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Blow-out fracture in a child: case report

Fratura orbitária tipo blow-out pura em criança: relato de caso clínico

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Resumo

As fraturas do tipo blow-out são aquelas que acometem o soalho orbitário. Podem ser divididas em pura, quando limitadas ao soalho, e impura, quando há o envolvimento do rebordo orbitário. Este trabalho tem como objetivo discutir a dificuldade do diagnóstico imediato quando não há sinais clínicos ou radiográficos evidentes da fratura, bem como ressaltar a importância do exame tomográfico e apresentar um caso clínico de uma fratura do tipo blow-out pura, numa criança de 10 anos, tratada por meio de reconstrução do soalho orbitário utilizando-se malha de titânio.

Descritores: Fratura orbitária; paciente pediátrico; trauma facial.

Abstract

Blow-out fractures involving the orbital floor can be divided into pure, when limited to orbital floor, and impure, when they involve the infraorbital margin. This article aims to: discuss the difficulty of immediate diagnosis when there are no evident clinical or radiographic signs; highlight the importance of the computed tomography scan; and, present a clinical case of pure blow-out fracture, involving a 10-year-old child, treated through reconstruction of the orbital floor using titanium mesh.

Descriptors: Orbital fracture; pediatric patient; facial trauma.

INTRODUCTION

Blow-out fractures involve the orbital floor and can be classified as pure, when confined to the orbital floor, and impure, when they involve the inferior orbital rim[1-3].

Theories such as that the hydraulic pressure and the resulting forces transmitted from the edge of the orbital floor have been associated with the causes of these fractures. This has made it difficult to reach consensus on pathological mechanism[4,5].

The diagnosis of Blow-out fractures may include clinical signs such as diplopia, dystopia, ophthalmoplegia, enophthalmos and restriction of ocular motility[6-8]. In pure Blow-out fractures, conventional radiographic examination may present limitations in the diagnosis, since the overlapping of images hinders the view of the orbital floor[2,4]. However, CT scans with coronal and axial slices and three-dimensional reconstructions offer suitable conditions for the diagnosis of this type of fracture[9].

Treatment involves a surgical approach, consisting of extrication of the herniated orbital contents and reconstruction of the maxillary sinus floor fractures. Various materials can be used for reconstruction of bone defects. Titanium mesh is a material accessible in public clinics and widely used in Brazil[10,11].

In this case study, we emphasize the importance of monitoring and using computed tomography in the diagnosis of patients with direct trauma to the eyeball.

DESCRIPTION OF CLINICAL CASE

A 10 year old male, reporting direct trauma to the left eye two days before, underwent evaluation for oral maxillofacial surgery. He reported a direct trauma to the left eye, two days before. Clinical examination revealed edema and hematoma in the left periorbital region. There was no bone defect in the zygomatic region or the infraorbital margin. He had no complaints about visual acuity nor signs of ophthalmoplegia and ocular motility was preserved. The Incidence of Waters showed mild opacification of the maxillary sinus involved and there were no other signs suggesting fracture

(Figure 1). Considering those findings, the patient and guardian were instructed about the need for clinical follow-up to control the edema. Seven days after the injury, the patient returned with double vision. Clinical examination revealed some restriction of the movement of the left eyeball, suggesting a fracture of the orbital floor. A CT scan showed an isolated fracture of the left orbital floor with herniation of soft tissue into the maxillary sinus (Figure 2). The patient's parents were instructed regarding the need for surgical intervention and they accepted treatment.

Under general anesthesia, the subtarsal approach was performed and the infraorbital margin exposed. After exploration of the orbital floor, it was possible to locate the fracture and herniated orbital contents within the maxillary sinus (Figures 3 and 4). Following extrication of the soft tissue, the bone defect was located and the orbital floor reconstructed with titanium mesh (Figure 5). The orbital content was positioned on the titanium mesh and the soft tissue sutured. The patient reported no double vision during the post-operative period. Ninety days after surgery, the patient had no diplopia or ophthalmoplegia and the CT scan showed good placement of the titanium mesh (Figures 6, 7 and 8).

Figure 1. The incidence of Waters showing the difficulty of observing images suggestive of orbital fractures.

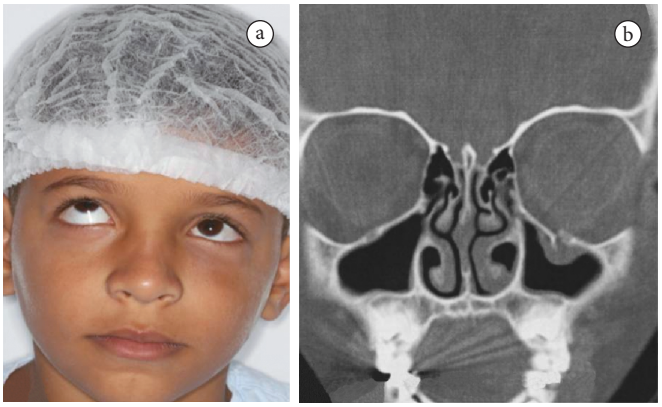

Figure 2. a) Clinical aspect presents the patient with limitation of eye movement. b) Computed tomography (coronal section) showing the fracture of the orbital floor.

