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Review Article

Aspects of Nonoperative Management of Shoulder Dislocation (Review)

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Abstract

Background: Shoulder dislocation (SD) is the most common dislocation represent 45% of all major joint dislocations. Worldwide, the number of patients with SD not decreased. There are many non-operative methods of reduction of SD. The ways of treatment are widely discussed in scientific forums and in publications. The aim of this review is the analysis of literature data concerning the methods of reduction of SD.

Results: Methods of non-operative techniques of SD have a long history, but today they have not lost their relevance. The widespread occurrence of SD is the reason of great number of reduction techniques available for SD. At the same time, recurrence of dislocation of the shoulder joint is observed in 50% of clinical cases, and often occurs in young patients. The disadvantages of methods for reduction the primary traumatic SD marked by many authors. The frequency of complications (habitual dislocation of the shoulder, instability of the shoulder joint, shoulder contractures), according to many authors, varies widely: from 15 to 95%. The review includes the main methods of non-operative reduction of dislocation of the shoulder joint, the frequency and structure of complications. Special focus have made to anesthesia during the reduction of the SD. In contrast to previously opinion, that it is necessary to use anesthesia during the reposition procedure, current data have demonstrated good results of SD without the use of intra-articular and other forms of anesthesia. The presented review allows to understand and to analyze current situation with treatment of SD.

Keywords: Shoulder Joint Dislocation; Shoulder Joint Dislocation Reduction; Anesthesia Support

Introduction

The shoulder joint is one of the most mobile joints in the human body. It is more prone to dislocations than any other joint (up to 45%) [1-4]. The reason for this is the loose joint capsule and the ratio of the surface area and the head of the humerus and the shallow articular fossa 4:1. This increased mobility contributes to frequent dislocations [5,6].

The frequency of dislocation of the shoulder joint (SD) is about 17 cases per 100,000 per year, while the maximum of SD is verified by men aged 21 to 30 years and women aged 61 to 80 years [7-9]. Recurrence of SD is observed in about 50% of cases [10]. There is a significant increase in the risk of recurrence at a younger age of the primary dislocation [11].

The disadvantages of the methods of reduction of primary traumatic SD are noted by many authors. The frequency of complications, according to some researchers, varies widely: from 15 to 95% [12]. Among the complications, habitual dislocation of the shoulder, instability of the shoulder joint, shoulder contractures are most often noted [13,14].

Methodology

Conservative methods of treatment of fractures and dislocations have a fairly long history, but, despite this, they have not lost their relevance and, in some cases, are the method of choice [15,17].

The dislocated segment must be corrected as soon as possible after diagnosis. Anesthesia can be both general and local. Many authors prefer anesthesia [18,19]. Local anesthesia is provided by the introduction into the joint cavity of a 1% solution of procaine (Novocaine) or another anesthetic in an amount of 20-40 ml [20-23]. Some authors prefer conductor anesthesia [24,25].

Shoulder reduction without anesthesia is considered by many specialists to be a mistake [26-29] Before the dislocation is eliminated, it is considered advisable to get in touch with the patient: calm him down, determine behavior at the stages of reduction, achieve maximum muscle relaxation. After anesthesia is achieved, shoulder reduction is started [26,30,31]. Despite the vast majority of such works, there are authors who disagree with this and recommend that dislocation be corrected without anesthesia. For example, D. Stafylakis., *et al*. (2016) believes that 18% of patients with shoulder dislocation can be treated without anesthesia [32]. In recent years, more and more publications have been devoted to the reduction of SD without anesthesia [33-35].

There are more than 50 ways to reduce shoulder dislocation conservatively. All of them can be divided into three groups [26-37]: lever methods; physiological methods based on muscle fatigue by stretching (traction); methods involving pushing the head of the humerus into the joint cavity (push methods).

This division is very conditional, since many methods combine various elements of the shoulder reduction technique [38].

The most famous example of the lever principle of the SD is the Kocher method (1870). the actions of the doctor in this case consist of four stages, smoothly replacing each other [26]. The Kocher method is one of the most traumatic, it can be used for SD in young victims with anterior shoulder dislocations. In elderly patients, it is not recommended to use it because of the threat of fracture of the porous bones of the shoulder and other complications [39,40].

The most common is considered to be a group of methods based on the reduction of dislocation by stretching. In many cases, stretching is combined with rotational or rocking movements [41].

The most ancient in this group is the Hippocratic method (IV century BC). The methods of Mukhin (1805) and Mota are also well-known (1812) [42-45].

There are several other methods of reduction of shoulder dislocation based on traction for the injured limb. These are the ways of Simon (1896), Chamberlain (1901), Yu. Janelidze (1922), A.A. Kudryavtseva (1937) [26,46,47].

A number of methods are based on the direct pushing of the head of the humerus into the articular cavity without the use of traction or with very slight stretching. These are the ways of Chaklin (1964) and Meshkov (1973) [26,48].

These methods of reduction of SD are not equivalent in technique and popularity, but each of them can restore the anatomy of the joint. However, this does not mean that the surgeon is obliged to use all methods and their modifications in his work. It is enough to master the technique of adjusting the head with three to five techniques and they will be enough to eliminate any types of traumatic dislocations. It is necessary to choose gentle, atraumatic methods of correction [49].

