Early Restoration Of Upper Limb Function In Patients With Clavicle Fractures.

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ABSTRACT

Relevance. Clavicle fractures account for 10 to 19.5% of all musculoskeletal fractures and adverse outcome rates range from 12.5 to 33.3%. Despite the variety of treatment . methods developed, in most cases they are not effective enough and it takes a long time to restore the function of the upper extremity.

Purpose of the study: Analysis of the results of treatment of patients with clavicle fractures by comparative study of the results of treatment of intramedullary osteosynthesis with Ilizarov wires and an extramedullary plate.

Materials and Methods: Under our supervision in the Department of Emergency Traumatology of the Multidisciplinary Clinic of Tashkent Medical Academy, from 2021 to 2023, there were 52 patients with clavicle fractures, and the patients were divided into 2 groups: a comparison group and a main group. The comparison group included 28 patients who underwent intramedullary osteosynthesis with Ilizarov wires.The main group consisted of 24 patients and received osteosynthesis with an extramedullary plate.

Results: In the comparison group of patients, good results were achieved in 12 (48%) cases, satisfactory results in 8 (32%) cases and unsatisfactory results in 5 (20%) cases. In the main group, the results were good in 18 (78.3%) cases, satisfactory in 3 (13%) cases and unsatisfactory in 2 (8.7%) cases.

Conclusion: *Osteosynthesis with a bone plate allows early restoration of the functional state of the upper extremity, which is especially important for young people with an active lifestyle.*

Keywords: Collarbone, Osteosynthesis, Treatment.

Relevance. Clavicle fractures account for between 10 and 19.5% of all musculoskeletal bone fractures [3; 1; 2]. They most often occur in the diaphyseal and proximal part of the clavicle and occur in young people who lead an active lifestyle.For this reason, there are increased requirements for the quality of treatment and the timing of social rehabilitation of patients with such fractures. Despite the variety of treatment methods available, both conservative and surgical, errors and complications in the treatment of such injuries occur in 12.5% - 30.5% of cases [10; 8; 15].

The proportion of unfavorable results when using a conservative treatment method is between 12.5% and 33.3% [11; 9]. At the initial stage of treatment (first 15 days), the most common complications are: secondary displacement of fracture fragments; Brachial plexus compression; the appearance of abrasions and diaper rash on the skin; Pressure from bandages [4].

In the late period of treatment, the following complications are possible: improper fusion with deformation of the clavicle and a pronounced cosmetic defect due to unsuccessful primary reduction or secondary dislocation of fragments; irritation of the brachial plexus; delayed healing of the fracture (consolidation);Formation of isbitochnoy bone tissue (bone callus); lodge system; ogranichenie podvijnosti v plechevom sustave; Synostosis akromialnogo kontsa klyuchitsy s klyuvovidnym otrostkom lopatki [16;3; 17].

When analyzing literaturenyx istochnikov vidno, chto, nesmotrya na raznoobrazie raznoobrazie razrabotannyx metodov lecheniya, oni v bolshinstve sluchaev okazyvayutsya dosmatochno effectivenymi i trebuyut prodolzhitelnogo vremeni dlya vosstanovleniya funkktsii verkhney konechnosti.The main focus is on eliminating contractures in adjacent joints and restoring muscle mass. Therefore, there is a great need for improved quality of care and faster social rehabilitation for patients with clavicle fractures.

Purpose of the study.

Analysis of the results of treatment of patients with clavicle fractures by comparative study of the results of treatment of intramedullary osteosynthesis with Ilizarov wires and an extramedullary plate.

Materials and methods.

From 2021 to 2023, 52 patients with clavicle fractures were cared for by us in the Department of Emergency Traumatology of the Multidisciplinary Clinic of the Tashkent Medical Academy.Of these, 39 were men and 13 women. The age of the patients ranged from 20 to 52 years, the mean age was 32 ± 1.1 years. Of these, 32 (61.5%) patients were domestic injuries, 18 (34.6%) patients were injured in traffic accidents, and 2 (3.9%) patients sustained injuries at work. According to the AO/ASIF classification (2018)[12], the fractures were distributed as follows: A– 28; B-14; C – 8. All fractures were closed.

