v. 2, n. 80, 2022

International Journal of Health Science

IMPORTANCE OF INITIAL RECOGNITION AND MANAGEMENT IN ORBITAL TRAUMA: A LITERATURE REVIEW

Marcela Chiriano
Universidade do Oeste Paulista (UNOESTE)
Jaú - SP
https://orcid.org/0000-0002-1148-0535

Gabriel Vieira Piredda
Centro Universitário Redentor (UniREDENTOR)
Itaperuna - RJ
https://orcid.org/0000-0002-9669-8516

Jéssica Alessandra Cruz dos Santos
Centro Universitário Fametro (Ceuni FAMETRO)
Manaus - AM
https://orcid.org/0000-0003-3759-2348

Alexia da Cruz Cantante
Universidade Anhembi Morumbi (UAM)
Piracicaba - SP
https://orcid.org/0000-0001-5797-113X

Sabrina Silva
Universidade do Sul de Santa Catarina (Unisul)
Palhoça - SC
https://orcid.org/0000-0001-6514-6084?lang=pt

Isabella Okamoto
Universidade do Oeste Paulista (UNOESTE)
Jaú - SP
https://orcid.org/0000-0001-9159-8498

Mariane Fantinelli Venarusso
Universidade do Oeste Paulista (UNOESTE)
Jaú - SP
https://orcid.org/0000-0002-4370-6279

Melissa Alves Aires Marques
Universidade Iguaçu (UNIG)
Itaperuna - RJ
https://orcid.org/0000-0002-0520-7161

Sheila Jakeline Silva
Universidade de Franca (UNIFRAN)
Franca - SP
https://orcid.org/0000-0003-1713-143X

Sérgio Augusto Dutra da Conceição
Universidade Evangélica de Anápolis (UNIEVANGÉLICA)
Anápolis - GO
https://orcid.org/0000-0002-0742-2009

Thaiz Geovana Bezerra
Universidade do Oeste Paulista (UNOESTE)
Jaú - SP
https://orcid.org/0000-0002-2525-4424

Josenil Bezerra Nascimento Neto
Doctor by institution: Universidade Estadual do Piauí (UESPI)
General Surgeon by institution: Hospital Getúlio Vargas (HGV)
Trauma Surgeon by the institution: Colégio Brasileiro de Cirurgiões
Teresina - PI
http://lattes.cnpq.br/0118442802140504

Abstract: Purpose: To discuss the initial management of orbital trauma and its impact on possible complications, seeking to obtain a better prognosis at a functional and structural level. Methods: Narrative Bibliographic Review carried out between October and November 2022, through searches in the Scielo and PubMed databases. After applying the inclusion and exclusion criteria, 12 were selected to compose the collection of this study. **Review:** Orbital fractures correspond to 16% of fractures that affect the face, and their pathogenesis varies according to the trauma mechanism and resulting forces. The damage encompasses bone structures, soft tissues and neurovascular structures, and the lesions may be isolated, of extensive pattern or be part of the greater zygomaticomaxillary complex, which occurs most of the time. For the identification of ocular and/or neurological lesions, clinical and radiological evaluation of the patients is necessary, and they may be referred to an ophthalmologist and neurologist, according to the affected structure. The transconjunctival approach is considered an option in the management of fractures of the orbitomaxillomalar complex, with a high success rate. Primary repair, using reconstructive principles, presented relevant aesthetic and functional results for victims of orbital trauma. **Final considerations:** The initial management of orbital trauma has an impact on the reduction of complications and outcomes when properly applied. The evaluation of orbital and periorbital structures in trauma depends on their recognition and immediate decision making to avoid negligence.

Keywords: Management of orbital trauma; orbital fracture; Complications.

INTRODUCTION

It is known that one of the main causes of visual impairment and unilateral blindness worldwide is ocular trauma. In the US, it is estimated that 2.4 million emergency room visits are due to eye injuries, where it is estimated that the economic impact of visual impairment is of the order of US$139 billion (HE C.H. et al., 2021). It is projected that eye injuries in the workplace are the cause of blindness in approximately 1.6 million people around the world, which demonstrates the need to expand forms of prevention and specialized knowledge (FEKIH O. et al., 2021).

The eyeball is a sensory structure confined to the orbital cavity. Among the different ocular trauma mechanisms, the most common is the impact of a blunt object larger than the orbital opening, resulting in partial herniation of the orbital content due to external fracture of the involved bones. Due to the proximity of the maxillary and ethmoid sinuses, the orbital floor, consisting of the zygomatic, maxillary, and palatine bones, together with the medial wall, consisting of the maxillary, lacrimal, ethmoid, and sphenoid bones, are generally the most affected walls in this type of fracture (KHOJASTEPOUR L et al., 2020).

