FEATURES OF SURGICAL TREATMENT OF INJURIES OF THE ZYGOTOORBITAL COMPLEX

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Abstract

In 2023, treatment was provided for 34 patients diagnosed with fractures of the zygomatico-orbital complex. Limited upward mobility of the eyeball was observed in 5.9% of cases, while 8.8% of patients reported minor postoperative cosmetic defects. Following surgical intervention, 85% retained a minimal residual enophthalmos and hypophthalmos of 1 mm, with 15% exhibiting more than 1 mm. The application of advanced diagnostic methods and surgical techniques enabled the delivery of effective medical care for zygomatico-orbital complex injuries.

Keywords: *fractures of zygomatico-orbital complex, orbit damage, orbital titanium lattice non-oven material with a through porosity, eliminating dystopia of the eyeball.*

Introduction

Zygomatico-orbital complex (ZOC) fractures are one of the most common types of facial fractures, often resulting from trauma such as vehicle accidents, sports injuries, or falls[1]. These fractures typically involve the zygomatic bone, orbital floor, and lateral orbital rim, leading to both functional and aesthetic issues [2]. The clinical presentation includes symptoms like bruising, swelling, diplopia, and limited eye movements, and can severely affect vision and facial symmetry [3]. Diagnosis is often made through advanced imaging techniques like computed tomography (CT), which allows for precise evaluation of the fracture [4].

Treatment of ZOC fractures requires a surgical approach to realign the bones and restore both the form and function of the face [5]. **Early intervention** is crucial for optimal recovery and aesthetic outcomes [6]. Minimally invasive surgical techniques, using plates and screws or resorbable materials, are often employed to achieve a successful repair [. These methods have shown to reduce recovery time and improve the cosmetic result significantly [8].

In managing complex ZOC fractures, it is essential to consider the anatomy of the orbital region and the intricacies of the surrounding structures [9]. Understanding these complexities can help surgeons prevent complications and ensure the proper alignment of the fracture [10]. The combination of surgical expertise and advanced

imaging techniques has significantly improved the outcomes of patients with ZOC fractures [3]. Moreover, the postoperative care and follow-up play a key role in ensuring the recovery and minimizing the chances of complications [2].

Materials and methods of the study.

The object of the study was 34 patients who applied to the maxillofacial surgery department of the multidisciplinary clinic of TashMA in 2024 with a referral diagnosis of "zygomatico-orbital complex fracture". Of these, 23 patients were treated with a diagnosis of "post-traumatic deformity of the midface", 11 with a diagnosis of "zygomatico-orbital complex fracture".

All patients underwent radiography of the facial skull in two projections, spiral computed tomography was performed according to indications. A complete ophthalmological examination was also carried out, including: checking visual acuity, autorefractometry, determining the mobility of the eyeball, assessing pupillary reactions, perimetry, determining the position of the eyeball in the orbit (exophthalmometry, determining hypophthalmos), Hess test, Amsler test, examination of the fundus, if necessary, OCT. In 82.4% (28 patients), the initial visual acuity was 0.7±0.05; in 17.6% (6 patients) — 0.1±0.05. Limited mobility of the eyeball was noted in 20.6%. Changes in the position of the eyeball (enophthalmos, hypophthalmos) — in 100% of cases (from 1 to 5 mm). Diplopia — in 94.1%.

The main attention was paid to the reconstruction of the destroyed bone walls of the orbit, which, of course, is the primary guarantee of obtaining a good treatment result. In order to eliminate defects and deformations of the orbital walls, many options for the material used have been proposed, such as: allograft bone, cartilage, synthetic and silicone material, etc. To restore bone defects of the orbit and eliminate enophthalmos, we use a specially made orbital mesh made of non-woven titanium material with through porosity. The best treatment outcomes in the restoration of the zygomatic-orbital complex are achieved by installing a titanium implant with through porosity (MP), which is installed using electromagnetic navigation systems. A prerequisite for high clinical effectiveness is the surface structure that ensures bone ingrowth.