To analyze the effectiveness of the treatment, patients were divided into two groups depending on the technique used: a comparison group and a main group. The comparison group included 28 patients who underwent intramedullary osteosynthesis with Ilizarov wires.

The main group consisted of 24 patients and received osteosynthesis with an extramedullary plate.

When patients were admitted to the emergency department after clinical and radiographic examination, the upper extremity was fixed with a plaster cast such as a harness and a scarf splint. After stabilization of the condition, one or another variant of osteosynthesis was carried out 1 to 5 days after the injury.To prevent hypostatic pneumonia, physiotherapy courses were conducted. On days 2–3 after surgery, patients began to become more active (physiotherapy, breathing exercises, and pressure ulcer prophylaxis were performed). In patients who underwent intramedullary osteosynthesis with wires on the 2nd or 3rd day, the damaged upper limb was fixed with a plaster cast like a harness for 8 weeks after the operation. For patients who underwent extramedullary osteosynthesis with an extramedullary plate, the damaged side of the limb was fixed with a scarf bandage for 2 weeks and passive and active movements were performed in all joints of the upper limb on the damaged side.

To determine the effectiveness of osteosynthesis for clavicle fractures, we evaluated the treatment results using a comparative study of recovery of upper limb function (contracture in adjacent joints, muscle atrophy) and complications (migration of metal structures, suppuration after an operation wound, etc.) and long-term treatment outcomes were measured using the Mattis System E.R.[5] examined.

Results.

In the comparison group of patients who underwent intramedullary osteosynthesis with wires, various complications were observed: the formation of a regional edema-pain syndrome in 2 patients, a superficial and deep infectious-inflammatory process after the surgical wound in 3 patients, migration of fixation wires in 11 patients. Migration of wire fragments occurred most often after the restoration of passive and active movements in

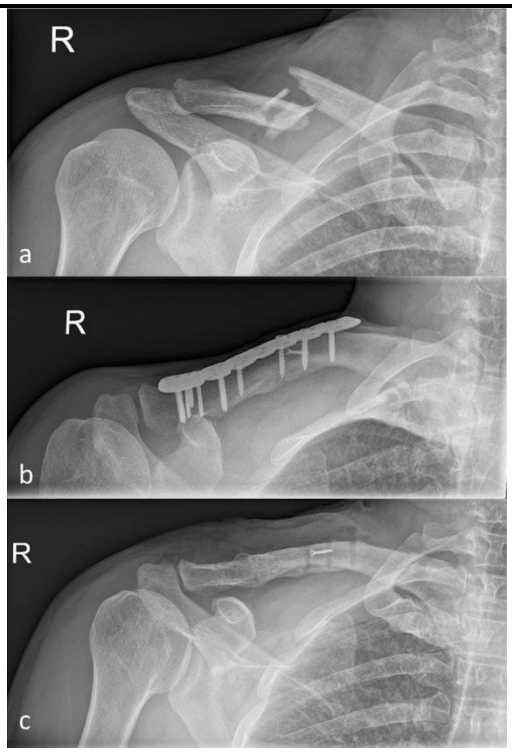
the shoulder girdle for 3 weeks after surgical treatment and was complicated by cellulitis of subcutaneous tissue or perforation of the skin. After 12 weeks, one patient suffered a wire break with migration into the pleural cavity and damage to the left lung apex. Together with thoracic surgeons, an urgent videotracoscopic examination and removal of the migrated wire, suturing of the tip of the left lung wound and a hematoma from the pleural cavity were carried out. The postoperative period went smoothly and without complications. After removal of the plaster cast, 19 patients experienced stiffness in the shoulder joint. Delayed consolidation was observed in 3 patients.