Trauma to the eyeball and its adjacent structures can give rise to orbital compartment syndrome (OCS), caused by increased intraorbital pressure after severe injuries. The possibility of visual loss is usually attributed to central retinal occlusion, direct compression of the optic nerve or its vasculature. This fact demonstrates that soft tissue involvement is of paramount importance in the outcome after trauma to this area. Thus, the identification of such lesions allows the use of crucial procedures for the patient's prognosis. For example, there is the application of emergency lateral canthotomy and inferior cantholysis at the bedside up to 2 hours after the injury, whose intention is to decompress, seeking to enhance the chances of a positive prognosis for ocular functionality (SINGH K.; SHRESTHA G.B., 2019).

In this context, the present study aims to investigate the effective initial management of orbital trauma, in order to understand its impact on the reduction of complications to obtain a better prognosis at the functional and structural level of the affected structures.

METHODOLOGY

The present study is a narrative bibliographic review carried out between October and November 2022. It was developed according to the PVO strategy, with the establishment of the population or research problem, its variables and outcome, which gave rise to the following guiding question: "What is the initial management of orbital trauma in order to reduce complications and obtain a better prognosis?". The searches were carried out in PubMed and Scientific Electronic Library Online (SciELO) databases. The following descriptors were used in combination through the Boolean operators "AND" and "OR": "Orbital trauma management", "Orbital fracture" and "Complications".

The inclusion criteria were: articles in English and Portuguese, published from 2017 to 2022 and that addressed the themes proposed for this research, including systematic review studies and originals made available in full. Exclusion criteria were: duplicate articles, available in summary form and that did not directly address the studied proposal. After applying the inclusion and exclusion criteria, 9 articles were selected from the PubMed database and 3 articles from Scielo, using a total of 12 studies to compose the collection.

RESULTS

Orbital fractures account for approximately 16% of all fractures that affect the face and

are considered extremely common. Its pathogenesis may vary depending on the accident mechanism and resulting forces, which play an important role in the extent of the injury (KHOLAKI et al., 2019). The damage involves bone structures, soft tissues and neurovascular structures (LUCAS J.P. et al., 2020). The lesions can be isolated, have an extensive facial pattern or be part of the greater zygomaticomaxillary complex, which are more frequently observed (LOZADA K.N. et al., 2019).

The blowout fracture (BOF), considered common in orbitofrontal trauma, is related to the mechanisms of intracranial injuries, such as contracoup injuries, frontal contusions and frontal hemorrhage. In trapdoor fractures, entrapment of the inferior rectus muscle occurs, with the mechanism of traumatic force displacing the orbital floor and content downwards (LOZADA K.N. et al., 2019). Involvement of the orbital roof is less frequent and is associated with high-impact injuries, with various neurological and facial injuries, being common in car accidents or following falls and assaults (KHOJASTEPOUR L et al., 2020).

In addition to BOF fractures, caused by direct or indirect trauma, there is an explosion of the orbital floor into the maxillary sinus or blow-in (BIF) into the orbital cavity itself (LOZADA K.N. et al., 2019; DEICHMÜLLER, C.; WELKOBORSKY, H.J., 2018). Specifically, BOF fracture involves the inferior and/or middle orbital wall maintaining the integrity of the orbital margin, which may result in enophthalmos, diplopia, infraorbital nerve palsy, facial asymmetry and nasolacrimal duct obstruction (POUCHAIN et al., 2020). While the blow-in fracture (BIF), less frequent, is related to intracranial lesions that lead to a decrease in orbital volume with downward and forward displacement, presenting the following clinical signs: edema and periorbital ecchymosis, orbital asymmetry, restriction in motility eye, palpebral ptosis, enophthalmos and hypophthalmos, in addition to paresthesia in the infraorbital region and diplopia. (KHOLAK O. et al., 2019).

Zygomatic fractures can be classified into grades I through VI. The centrals and counter centrals, according to Le Fort, in types I to III; and in types I to IV according to Wasmund. The frontonasals are classified in grades I to IV, according to Escher. Due to the diversity of fracture mechanisms and the different superimposed forces, mixed fractures constantly occur, and for this reason, the classification of midface fractures must only be used as an approximate guide. 2018).

The involvement of ocular and periorbital soft tissues presents OCS as a complication, considered an ophthalmic emergency, which must be recognized during the initial management of facial trauma. SCO occurs due to the sudden elevation of orbital pressure associated with trauma, which has little tolerance for space-occupying lesions, such as intraorbital bleeding or mass effect (LUCAS J.P. et al., 2020).

Clinical and radiographic evaluation is of paramount importance to identify ocular or neurological lesions and thus manage patients according to the affected topography and its possible complications, since specialized ophthalmological and/or neurological intervention may be necessary (CHEN Y. H. et al, 2021).