To bring the eyeball to a more correct position in the orbit during surgery, we use an exophthalmometer, which allows us to control the position of the eyeball in the frontal plane. To control the vertical axis, we used a device for determining the position of the eyeball in the orbit.

To reduce post-traumatic edema of the retrobulbar tissue, prolonged-release glucocorticosteroids were administered (intraoperative retrobulbar administration of a 0.5 ml diprospan solution). In the postoperative period, all patients received anti-inflammatory (intramuscular "Diclofenac" 3.0 ml), antibacterial treatment

(intramuscular "Cefazolin" 1.0 ml), and were also prescribed drugs from the diuretic group (intramuscular "Lasix" 1.0 ml).

Results of the study.

In 2023, 27 patients underwent surgeries: correction of deformation, reposition of fragments, osteosynthesis with titanium plates and meshes made of non-woven titanium material with through porosity; 7 patients underwent surgeries: reposition of fragments, fixation using intraosseous osteosynthesis with a pin.

In 2 patients (5.9%), there was limited upward mobility of the eyeball and in 3 patients (8.8%) - minor cosmetic postoperative defects, impaired sensitivity of the skin of the infraorbital region of the damaged area, which was subsequently restored within 4-6 months.

After the surgery, 29 patients (85%) had minor residual enophthalmos and hypophthalmos by 1 mm, which is physiological. Patients did not actively complain of double vision, the Hess test was negative. In 5 patients (15%), enophthalmos greater than 1 mm was detected, a decrease in diplopia was noted compared to the preoperative period, the Hess test was positive.

Diprospan solution was administered to 8 patients out of 34, all patients noted a subjective decrease in pain syndrome in the postoperative period.

After the introduction of prolonged-release glucocorticosteroids, non-steroidal anti-inflammatory drugs, and diuretics into the treatment regimen, the average bed day decreased by 3 days and amounted to 11 days in 2023, compared to 14 bed days in 2022.

Discussion.

Fractures of the zygomatic-orbital complex are currently one of the most common types of fractures among injuries to the bones of the facial skeleton. The use of a mesh made of non-woven titanium material with through porosity allows us to avoid soldering the soft tissues of the orbit, including the muscles of the eyeball, with the plate, which reduces the likelihood of limitation of eyeball movement in the remote period. This is due to the specific thickness and porosity of this mesh. Using an exophthalmometer and a device for determining the position of the eyeball in the orbit, we can most accurately bring the eyeball into a physiologically correct position during the intraoperative period, which reduces the risk of new complaints or eliminates the persistence of previous ones for diplopia.

Retrobulbar administration of prolonged-release glucocorticosteroids during the intraoperative period and the inclusion of non-steroidal anti-inflammatory drugs in combination with diuretics in the postoperative treatment regimen reduces pain and shortens the course of the postoperative period for the patient, which is undoubtedly a positive indicator. The treatment complex we offer minimizes the risk of complications such as diplopia, and accordingly increases the effectiveness of surgical treatment of

patients with traumatic injuries of the zygomatico-orbital complex, which helps improve the quality of life of patients with this type of pathology.

Conclusion.

Fractures of the zygomatico-orbital complex are accompanied by displacement of the eyeball. To bring the eyeball into the correct position during surgery, we propose using a device for determining the position of the eyeball in the orbit relative to the vertical plane, a Hertel exophthalmometer relative to the frontal plane. A mesh made of non-woven titanium material with through porosity can be used as a plastic material for creating the lower wall of the orbit. To reduce swelling of the retrobulbar tissue in the postoperative period, intraoperative retrobulbar administration of prolonged-release glucocorticosteroids (Diprospan 0.5 ml) is advisable. In the postoperative period, it is advisable to use non-steroidal anti-inflammatory drugs (Diclofenac 3.0 ml daily for 5 days), diuretics (Lasix 1.0 ml for 3 days).

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