



**A CASE OF SUCCESSFUL TREATMENT OF TRANSORBITAL
PENETRATING DAMAGE TO THE SKULL AND BRAIN.**

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Abstract: Penetrating wounds of the skull and brain belong to the category of severe injuries, often leading to permanent disability and death. In this article, we describe a case of successful surgical treatment of rare penetrating transorbital damage by a metal foreign body to the cerebral hemisphere in a 20-year-old patient without neurological deficiency.

Keywords: penetrating wounds of the skull and brain, metallic foreign bodies, transorbital wounds.

Traumatic brain injuries occupy a leading place among other types of mechanical damage and are characterized by a high frequency of various consequences and complications. Injuries to the skull and brain predominate among people aged 20-49 years, i.e. in the most active category of the population[1,4]. The high frequency and high mortality in head injuries of the active population emphasizes the socio-medical significance of traumatic brain injuries.

One of the urgent tasks of modern neurotraumatology is the treatment of victims with penetrating traumatic brain injuries. Penetrating wounds of the skull and brain by metal foreign bodies of complex configuration are rarely observed. There are no recommendations in the literature concerning the diagnosis and tactics of surgical and conservative treatment of this group of patients. Unlike gunshot craniocerebral wounds, injuring metallic foreign bodies do not have high kinetic energy and, penetrating into the cranial cavity, cause destruction mainly of the craniofacial and craniobasal areas [3]. These patients are mainly

hospitalized in multidisciplinary hospitals, where the treatment tactics are jointly determined by neurosurgeons, maxillofacial surgeons, ophthalmologists and otorhinolaryngologists[2].

DESCRIPTION OF THE CLINICAL CASE.

Patient T.H., 20 years old (case history No. 22169/1631), was taken by passing motor transport on 03.11.2018 at 17-05 to the emergency department of neurotraumatology to a neurosurgeon with the presence of a metallic foreign body in the right eye area. The patient complains of headache, dizziness, nausea, vomiting and the presence of a wound in the upper eyelid of the right eye.

From anamnesis: when performing construction work, he fell from a height of = 2 meters on the rebar. He was taken to the hospital by a passing car. Considering the severity of the condition, the patient was hospitalized in the neuro-intensive care unit.



Figure 1. The patient at admission to the hospital.

Objective examination: the general condition of the patient of moderate severity. The skin and visible mucous membranes are pale pink. Breathing is even, independent. BDD – 20 times in 1 minute. The heart tones are muted. Pulse – 110 beats/min. A /D 100/60 mmHg. The tongue is clean, moist. The belly is soft, painless.

Neurological status: Degree of disturbance of consciousness – deep stunning. He answers the questions asked reluctantly, in monosyllables. GCSH – 12 points. The left pupil is of normal size, the photoreaction is preserved, due to the inability to lift the upper eyelid, the right pupil could not be examined. The face is symmetrical. Facial expressions are preserved. Active movements in the limbs are preserved. Muscle strength in the extremities = 4 points. Tendon reflexes BR, TR, PR, ARD=S, are triggered. Babinsky's pathological reflex is positive from 2 sides. There are no meningeal signs.

Locally: there is the presence of a foreign metal object (armature), about 1 meter long, penetrating through the upper eyelid on the right in the direction of the cranial cavity. There is a soft tissue swelling in the frontal region, measuring 4.0 x 3.0 cm, under which the distal end of the foreign body is palpated.

Oculist: OD is a through wound of the upper eyelid. Enophthalmos. (are there really no bruises, hematomas of the iris, for example)

Neurologist: Severe open traumatic brain injury. Moderate brain injury.

Radiography of the skull in 2 projections - the presence of a penetrating metallic foreign body into the cranial cavity is noted. Signs of increased intracranial pressure.



Figure 2. X-ray of the skull in two projections.

Preliminary diagnosis: Catastrophe. Severe end-to-end traumatic brain injury. Bruising and crushing of the brain of severe severity. Perforated fracture of the upper wall of the right orbit and frontal bone with the presence of a metallic foreign body (armature). Destruction of the right eyeball. Post-traumatic shock of the II degree.

Blood test: Hemoglobin – 90 g / l, Erythrocytes 3.5×10^{12} g / l, Leukocytes - 7.0×10^9 , Hematocrit – 31%, ESR – 3 mm / hour.

Urine analysis: Color – straw yellow, transparency – full, Protein – abs, Bilirubin – negative, Epithelium (flat) – 1-2, Leukocytes - 4-5, salts – abs.

ECG – sinus rhythm, heart rate – 84 beats/min, Vertical el.the axis of the heart.