In cases of suspected orbital fracture, computed tomography of the orbits with helical cuts in thin slices (1.5 mm) is indicated, and it is important to reconcile other CT images of the face, head and cervical spine to assess possible concomitant injuries in extensive trauma (CHUKWULEBE S.; HOGREFE C., 2019). According to the study by Valencia M. R. et al. (2021), CT reveals a variety of findings that may be useful in

the surgical management of patients with orbital fractures. Routine findings include comminuted/disarticulated, articulated, and linear fractures, which are located on the orbital floor medial to the infraorbital nerve and on the medial orbital wall.

For Chukwulebe S. and Hogrefe C.(2019), the most important exam after ocular trauma involves the assessment of acuity. Injuries that include soft tissue, including ruptured globe, retrobulbar hematoma, lens displacement, vitreous hemorrhage, choroidal/retinal tear or detachment, require emergency evaluation by an ophthalmologist. The evaluation of areas of bone sensitivity, swelling and ecchymosis is also necessary, followed by verification of the presence of movement impairment, subconjunctival hemorrhage and inferior orbital nerve paresis. Immediate evaluation by an ophthalmologist must be indicated in conditions of ruptured globe, visual changes and/or ocular impairment (CHUKWULEBE S.; HOGREFE C., 2019).

In a retrospective descriptive study, carried out by Pedemonte Trewhela C. et al., (2020), which analyzed 98 patients with orbital fractures who underwent a transconjunctival approach, evidence was sought on the success rate of this technique in fractures of the maxillofacial complex. The results obtained demonstrated a high success rate (94%) in relation to few complications (6%), indicating that the transconjunctival approach is a possibility in the management of fractures of the maxillo-malar orbital complex, mainly to access the orbital floor.

The study by Sadek E. et al. (2019) demonstrated that the functional results were unsatisfactory due to negligence related to the involvement of orbital and periorbital structures in the trauma. With this, there is a proposal for the three-dimensional search for possible injuries, involving a preoperative evaluation for the establishment of a surgical plan. The primary and adequate repair for the affected hard and soft regions, through reconstructive principles, obtained significant functional and aesthetic results.

FINAL CONSIDERATIONS

The initial management of orbital trauma has an impact on the reduction of complications and unsatisfactory outcomes, including changes in visual acuity, functionality and aesthetics. Clinical and radiographic evaluation are important precepts in the identification of ocular and neurological lesions, in a way that they help in subsequent conducts under specialized care. Thus, it is demonstrated the need for recognition of orbital trauma by health teams in the evaluation of orbital and periorbital structures for immediate decision making, avoiding possible negligence that could compromise the prognosis of patients.

REFERENCES

1. CHEN, Yi H. et al. Factors infuencing surgical outcomes in orbital trapdoor fracture. **Scientific Reports**, v. 11, n. 1747, p. 1-7, 2021.

2. DEICHMÜLLER, Cordula; WELKOBORSKY, H.-J. Traumatologie der Orbita. **HNO**, v. 66, n. 10, p. 721-729, 2018.

3. FEKIH, Olfa et al. Traumatismes Oculaires En Milieu Professionnel: à propos de 110 cas. **La Tunisie Médicale**, v. 99, n. 08-09, p. 881, 2021.

4. HE, Catherine H. et al. Characteristics of ocular trauma in the United States. **Arquivos Brasileiros de Oftalmologia**, 2021.

5. KHOJASTEPOUR, L. et al. Prevalence and severity of orbital blowout fractures. **British Journal of Oral and Maxillofacial Surgery**, v. 58, n. 9, p. e93-e97, 2020.

6. KHOLAKI O. et al. Management of orbital fractures. **In Atlas of the Oral and Maxillofacial Surgery Clinics of North America**, v. 27, n. 2, p. 157-165, 2019.

7. LOZADA, Kirkland N. et al. Orbital Trauma. **Seminars in Plastic Surgery**, v. 33, n. 2, p. 106-113, 2019.

8. LUCAS, Jordyn P. et al. Orbital roof fractures: an evidence-based approach. **Facial Plastic Surgery & Aesthetic Medicine**, v. 22, n. 6, p. 471-480, 2020.

9. PEDEMONTE TREWHELA, Christian et al. Abordaje transconjuntival: primera elección en trauma orbitario. **Revista Española de Cirugía Oral y Maxilofacial**, v. 42, n. 1, p. 12-19, 2020.

10. SADEK, EmanYahya et al. Periorbital trauma: a new classification. **Craniomaxillofacial Trauma & Reconstruction**, v. 12, n. 3, p. 228-240, 2019.

11. SINGH, Kinsuk; SHRESTHA, Gulshan Bahadur. Traumatic orbital compartment syndrome: a sight threatening emergency. **Nepalese Journal of Ophthalmology**, v. 11, n. 1, p. 91-97, 2019.

12. VALENCIA, Ma ReginaPaula et al. Radiological findings of orbital blowout fractures: a review. **Orbit**, v. 40, n. 2, p. 98-109, 2021.