In the main group that underwent osteosynthesis with an extramedullary plate, the following complications were observed: Migration of screws – in 2 (11.1%). Screw migration has been observed due to excessive physical activity or during rehabilitation in the presence of fracture consolidation.Migration of the structures did not result in secondary gross displacement of the fragments and did not require repeat osteosynthesis of the clavicle. However, the migration posed a risk for the development of soft tissue pressure ulcers and the subsequent development of a fistula. One week after removal of the structure in the area of the unstable screw, a new fracture occurred in 1 patient, requiring retreatment.After osteosynthesis with an extramedullary plate, migration of fixators and recurrent fractures were not observed, residual pain syndrome was less common (11.1%) and less pronounced. One patient had a thrombosis of the subclavian vein. After adequate therapy together with vascular surgeons, the patency of the subclavian vein was restored.

Long-term treatment outcomes were assessed in 48 (67.4%) patients over a period of 1 to 2 years; the results were evaluated using the E.R. method. Mattis. In the comparison group of patients, good results were achieved in 12 (48%) cases, satisfactory results in 8 (32%) cases and unsatisfactory results in 5 (20%) cases, which was due to nonunion. In the main group, the results were good in 18 (78.3%) cases, satisfactory in 3 (13%) cases and unsatisfactory in 2 (8.7%) cases. The unsatisfactory outcome was due to patients' noncompliance with the orthopedic regimen and early severe labor.

Clinical example.

Patient A., born in 1994 The patient was admitted to the emergency room of the TMA Multidisciplinary Clinic with complaints of severe pain in the area of the right shoulder girdle. From his anamnesis it is known that he fell from his bicycle 1 hour before admission. After an examination by a traumatologist in the emergency room under the ATLS protocol (radiography, ultrasound, minimum clinical laboratory examination), the diagnosis was made: a closed comminuted fracture of the middle third of the right clavicle with mixed bone fragments. Abrasion of the right elbow joint. According to AO (2018) classification – 15.2C (Fig. 1, a.). After clinical and radiological examination and exclusion of damage to internal organs, the right upper limb was fixed with a gusset splint. After preparing for surgery, the patient underwent osteosynthesis under general anesthesia with an extramedullary plate of the right clavicle (Fig. 2, b).The next day after the operation, the patient was prescribed a series of rehabilitation measures, exercise therapy: to restore the function of the upper extremity, with the aim of eliminating contractures in neighboring joints and muscle atrophy.The postoperative phase was uneventful and the patient was discharged from the hospital on the 5th day in satisfactory condition. At a follow-up examination after 12 months, the X-ray image (Fig. 3, c) shows complete restoration of the anatomical structure. During the functional examination, no restriction of movement in the shoulder joint and no muscle atrophy were found. The treatment result was assessed as good.



Discussions.

Although the osteosynthesis method using wire bundles has advantages such as less invasiveness and shorter operation time compared to the use of plates and other constructs, it also has some disadvantages. It does not provide sufficiently rigid stability and requires external immobilization and constant monitoring. Complications such as wire migration are common. As a result of such complications, arthrosis of the joint may develop, accompanied by calcification of the ligaments, osteolysomacromion (upper part of the scapula) and dislocation in the joint. Osteoarthritis and pain can be observed in 52% of patients [14]. In addition, long-term use of a plaster cast for fixation may lead to limited mobility of the shoulder joint, requiring long-term rehabilitation treatment [7].

The method of external osteosynthesis using plates is being actively introduced into the practice of surgical treatment of clavicle fractures. This method ensures rapid recovery of the functional status of the limb, despite the need for extensive mobilization of the fracture site and the associated trauma. This is particularly important for young people who lead an active lifestyle [6; 13].

Conclusions.

Thus, osteosynthesis with a bone plate allows for early restoration of the functional state of the upper extremity, which is especially important for young people with an active lifestyle. A comparative analysis of the results of osteosynthesis of diaphyseal clavicle fractures using standard plates shows more favorable results.

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