Biochemical blood test: Glucose-9.0 mmol/l, total.protein-78 g/l, Urea 5.6 mmol/l, Bilirubin total. 8.1 Mmol/l, straight-abs. Sijdik tah. Rangi-sarik. Tinikligi- tulik. Protein – abs. Lake-4-5. Epi-1-2.

An hour after admission, on 03.11.2018, "PHO wounds were made. RTCH of the right frontal area. Revision of the wound canal, removal of a foreign body, cerebral detritus and intracerebral hematoma of the right hemisphere of the brain under microscopic assistance."

The protocol of the operation is under general anesthesia, after appropriate skin treatment, a horseshoe-shaped incision was made in the projection of the exit opening of a foreign body in the right frontal-parietal region of the head up to 16 cm long. The soft tissues are edematous, imbibed with blood. A milling hole is placed next to the foreign body with a twist, which is expanded to 3.5×4.0 cm with the help of bone pliers. During the revision of the epidural space, damage to the TMF in the area of the exit opening and penetration of a foreign body into the brain substance is noted. A foreign body was removed through the upper eyelid. The depth of penetration of a foreign body into the substance of the brain is 15 cm . A revision of the wound canal was performed using a microscope, removal of blood clots and cerebral detritus by washing with warm saline solution and aspiration along the entire length of the wound canal. Hemostasis was performed by coagulation and using a 3% H₂O₂ solution. The area of fracture of the upper wall of the orbit is closed by a spongostane. The revision of the right eye was performed – there is a skin wound 2.0×0.5 cm on the upper eyelid. On examination, the right eyeball is not damaged, enophthalmos is noted. The oculist performed intraoperative ophthalmoscopy. Layered sutures on wounds. Iodine. Aseptic dressing.

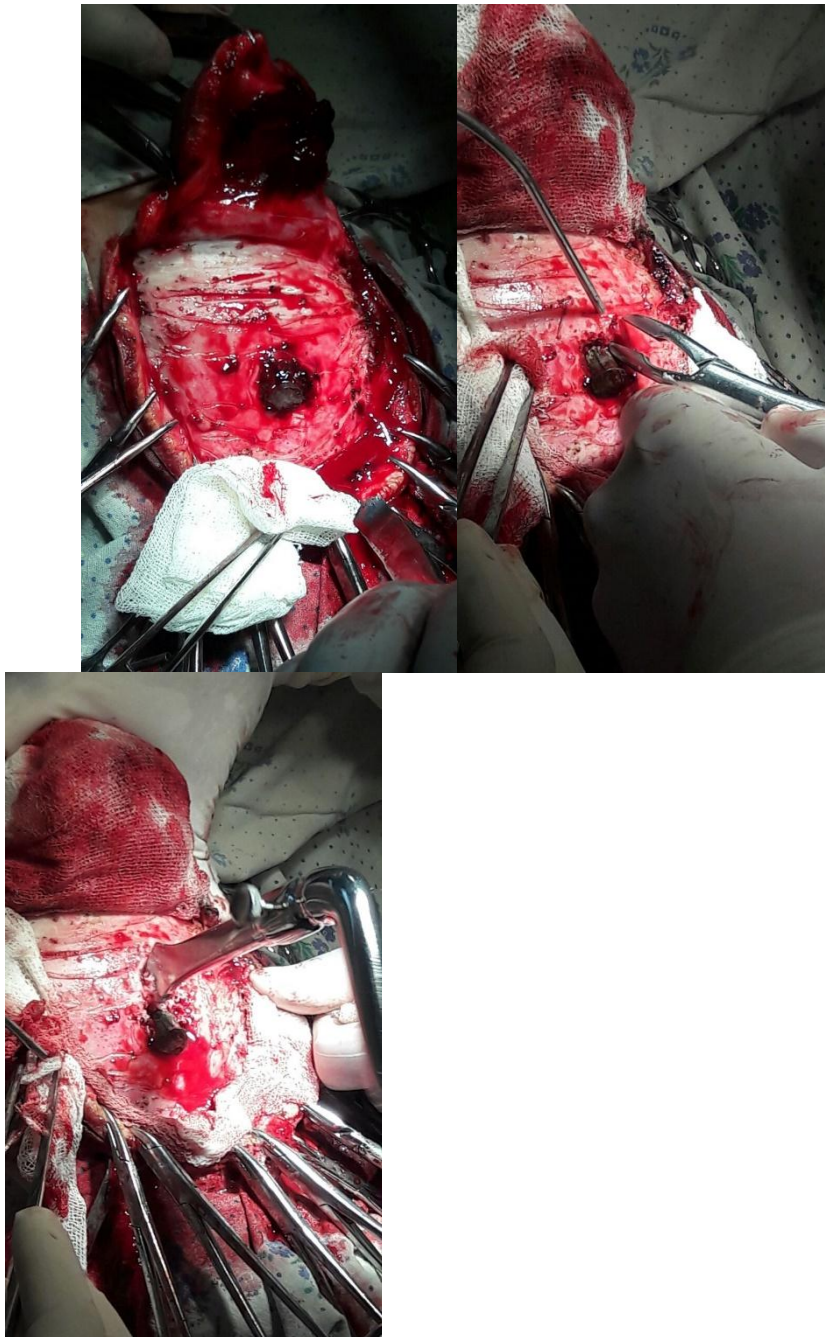


Figure 2. Stages of the operation.