DISCUSSION

Blow-out fractures can cause a variety of ocular diseases, since the fracture of the orbital floor may cause the supporting structures of the eyeball to change position, causing diplopia, dystopia and ophthalmoplegia[1,9].

Due to the changes in the soft tissue involved, the immediate diagnosis of this fracture has a limitation. The conventional radiographic examination for pure blow-out fracture does not contribute significantly to the diagnosis, since the view of the orbital floor is complicated by the superimposition of

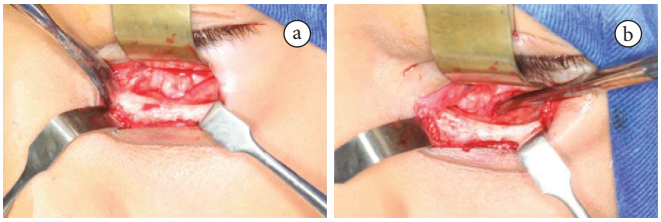

Figure 3. a) Location of orbital fracture. b) Extrication of the herniated contents into the orbital sinus.

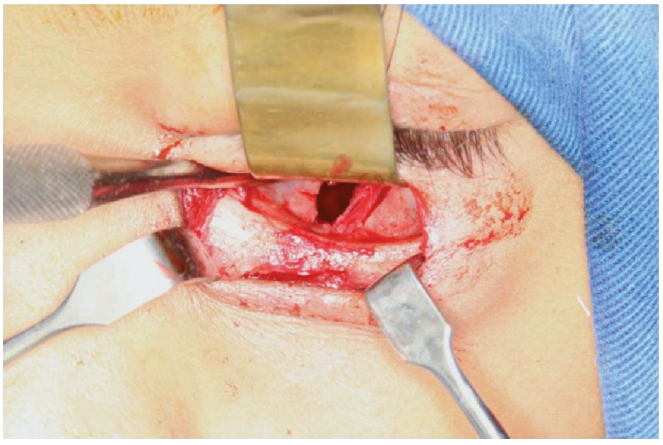

Figure 4. Exposure of the orbital floor fracture.

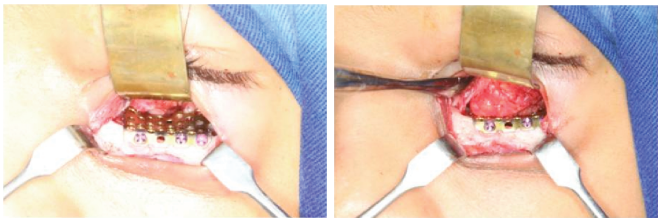

Figure 5. Reconstruction of the orbital floor with a titanium mesh and repositioning the orbital contents.

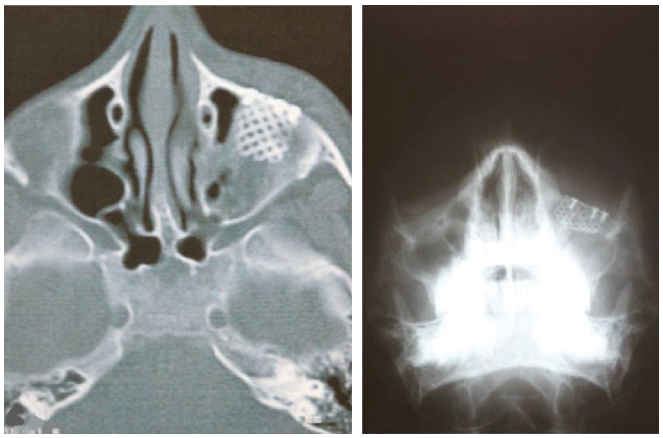

Figure 6. a) Sagittal CT showing the proper placement of titanium mesh. b) Incidence of Waters for postoperative control.

Figure 7. Clinical aspect in 90 days postoperative.

other anatomical structures. Due to the difficulty of immediate diagnosis, monitoring should be performed until there is improvement of the periorbital tissues. In this case study, the patient had no diplopia or ophthalmoplegia during the initial evaluation, and radiographs showed only slight opacification of the left maxillary sinus. It was only after seven days of monitoring that the patient developed signs and symptoms of pure blow-out fracture.

Figure 8. Absence of ophthalmoplegia, diplopia or dystopia.

Computed tomography provides better visualization and interpretation of the periorbital tissues[12]. In this case study, CT was performed after the onset of signs and symptoms of blow-out fracture, making it possible to observe the floor and herniation of orbital contents. This examination is of utmost importance for proper diagnosis and treatment of such fractures.

