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ЭПИДЕМИОЛОГИЯ ПЕРЕЛОМОВ СТЕНОК ОРБИТ. РЕТРОСПЕКТИВНОЕ ИССЛЕДОВАНИЕ

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Аннотация

Переломы костей средней зоны лицевого скелета представлены множеством различных вариантов конфигурации зоны повреждения, а также различной степенью их тяжести. Переломы стенок орбит в структуре травматических повреждений краниофациальной зоны занимают особое место. В настоящее время существуют две основные теории возникновения данных переломов: Blow-out и Force transmission. Согласно первой, перелом стенок глазницы происходит при резком повышении интраорбитального давления, согласно второй, в основе механизма перелома лежит передача приложенной силы через наружные края глазницы непосредственно на более хрупкие ее стенки. Кроме того, у лиц молодого возраста в силу особенностей анатомического строения костной ткани, актуален механизм перелома стенок орбиты по типу «закрытой дверцы» (Trapdoor), когда происходит перелом без формирования костного дефекта, но содержимое глазницы пролабирует в щель перелома, где происходит его ущемление. Нередко в зону ущемления попадает и нижняя прямая мышца глаза, что является достаточно грозным осложнением.

По данным зарубежных авторов, переломы наружных краев и стенок глазниц встречаются более чем в 40 % всех случаев травм костей лицевого скелета. По данным отечественных авторов, частота переломов скулоорбитального комплекса и верхней челюсти составляет 12 и 8 % соответственно. Кроме того, сложность строения глазницы, а также близость расположения органа зрения могут вызвать определенные трудности как в диагностике, так и лечении данных пациентов.

В статье рассмотрены вопросы особенностей анатомического строения глазниц, а также эпидемиологии орбитальной травмы на основании статистических данных нейрохирургического отделения ЦГКБ № 23 г. Екатеринбурга за 2017 год.

Ключевые слова: *орбита, реконструктивная хирургия, перелом, черепно-челюстно-лицевая хирургия, сочетанная травма*

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FREQUENCY OF THE ORBITAL WALLS FRACTURES. A RETROSPECTIVE STUDY

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Summary

Midfacial fractures are presented by wide range of different patterns and severity. Orbital walls fractures have a special place in the structure of traumatic craniofacial injuries. Referring foreign authors, fractures of external rims and internal orbital walls are presented in more than 40 % of all bony injuries of facial skeleton. And referring Russian authors frequency of zygomatico-maxillary complex and isolated maxillary fractures presented by 12 and 8 % respectively. Furthermore complex anatomy of the orbit and proximity of the globe can occur some difficulties in diagnostics and treatment process of these patients. Today there are two main mechanisms of orbital walls fractures development – Blow-out, when fracture caused by increasing of intraorbital pressure, and Force-transmission, when force applied to external orbital rims transmits to a weaker orbital walls. Moreover in young patients Trapdoor mechanism is actual, which results in entrapment of soft tissues in the fracture line. Often there is an inferior rectus muscle entrapment and that is serious complication, when immediate surgery is required.

The article deals with issues of anatomical construction of orbit and orbital trauma epidemiology based on statistics of neurosurgical department of Central city clinical hospital № 23, Ekaterinburg, for 2017.

Keywords: *orbit, reconstructive surgery, fracture, craniomaxillofacial surgery, combined trauma*

Introduction

Midfacial fractures are quite often for patients with fractures of the facial skeleton. K. Kunz reports, that in more than 40 % of facial fractures orbital rims or internal orbital walls are involved showing different fracture patterns [2]. Injuries of zygomatico-maxillary and naso-orbito-ethmoidal complexes and their combinations demonstrates great variety between orbital fractures from simple ones to more difficult comminuted [1, 13]. In simple cases single-wall "blow-out" fractures are common and more frequent. Nevertheless, surgeon should remember that the orbit is complex 3D-structure and need extra-precision in reconstruction [5, 6, 8, 10, 11, 14].

Theory

Due to anatomic features of bony orbit, frequency of orbital fractures is differ between its regions. Orbit is presented as pyramidal cavity, formed by 7 different bones [10]:

- lateral wall presented by greater wing of sphenoid bone and orbital surface of zygomatic bone. Both of them are quite massive and any fracture of lateral orbital wall will be accompanied with injury of zygomatic component [12, 17, 21];
- medial wall consists of lacrimal bone and orbital plate of ethmoidal bone called "lamina papyracea" because of its small thikness;
- lower wall (orbital floor) presented by orbital surface of maxilla and orbital process of palatal bone in distal portion [2]. Orbital floor is quite fragile structure, which don't have any reinforcements by complex bony parts as medial wall for example, what explains prevalence of orbital floor fractures over other ones [4];
- upper wall (orbital roof) formed by orbital surface of frontal bone and lesser wing of sphenoid bone in distal parts;
- apical part of orbit is the point of exit of the optical nerve and phylogenetically presented as massive structure, formed by lesser wing of sphenoid bone.