It should be noted that sometimes, even with the classical execution of the technique, it is not possible to restore the articulation. These are the so-called irreducible dislocations of the shoulder. They occur when tissues get caught between articulating surfaces. Most often these are damaged tendons and muscles, the edges of the torn and wrapped capsule of the joint, the slipped tendon of the long head of the biceps muscle, bone fragments. In addition, an obstacle may be the shoulder blade muscle tendons detached from the large tubercle, soldered to the joint capsule and referred to by surgeons as the rotator cuff.

The issues of diagnosis of long-standing shoulder dislocations are not difficult. At the same time, it is not always possible to

choose a treatment method that guarantees complete restoration of hand functions [50]. The surgeon's tactics depend on the type of dislocation, its prescription, the presence of concomitant diseases and the age of the patient. Most authors believe that in young patients it is necessary to try to eliminate closed SD regardless of its prescription. It is possible to eliminate dislocations of 4 and even 6 months old [51,52].

A number of researchers believe that the correction of SD is performed under general anesthesia and only in the operating room for the following reasons. Firstly, when the axillary artery is involved in the adhesions surrounding the shoulder joint, at the time of reduction it may rupture and emergency surgery will be required. Secondly, the reduction of the shoulder sometimes occurs relatively easily, but with the weakening of the fixation of the limb, the head of the humerus slides off the articular cavity. In such cases, it is recommended to carry out two Kirschner wires trans-articular in order to keep the head reduced. These wires can be removed after 3 weeks. This technique should be resorted to more often, since half of the patients with SD, who had an old dislocation and reduced at a late date, re-dislocation occurs on the 3rd-10th day, it is necessary to repeat the correction. And thirdly, if the closed reduction failed, an open one is used, about which the patient should be warned in advance.

All the authors agree that the longer the duration of SD, the more difficult and traumatic the intervention and the worse the functional outcome can be. Due to the frequent stiffness in the shoulder joint, some surgeons refuse radical interventions and perform palliative procedure: resection of the shoulder head or arthrodesis of the shoulder joint. In patients of older age groups, the rigidity of soft tissues is formed much faster. The reduction of long-standing dislocations, even for short periods, is a problem due to the presence of a significant number of complications. With the existing risk, many authors recommend abandoning manipulation and prescribing therapy: electrophoresis of analgesics, active physical therapy with a gradually increasing range of motion. In these cases, the goal is to create neo-arthrosis of the shoulder joint. With sufficient treatment, the results are often better than after surgical treatment. The patient can be fully independent and perform usual work [53,54].

Studies on the long-term results of conservative treatment of patients with SD show an unfavorable picture. Such treatment can be successful only in the case of minor defects, such as partial injuries, tears of tendons and muscles forming the rotator cuff of the shoulder joint. Physiotherapeutic treatment in combination with immobilization in the acute period and taking nonsteroidal anti-inflammatory drugs quickly gives positive results in such patients, relieving pain syndrome and restoring working capacity. However, in cases of more traumatic injuries, conservative treatment will be effective only in 22.5% [55].

Some authors tried to offset the low percentage of the effectiveness of conservative treatment of SD by the position of the upper limb during immobilization, changes in the duration of immobilization or changes in rehabilitation measures of physical therapy. However, such measures did not lead to a significant improvement in the results [56].

Currently, the attention of modern researchers is drawn to underestimating the significance of the revealed injuries of the bone and soft tissue structures of the shoulder joint. Despite the emergence of highly effective non-invasive diagnostic methods that allow to determine even minimal defects in both bones and soft tissues, most injuries are still detected only in cases when people are treated with a recurrence of dislocation or developed instability of the shoulder joint or [56,57].

Timely treatment of anterior SD is indicated to achieve optimal results in patients, since there is a high risk of unstable reduction. This leads to a reduction in the risk of damaging manipulations and spasm of the muscles and neurovascular structures of the shoulder. Despite the fact that there is some agreement in the literature regarding the timing of the reposition of an anterior dislocation of the shoulder, the optimal method of reposition still causes discussions [58,59].

A surgeon chooses a method of reposition based primarily on personal preferences and the patient's ability to hold the upper limb in the appropriate position [58,60]. Due to the need for sedation, a combination of narcotic drugs and benzodiazepine with or without propofol is often used Yang G., *et al*. 2013. One of the aspects of urgent reduction is the use of proper analgesia: the earlier the manipulation is done, the easier it is to choose an analgesic drug [61].

Also, the effectiveness of SD depends on the age of the patient. The older the patient, the slower the recovery [62,63]. With SD, sig-

nificant resources of the body are needed to restore functionality, therefore, when dealing with patients, attention should be paid to age, the later the manipulation is performed, the longer and more difficult the path to complete recovery will be [57,64].

Conclusion

Shoulder dislocation is a common injury in the modern world. Currently, there are different methods of treating dislocation: surgical and conservative. The latter have become widespread in the world due to the possibility of rapid reduction of the joint.

This method allows one to quickly eliminate the defect. So, there are about 50 methods of correcting shoulder dislocation. Each method is unique and applies to certain types of dislocations. However, in modern world of medicine, the choice of one or another method of reduction is often depends solely upon the treating surgeon.

Among the discussions on this problem, the most attention is drawn to the question of anesthesia during the reduction of dislocation of the shoulder joint. Many authors have taken opposite opinion. From the need for analgesia of SD to its denial. There is no doubt that this issue requires further study.

Thus, the result of the reduction depends on the choice of the surgeon: if the manipulation was selected and performed technically correctly, then the joint will recover quickly enough under the conditions of proper continuation of treatment. If the technique of reduction was violated or the wrong method of reduction was chosen, then there is a possibility of complications, for example, in the form of joint damage or chronic instability of the joint.

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