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TREATMENT OF PATIENTS WITH INTERTIBIBIAL SYNDESMOSIS DAMAGES (LITERATURE REVIEW)

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Abstract: Treatment of patients with ankle fractures with tibiofibular syndesmosis rupture is an unresolved problem of modern traumatology. The classification, history of the development of conservative and surgical treatment of ankle joint injuries with a detailed analysis of structures, types, as well as complications in their use is presented.

Keywords: ankle joint, tibiofibular syndesmosis, internal osteosynthesis, external fixation apparatus.

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Relevance. One of the most common pathologies in the practice of a doctor traumatologist-orthopedist are injuries of the ankle joint (AJ), accounting for up to 20% of injuries of the musculoskeletal system. According to statistics, the incidence of ankle fractures averages 100–120 cases per 200,000 population per year. From 54.1 to 84.6% of ankle fractures with rupture of the MBS occur in young and able-bodied individuals population [1–3].

Despite the fact that modern traumatology has a large arsenal of methods for treating patients with ankle fractures, accompanied by rupture of the tibiofibular syndesmosis (IBS), among the treatment outcomes of this category of patients from 3.0 to 53.7% there are ankle joint contractures, improperly fused ankle fractures, false joints , chronic subluxations of the talus with diastasis between the tibia in the area of the MJ, deforming arthrosis of the damaged AJ [4–6]. To form a clear approach to treatment, all fractures of the ankle joint are divided into stable and unstable. The ankle fork is conditionally taken as a ring consisting of three bones and ligaments connecting them.

Since these ligaments are practically inextensible, a single injury to the ring, for example, an isolated fracture of the lateral malleolus, which accounts for up to 85% of ankle fractures, cannot lead to anteroposterior, or lateral, displacement of the talus and is thus stable [5–6]

According to a number of authors, damage to the ring in two places, which can be represented either a fracture of both ankles, or a fracture of one ankle and a rupture of one of the groups of ligaments, is unstable and accounts for 15% of ankle

fractures. The above scientists also include all two- and three-malleolar fractures in this group, taking into account that ligament damage is equivalent (often more severe) fracture of the ankle. With conservative treatment of patients with ankle fractures, accompanied by rupture of the MJ, unsatisfactory results occur from 6.6 to 23.4% of cases.

This is due to the fact that after the closed manual reposition of ankle fragments and their external fixation with plaster or polymer dressings, the displacement of fragments and diastasis between the tibia in the MBS area often remain.[7–9].

K.V. Shevyrev (2004) notes that of all patients with fractures of the ankles treated conservatively in need of reconstructive operations in the AJ, 58% of patients had a history of fractures of the ankles with rupture of the tibiofibular syndesmosis. The frequency of unsatisfactory results after surgical treatment of ankle fractures with rupture of the IBS ranges from 4.8 to 19.3% of cases [10–11].

Fixation of the syndesmosis with “rigid” or “elastic” submersible structures that fasten the tibia bones together in the area of the MJ often leads to a strong compression of the talus block between the tibia, which limits the movement of the talus in the “fork” of the AJ, provokes the development of osteoarthritis in the damaged AJ and pain [12–13]. Domestic and foreign authors believe that after the surgical treatment of ankle fractures with rupture of the MJ, from 24 to 52% of cases of diastasis between the tibia in the MJ cannot be eliminated, the need for reoperation arises from 2.1 to 20% of cases [14– 16].

An analysis of the frequency of people recognized as disabled for the first time after ankle fractures showed that patients with ruptured MJs dominated among them, ranging from 3.1 to 36.7% [17–18]. The variety of injuries in the ankle joint led to the creation of many classifications. Modern classifications of ankle fractures can be divided into three main groups.

1. Classifications based on the anatomical signs of injuries in the ankle joint. There are unimalleolar fractures (fracture of the inner or outer malleolus), bimalleolar and trimalleolar fractures [19].

2. Classifications based on the mechanism of injury. There are ankle fractures abduction (pronation), adduction (supination) and rotational (eversion and inversion). A common disadvantage of classifications based on the mechanism of injury is the inconsistency in the terms that characterize the movement of the foot and the inability to determine the tactics of treatment [20].

3. Classifications based on fracture severity. These classifications take into account the level of fibula fracture and ankle stability [21].

A retrospective analysis of the literature available to us shows that the study of MJS injuries that complicate the course of ankle fractures is one of the most

important issues in the diagnosis and treatment of AJ fractures and dislocations. Evidence of this is the creation of classifications of MBS damage by various authors.

S.N. Khoroshkov (2006) notes that the nature of the damage to the MBS in ankle fractures can be ligamentous, bone-ligamentous and bone. In our work, we used the AO/ASIF classification adopted by the SICOT Congress in Montreal in 1990 as an international one.

The three types of ankle fractures are labeled A, B, C: each type is subdivided into three groups. Each group is divided into three subgroups, marked with numbers 1, 2, 3. Classification of ankle fractures is made in order of increasing severity of fracture, difficulty of treatment, prognosis. Fractures of the ankles with rupture of the MBS are classified as type C.

Conservative treatment. The main advantages of the conservative method of treating patients with fractures of the ankle joint with plaster or polymer dressings are economic and technical accessibility, ease of application and patient mobility.

Methods for closed reposition of fractures do not require invasive intervention, indirect manual or hardware reposition of ankle fragments is performed without damage to the skin, soft tissues, blood circulation is maintained not only in soft tissues, but also in bone fragments, with the risk of infectious complications is minimal.