Postoperative diagnosis: Cata trauma. Severe end-to-end traumatic brain injury. Severe bruising and crushing of the brain. A perforated fracture of the upper wall of the right orbit and frontal bone with the presence of a metal foreign body (armature) without damage to the eyeball. Post-traumatic shock of the II degree.

1st day after surgery: complaints of headaches, dizziness, nausea, pain in the right eye. The general condition of the patient of moderate severity. Breathing is even, independent. BDD – 20 times per minute. Auscultation – vesicular respiration in the lungs. The heart tones are somewhat muted, rhythmic. Pulse – 80 beats/min. Blood pressure 110/70 mmHg.

Neurological status: conscious, answers questions, executes instructions. GKSH – 13 points. The pupils are on the left of the usual size, the photoreaction is preserved, on the right, due to the presence of soft tissue edema, it was not possible to check. It is better to write: Pupils OD = OS. The face is symmetrical. Skin and tendon reflexes are caused by D=S. Active movements in the limbs are preserved. There is some rigidity of the occipital muscles. There are no pathological signs. Babinsky's pathological reflex (+/-) on both sides.

Locally: the postoperative wound in the frontal-parietal region is clean, without secretions. The wound was treated and an aseptic dressing was applied. The wound of the upper eyelid is edematous, without discharge. The wound has been treated, an aseptic bandage has been applied.

The patient was prescribed antibiotic therapy, dehydration, painkillers, neuroprotectors.

In the following days, the patient's condition is also stable, relatively satisfactory. There is no neurological deficit. Topically: the wounds are clean, without secretions. Daily wound dressing was carried out.

On 6.11.2018 (on the 3rd day after the operation), the patient was transferred from the neuro-intensive care unit. In dynamics, the patient's condition improves. There is no neurological deficit. The vision of the right eye is preserved. Wound healing is primary.

On the day of discharge, neurological status: the patient is conscious. SHKG = 15 points. Answers questions, follows instructions. Pupils D=S, photoreaction is preserved. The function of the oculomotor nerves is preserved. The face is symmetrical. Facial expressions are preserved. The tongue is in the middle line. Tendon reflexes BR, TR, PR, AR are called, D=S. There are no paresis, paralysis. Sensitivity is not impaired. Stable in the Romberg pose. Performs coordination tests correctly. There are no pathological signs.

Locally: healing of wounds of the soft tissues of the skull and upper eyelid is primary, there is no discharge.

Ophthalmoscopy: Vision of the right eye is preserved. The visual acuity of the right eye is 0.9, the left eye is 1.0. OU – ZN is pale pink, the boundaries are clear. The ratio of arteries and veins is 1.5 – 3.

On 14.11.2018 (11 days after admission), after the removal of stitches, the patient was discharged from the hospital in a relatively satisfactory condition to continue treatment at the place of residence under the supervision of a neurologist.

Conclusion.

1. All patients with penetrating injuries of the skull and brain should be hospitalized in specialized neurosurgical departments.

2. All victims with penetrating wounds of the skull and brain are recommended to perform CT in bone and soft tissue modes in axial projection. In patients with damage to the basal structures or the upper part of the cranial vault, it is advisable to perform CT in coronary or sagittal projections.

3. To plan surgical access for craniobasal wounds, it is advisable to perform 3D CT reconstruction.

4. Analog or digital craniography is useful in assessing bone injuries, the presence of air and radiopaque foreign bodies and radiopaque foreign bodies.

5. It is advisable to use MRI for injuries with non-magnetic objects.

6. This type of injury is severe, but with the timely provision of the necessary amount of surgical care, the absence of concomitant injuries and somatic pathologies, a favorable outcome can be predicted. In addition, the young age of the patient also contributed to early recovery after severe traumatic brain injury.

Thus, the issues of prevention, early diagnosis and timely surgical treatment of this category of patients remain relevant. The correct interpretation of the obtained results of X-ray and MSCT studies, the choice of optimal surgical access individually for each patient, compliance with surgical rules for eliminating the consequences of brain damage and adequate postoperative intensive therapy is the key to success in the treatment of this severe category of patients.



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