Visual deficit related to facial trauma in a cycling accident

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ABSTRACT

Introduction: Face trauma can impair patients' ability to eat, speak, see, interact with other people, and perform other important functions. The treatment of facial injuries must prioritize threats to life, but secondary considerations are important for long-term functions, which can be operative or conservative.

Case Report: A 34-year-old male cyclist had an accident while cycling in a rural area resulting in major facial trauma. He presented with significant swelling in the face and difficulty in breathing, requiring orotracheal intubation. Imaging tests revealed numerous fractures of the facial bones and bilateral frontal contusion. After partial recovery from the accident, the patient reported visual impairment in the peripheral visual field since the event. After imaging ophthalmological evaluation, our team decided for a conservative treatment. After 11 months, the patient reported an almost complete return of the visual field.

Conclusion: Knowledge about the mortality rate of cyclists traumatized due to transport accidents and the profile of the victims can provide valuable information to assist in the development and implementation of public policies aiming at preventing and facing this serious social and public health problem.

Keywords: Cycling accident, Facial trauma, Visual acuity

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INTRODUCTION

The uncontrolled growth of metropolises and the increasing number of people have been making transportation gradually more difficult. This led to an increase in the number of cars and mainly bicycles in big and even in small cities worldwide [1].

The bicycle is a low-cost means of transportation, which also has advantages for the environment, in addition to combining transport with the practice of physical activity. It is an economically accessible alternative to public transportation for most people, regardless of income, and can be used from childhood to older age [2].

Despite playing an important role in the transportation of millions of people around the globe, the infrastructure necessary for the use of bicycles is not available in all locations, moreover in low and middle-income countries [2]. The shared traffic of bicycles with motor vehicles is identified as the main factor of insecurity, thus facilitating the occurrence of accidents [3].
CASE REPORT

A 34-year-old male cyclist, without comorbidities, had an accident while cycling in a rural area resulting in major facial trauma, since he was not using a protective helmet. He was immediately transported to the emergency department and was administered first aid. He presented with significant swelling in the face and difficulty in breathing, requiring orotracheal intubation. Imaging tests revealed numerous fractures of the facial bones and bilateral frontal contusion.

After partial recovery from the accident, the patient reported visual impairment in the peripheral visual field since the event. Computed tomography of the bones of the face showed complete fracture of the right lateral wall of the sphenoid sinus, involving the right optic canal, with a bone fragment in the middle third of the canal causing its moderate narrowing, measuring 5.2 mm in the proximal third and 3.7 mm in the maximum narrowing focus, making the local sphenoid wall to bulge. Nodular mucous thickening inside the sphenoid sinus was obliterating the bone fracture in the roof, and fractures were also observed in the papyraceous laminae of the sphenoid wings. He underwent surgical treatment to stabilize the fractures of the facial bones (Figure 1).

The ophthalmological evaluation consisted of the examination of ocular motility, retinography (Figure 2), magnetic resonance, and optical coherence tomography (Figure 3), all without alterations, except for the bone fractures caused by the bicycle accident. The result of the pattern-reversal visual evoked potential test was compatible with prolonged conduction time in both optical pathways.

Campimetric alterations after severe trauma to the facial bones, specifically when bone fragment is found, with impact at the level of the optic canal, require a decision between operating on the patient or maintaining conservative treatment; either way, a neurologist and an ophthalmologist should work conjointly. The ophthalmological evaluation of our patient left no doubt about the visual field impairment. Medications (brimonidine tartrate 0.2% and timolol maleate 0.5% ophthalmic solutions), ophthalmic physiotherapy, and monthly reevaluations were instituted. Given the gradual improvement and signs of peripheral visual field recovery, a surgical intervention was discarded. It is evident that the transcranial or the transorbital surgical approach could lead to a risk of worsening the injury to the optic nerve, which could cause visual loss.

After 11 months of the conservative treatment, the patient reported an almost complete return of the visual field. In addition, he continued adhered to routine neurological and ophthalmological follow-ups. The most recent image exam showed complete healing of bone fractures (Figure 4).
DISCUSSION

Injuries caused by traffic accidents are important causes of death worldwide. Of the nearly 1.3 million annual deaths that result from these injuries, approximately 90% occur in low and middle-income countries [4]. Injuries related to bicycle accidents are responsible for approximately 900 deaths, 23,000 hospital admissions, 580,000 emergency consultations, and more than 1.2 million medical visits per year in the United States alone, resulting in an estimated cost of more than US$ 8 billion annually [5, 6].

In Brazil, in the period between 2000 and 2010, 32,422 bicycle-related deaths were registered. In 2010, there was an average of 8.8 deaths per day in this country, with a proportion ranging from 15.3 to 15.9 deaths per 1 million inhabitants [7].

The major risk factors for trauma with bicycles are: male cyclists, riding a bicycle in the late afternoon or early evening, not wearing a helmet, involvement of a motor vehicle, mountain bike competitions, among others [8, 9]. Most bicycle-related injuries occur on the extremities of the upper or lower limbs, followed by the head, face, abdomen or chest, and neck [5, 9]. Several factors can decrease the risk of injury, such as the correct use of a helmet and flags. These simple measures can reduce the risk of trauma to the skull by 74–85%, and to the nose and upper floor by approximately 65% [10].

CONCLUSION

Transport accidents, including those involving bicycles, are important causes of morbidity and mortality and impose high costs on the health system as well as on the society. Knowledge about the mortality rate of cyclists traumatized due to transport accidents and the profile of the victims can provide valuable information to assist in the development and implementation of public policies aiming at preventing and facing this serious social and public health problem.

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Author Contributions

Julia Brasileiro de Faria Cavalcante – Conception of the work, Design of the work, Acquisition of data, Analysis of data, Interpretation of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

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Authors declare no conflict of interest.

Data Availability
All relevant data are within the paper and its Supporting Information files.

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