Some authors propose to perform manual reposition with a plaster cast immediately upon admission to a hospital or emergency room, despite the developed post-traumatic edema [22–23].

In their opinion, this is due to the fact that in the first hours after the injury there is no muscle retraction, which makes it possible to compare the fragments without significant physical effort, and the exact reposition of the fragments of the damaged limb segment contributes to the early subsidence of post-traumatic edema.

Others insist on the delayed application of a plaster cast after the subsidence of post-traumatic edema, justifying this by the fact that it is easier and better performed on a non-edematous limb [24–25].

V.V. Klyuchevsky and Yu.A. Filimendikov (2002) advocate a method for delayed reduction of ankle fractures. After elimination of dislocations of the foot, a tubular mesh bandage is put on the injured limb up to the middle third of the thigh. At the fingertips, a mesh bandage is tied in a knot, and the foot is suspended on a spring from the Balkan frame. The thigh is placed on the Beler splint, the foot and lower leg remain suspended. In the suspended position of the foot and lower leg, after reduction of the dislocation or subluxation of the talus, the possibility of active movements in the damaged AJ remains, which contributes to the improvement of microcirculation and lymphatic drainage of the injured limb [26].

After subsidence of post-traumatic edema, after 5–6 days, the final reposition of ankle fragments is performed with the imposition circular plaster bandage "boot". This technique made it possible to reduce the secondary displacement of fragments to 1.72%, but its significant drawback is the need for forced bed rest.

Many authors prefer a “U”-shaped plaster cast up to the upper third of the lower leg [27], with a change to a circular “boot” plaster cast after edema decreases

A plaster bandage that fixes the knee joint, according to the authors, is more reliable for the prevention of secondary displacements. Since flexion of the knee joint to 110 ° reduces the tension of the calf muscles involved in the formation of the Achilles tendon. After 3–4 weeks, the bandage is shortened to the knee joint [28]. Inaccurate reposition of ankle fractures in 6–17.8% of cases leads to their incorrect healing, from 2.1 to 11% of cases – to the formation of a false joint of the medial malleolus [29].

Operative treatment. Currently, the priority treatment for ankle fractures with torn MJs is surgery. For osteosynthesis of fractures in the ankle joint, a large number of metal fixators of various designs have been developed and introduced into practical healthcare. According to Russian researchers, the frequency of surgical treatment of ankle fractures with torn MJs ranges from 39.1% to 63.1% of patients [30].

M. Gris et al. (2005) used “P”-shaped steel staples for osteosynthesis of the medial malleolus fracture. In the treatment of damage to the deltoid ligament, there are works in the literature that reflect diametrically opposed opinions. Thus, according to [31], a rupture of the deltoid ligament does not require surgical repair if the damaged ligament has not been interpositioned into the medial AJ joint space.

A.A. Radjabov, Sh.A. Baimagambetov (2006) consider the restoration of the damaged deltoid ligament to be an obligatory step in the surgical intervention.

R.S. Titov (2008) recommends using a wire loop to increase the strength of fixation in osteosynthesis of a fracture of the medial malleolus with knitting needles.

A.B. Kazantsev et al. (2008), P.P. Chekeres (2010), during a clinical study, revealed a significant deterioration in the outcomes of surgical treatment in a group of patients who did not undergo deltoid ligament suture.

For fixation of suprasyndesmotic fractures of the fibula in fractures of the ankles with torn MJs, in most cases, osteosynthesis with plates is used. Stabilization of the “fork” of the GSS in this case is achieved only by introducing a position screw at the level of the MBS [32]

M.S. Kuvin (2002) used lavsan threads woven in a “pigtail” to stabilize the MBS. With a drill, three channels are formed in the fibula and tibia, through which

a lavsan "pigtail" is passed, fixed with biopolymer hairpins. Elimination of tibiofibular diastasis was carried out using the author's intertibial syndesmosis reponator, carried out over the MBS.

In recent years, in the surgical treatment of ankle fractures with rupture of the MJ, stabilization of the MJ with a position screw has become widespread. As a positioning screw, some authors use a cortical screw with a diameter of 3.5 mm, while others use 4.5 mm [33-35].

Currently, more than 50 modifications of external fixation devices (EFDs) are used abroad and in our country. The method developed by G.A. Ilizarov and his students in 1951, won worldwide recognition.

It was on the basis of spoke devices in 1972 that G.A. Ilizarov published a method for repositioning and fixing the tibia in case of damage to the DMS using pins with a thrust platform passed through the tibia at the level of the DMS. The accumulated extensive experience in the use of compression-distraction devices using pins shows that this method has a number of significant advantages.

Simultaneously, suppuration of soft tissues in the area of the pins was noted in 13.6–21.3% of cases. Osteomyelitis in the places where the wires are held also accounts for 2.7-6.4% of cases, bleeding from the wound channels around the wires is observed in 3.5-4% of cases, as well as pain, persistent edema, pathology of internal organs that develop as a result of damage to the nerves and their receptors. Some authors attribute these complications to damage by irritation of biologically active points [36].

Despite the advances made in medical science in recent decades, the introduction of various new technologies into traumatology, patients with ankle fractures with ruptured MJs often experience unsatisfactory treatment results, which often leads to their disability. This causes significant economic damage to society, determines the medical and social relevance of this problem.

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