Between forming parts of orbit there are several important anatomical spaces:

- between lateral and upper walls there is upper orbital fissure which connecting orbital cavity with middle cranial fossa;
- there is lower orbital fossa located on a border between orbital floor and lateral wall, connecting orbital cavity with pterygopalatine fossa and subtemporal fossa [22, 19].

S-shape of orbital floor is the key-factor of globe positioning in orbital cavity and it's very important to restore orbital volume to avoid the globe dislocation (fig. 1), also surgeon during the orbital floor reconstruction must remember that's there is an infraorbital nerve near it [16, 18, 20, 23—25];

- external orbital rims are massive structures consists of frontal, zygonamic bones and maxilla, and it's strategically important point for comminuted fractures reconstruction [3, 9].

Due to the anatomical features, functional and aesthetic significance of this area, fractures of the midface, especially orbital fractures, epidemiology of traumatic injuries in this localization has special interest [4, 7, 9, 15].

Data and methods

We are performed a retrospective analysis of medical documentation of 190 patients males and females aged from 18 to 65 years old with isolated and concominant injuries of cranio-maxillofacial region, hospitalized in neurosurgical department of Central City Clinical Hospital № 23 in Ekaterinburg city. Received data was statistically processed using Microsoft Office Excell 2010 software.

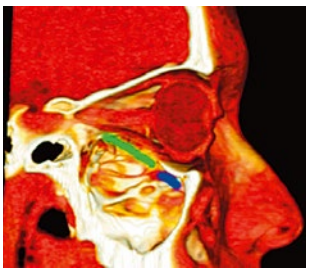

Fig. 1. S-shape of orbital floor (sagittal slice)

Рис. 1. С-образная форма нижней стенки орбиты (сагиттальный срез)

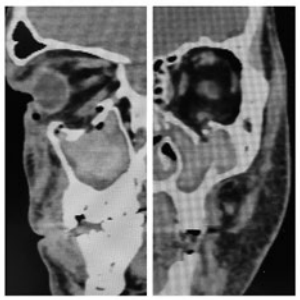

Fig. 2. Total post-traumatic defect of orbital floor

Рис. 2. Тотальный посттравматический дефект нижней стенки орбиты

Results

During the study, a retrospective analysis of medical documentation of 190 male and female patients aged from 18 to 65 years old who were hospitalized and treated at the neurosurgical department of the Central City Clinical Hospital № 23 with isolated and combined traumatic injuries of the facial skeleton, especially with orbital injuries, was performed for the period from 01.01.2017 to 12.31.2017.

The sample is presented by patients with isolated fractures of the orbital floor, medial wall, combined fractures of the orbital floor and zygomatico-maxillary complex, orbital walls and anterior cranial fossa, fractures of orbital walls and maxilla/mandible. The results of the study are presented in table.

From the obtained results follows, that the most frequent variant of orbital injury is an isolated orbital floor fracture (68 cases, fig. 2), as well as a combination of orbital floor fracture with the zygomatico-maxillary complex (59 cases). Combined fractures of orbital walls and anterior cranial fossa (4 cases) were less frequent.

Table

Frequency of isolated and combined orbital fractures

Табл. ***Частота встречаемости изолированных и сочетанных переломов стенок орбит***

Fracture localization	*Quantity of patients*
Orbital floor	68
Medial orbital wall	19
Orbital floor and zygomatico-maxillary complex	59
Orbital walls and mandible	20
Orbital walls and maxilla	20
Orbital walls and anterior cranial fossa	4

Conclusion

1. Considering the features of the orbital anatomy, as well as the aesthetic significance of this area, the correct and well-timed surgery of orbital fractures have a great importance in the comprehensive rehabilitation of patients with traumatic injuries of the facial skeleton.

2. According recieved data from retrospective study, isolated orbital floor fractures, as well as a combination of orbital floor and zygomatico-maxillary complex fractures are the most frequent.

3. Less frequency showed by combined fractures of orbital walls and anterior cranial fossa.

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