Several materials have been used in the reconstruction of the orbit. One may choose autologous biological material such as ear shell cartilage; nasal septum, or bone grafts from different donor sites; and other, biocompatible materials such as silicone, used less and less, porex blades and titanium mesh. Titanium mesh is easy to handle, available in the Unified Health System, eliminates the need for donor area and presents good results[5,10, 13-16].

CONCLUSION

Signs and symptoms of blow-out type fractures may appear later, and therefore, there must be a follow-up of the patients with direct trauma to the eye until there is an improvement in the condition of the periorbital tissues.

Conventional radiographs have limitations for the diagnosis of this type of fracture; therefore, tomography provides better conditions for achieving the correct diagnosis and treatment.

REFERÊNCIAS

1. Couto Junior AS, Oliveira DA, Mattosinho CCS, Curi R. Fratura de órbita por queda de cavalo e correção de estrabismo. Rev Bras Oftalmol. 2010; 69:180-3. http://dx.doi.org/10.1590/S0034-72802010000300008
2. Smith B, Regan WF Jr. Blow-out fracture of the orbit; mechanism and correction of internal orbital fracture. Am J Ophthalmol. 1957; 44:733-9. PMid:13487709.
3. Wang NC, Ma L, Wu SY, Yang FR, Tsai YJ. Orbital blow-out fractures in children: characterization and surgical outcome. Chang Gung Med. J 2010; 33: 313-20. PMid:20584509.
4. Iizuka T, Mikkonen P, Paukku P, Lindqvist C. Reconstruction of orbital floor with polydioxanone plate. Int J Oral Maxillofac Surg. 1991; 20: 83-7. http://dx.doi.org/10.1016/S0901-5027(05)80712-X
5. Souza EMR, Rocha RS, Silva LCF. Reconstrução orbitária com tela de titânio: relato de dois casos. Rev Cir Traumatol Buco-Maxilo-Facial. 2009; 9:75-82.
6. Chi MJ, Ku M, Shin KH, Baek S. An analysis of 733 surgically treated blowout fractures. Ophthalmologica. 2010; 224:167-75. PMid:19776656. http://dx.doi.org/10.1159/000238932
7. Tahiri Y, Lee J, Tahiri M, Sinno H, Williams BH, Lessard L, et al. Preoperative diplopia: the most important prognostic factor for diplopia after surgical repair of pure orbital blowout fracture. J Craniofac Surg. 2010; 21:1038-41. PMid:20613563. http://dx.doi.org/10.1097/SCS.0b013e3181e47c45
8. Kruschewsky LS, Novais TV, Castelo-Branco B, Mello Filho FV. Aspectos epidemiológicos e sequelas nas fraturas de soalho de órbita atendidas em Serviço de Cirurgia Craniomaxilofacial de Salvador, Bahia. Rev Bras Cir Craniomaxilofac. 2010; 13: 216-20.
9. Himori N. Central retinal artery occlusion following severe blow-out fracture in young adult. Clinical Ophthalmology. 2009; 3: 325–8. PMid:19668585. PMCid:2709037.
10. Morain WD, Colby ED, Stauffer ME, Russell CL, Astorian DG. Reconstruction of orbital wall fenestrations with polyglactin 910 film. Plast Reconstr Surg. 1987; 80: 769-74. PMid:2960996. http://dx.doi.org/10.1097/00006534-198712000-00001
11. Waite PD, Clanton JT. Orbital floor reconstruction with lyophilized dura. J Oral Maxillofac Surg. 1988; 46: 727-30. http://dx.doi.org/10.1016/0278-2391(88)90180-2
12. Egbert JE, May K, Kersten RC, Kulwin DR. Pediatric orbital floor fracture: direct extraocular muscle involvement. Ophthalmology. 2000; 107:1875-9. http://dx.doi.org/10.1016/S0161-6420(00)00334-1
13. Mendonça JCG, Lima CM da C. Reconstrução de assoalho de órbita com lâmina de silicone. Rev Bras Cir Craniomaxilofac. 2011; 14(1): 53-5.
14. Oliveira RB, Silveira RL, Machado RA, Nascimento MMM. Utilização de diferentes materiais de reconstrução em fraturas do assoalho de órbita: relato de seis casos. Rev Cir Traumatol Buco-Maxilo-Facial. 2005; 5: 43–50.
15. Tabrizi R, Ozkan TB, Mohammadinejad C, Minaee N. Orbital floor reconstruction. J Craniofac Surg. 2010; 21:1142-6. PMid:20613583. http://dx.doi.org/10.1097/SCS.0b013e3181e57241
16. Peron MF, Ferreira GM, Camarini ET, Iwaki Filho L, Farah GJ, Pavan AJ. Levantamento epidemiológico das fraturas do complexo zigomático no Serviço de Residência em Cirurgia e Traumatologia Bucomaxilofacial da UEM, no período de 2005 e 2006. Rev Odontol UNESP. 2009; 38(1): 1-5.

CONFLICTS OF INTERESTS

The authors declare no conflicts of interests.

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