intraarticular pathology, assess the nature of damage to individual structures, and identify predictors that increase the risk of postoperative recurrence of dislocations is the key to successful restoration of the damaged joint.

The result of the implementation of the algorithm is the choice of the least traumatic, most anatomical and, in turn, reliable surgical tactics with the lowest risk of developing biomechanical disorders in the immediate and long-term follow-up periods. The implemented algorithm for diagnostics and surgical intervention in the treatment of anterior instability of the shoulder joint demonstrates the complexity of the approach to this problem. It reflects the modernized tendency to consider shoulder joint surgery as complex, requiring to take into account the variety of structural damage, age, the specifics of physical activity, and to achieve long-term stability of the joint by performing low-traumatic, pathogenetically substantiated operations.

Ethical Aspects

Ethics committee approval. The study was approved by the ethical committee of the Samarkand State Medical University.

Agreement

The patients agreed to publish the message and post information on the Internet about the nature of their disease, the treatment performed and its results for scientific and educational purposes.

Financing

The work was carried out in accordance with the research plan of the Samarkand State Medical University.

Conflict of Interest

The authors declare no conflict of interest.

REFERENCES

[1] Martinez-Calderon J, Struyf F, Meeus M, Morales-Ascencio JM, Luque-Suarez A. Influence of psychological factors on the prognosis of chronic shoulder pain: protocol for a prospective cohort study. BMJ Open. 2017; 7: e012822. https://doi.org/10.1136/bmjopen-2016-012822.

[2] van der Windt DAWM, Koes BW, de Jong BA, Bouter LM. Shoulder disorders in general practice: incidence, patient characteristics, and management. Ann Rheum Dis. 1995; 54: 959–64. https://doi.org/10.1136/ard.54.12.959.

[3] Winters JC, Sobel JS, Groenier KH, Arendzen JH, Meyboom-De Jong B. The long-term course of shoulder complaints: a prospective study in general practice. Rheumatology (Oxford). 1999; 38(2): 160–3. https://doi.org/10.1093/rheumatology/38.2.160.

[4] Luime JJ, Koes BW, Hendriksen IJM, Burdorf A, Verhagen AP, Miedema HS, et al. Prevalence and incidence of shoulder pain in the general population; a systematic review. Scand J Rheumatol. 2004; 33: 73–81.

[5] Kemp KAR, Sheps DM, Luciak-Corea C, Styles-Tripp F, Buckingham J, Beaupre LA. Systematic review of rotator cuff tears in workers' compensation patients. Occup Med (Oxford, England). 2011; 61: 556–62. https://doi.org/10.1093/occmed/kqr068.

[6] Murphy J, Gray A, Cooper C, Cooper D, Ramsay C, Carr A. Costs, quality of life and cost-effectiveness of arthroscopic and open repair for rotator cuff tears an economic evaluation alongside the ukuff trial. Bone Joint J. 2016; 98-B: 1648–55. https://doi.org/10.1302/0301-620X.98B12.BJJ-2016-0121.R1.

[7] American Academy of Orthopaedic Surgeons. The Burden of Musculoskeletal Diseases in the United States. Rosemont: American Academy of Orthopaedic Surgeons; 2008.

[8] Urwin M, Symmons D, Allison T, Brammah T, Busby H, Roxby M, et al. Estimating the burden of musculoskeletal disorders in the community: the comparative prevalence of symptoms at different anatomical sites, and the relation to social deprivation. Ann Rheum Dis. 1998; 57: 649–55. https://doi.org/10.1136/ard.57.11.649.

[9] Tkachenko AN, Gaikovaya LB, Ehsan-Ul-hak [et al.]. Prediction possibilities of local infectious complications after metal osteosynthesis of limb long tubular bones. *Surgery news*. 2018; 26(6): 697-706. (In Russ.). https://doi.org/10.18484/2305-0047.2018.6.697.

[10] Kania-Richmond A, Werle J, Robert J. Bone and joint health strategic clinical network: keeping Albertans moving. CMAJ. 2019; 191: S10–2. https://doi.org/10.1177/2374373519827340I.

[11] Eubank BHF, Lafave MR, Preston Wiley J, Sheps DM, Bois AJ, Mohtadi NG. Evaluating quality of care for patients with rotator cuff disorders. BMC Health Serv Res. 2018; 18. https://doi.org/10.1186/s12913-018-3375-4.

[12] Mitchell C, Adebajo A, Hay E, Carr A. Shoulder pain: diagnosis and management in primary care. Br Med J. 2005; 331: 1124–8. https://doi.org/10.1136/bmj.331.7525.1124.

[13] Lillicrap MS, Byrne E, Speed CA. Musculoskeletal assessment of general medical in-patients - joints still crying out for attention. Rheumatology. 2003; 42: 951–4. https://doi.org/10.1093/rheumatology/keg259.

[14] Di Giacomo, G. Atlas of functional shoulder anatomy / G. Di Giacomo [et al.]. – New York: Springer, 2008. – P. 112.