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Management of Isolated Orbito-Zygomatic Fractures at the National Center for Odontology and Stomatology Professor Hamady Traore in Mali

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Abstract

Introduction: Orbitozygomatic fractures have a multitude of anatomo-clinical variations, resulting in functional and morphological repercussions. Optimal management helps prevent irreversible sequelae. The objective of this study was to study the epidemiological, clinical, and therapeutic characteristics of isolated orbitozygomatic fractures. **Patients and Methods:** This was a descriptive cross-sectional study, which took place from January 1, 2022 to December 31, 2022. It concerned all cases of isolated orbitozygomatic fractures treated in the department. The data collected were entered and analyzed using SPSS 2.0 software. **Results:** A total of 24 cases of orbitozygomatic fractures were collected. The male sex was predominant with a sex ratio of 5. The age group of 20 to 30 years was the most affected with 45.8%. Road traffic accidents were the dominant cause (87.4%). Clinical signs were dominated by swelling in 87.4%, conjunctival hemorrhage in 95.8%, suborbital hypoesthesia in 37.5%. The radiological signs observed were a shift in 91.7% of cases. The Zingg type B fracture was the most common (54.3%). Management was mainly surgical (91.3%). **Conclusion**: Isolated orbitozygomatic fractures are relatively common in maxillofacial trauma, affecting young adult males.

Keywords

Orbitozygomatic Fracture, Management, Surgery, Bamako

1. Introduction

Orbito-zygomatic fractures are very common pathologies in maxillofacial traumatology. They are the most frequent fractures of the middle level of the face after those of the nasal bones, this is due to the prominence of the zygomatic bone [1] [2]. The zygoma is particularly exposed during maxillofacial trauma because it represents the lateral bumper of the face [1] [3]. In the study of Traoré *et al.* in Morocco, these fractures represented 19% of maxillofacial traumas [4]. Millogo *et al.* in Burkina Faso, found an annual incidence of 22.8 cases [5]. Orbito-zygomatic fractures have a multitude of anatomo-clic varieties, causing functional and morphological retentions. Lesions of the eyeball during orbital trauma vary between 14% and 50%. Road accidents thus represent 50% to 70% of etiologies [6]. Management must be multidisciplinary and optimal to prevent irreversibles complications. Orbital fractures that are not treated promptly and optimally can lead to serious functional and aesthetic complications. Numerous studies have focused on their epidemiology, clinical and anatomo-clinical forms, treatment modalities, and potential complications. However, to date, few studies have been conducted on this topic in Mali.

The objective of this study was to investigate the epidemiological, clinical, and therapeutic characteristics of isolated orbitozygomatic fractures in our practice.

2. Patients and Methods

This was a descriptive cross-sectional study carried out in the stomatology and maxillofacial surgery department of the National Center for Odonto-Stomatology Professor Hamady TRAORE, over a one-year period from January 1, 2022 to December 31, 2022. All patients of both sexes in whom the diagnosis of isolated orbitozygomatic fracture was made clinically and confirmed by radiography, who received treatment, were included in this study. All patients underwent an ophthalmological consultation before and after the operation and a maxillofacial computed tomography (CT) scan to classify the lesions according to the Zingg classification [6]. Orbitozygomatic fractures include the following types of Zingg fractures: lateral orbital rim fractures (Zingg A2), infraorbital rim fractures (Zingg A3), fractures of all three zygomatic processes (Zingg B), and comminuted zygomatic bone fractures (Zingg C).

Data collection was carried out using a survey form developed for this purpose. The variables studied (epidemiological, clinical, radiological and therapeutic) were compiled, entered and analyzed using SPSS 2.0 software.

3. Results

We collected 24 cases of isolated orbito-zygomatic fractures, representing 14.63% of maxillofacial trauma cases and 8.14% of the department's surgical activities.

The male sex was predominant with 83.3% (n = 20) or a sex ratio of 5 (**Table 1**).

Table 1. Distribution of patients by sex.

Sex	Effective	Frequency (%)
Male	**20**	**83.3**
Female	4	16.7
Total	**24**	**100**

The most affected age group was between 20 and 30 years 45.8% with an average of 35 years ± 8 years (Table 2). The majority of patients were referred 91.7% (n = 22).

Table 2. Distribution of patients by age.

Age group (year)	Effective	Frequency (%)
]10 - 20]	02	08.3
]20 - 30]	**11**	**45.8**
]30 - 40]	7	29.2
]40 - 50]	4	16.7
Total	**24**	**100**

The consultation time was between 24 and 72 hours in 41.6% (Table 3).

Table 3. Distribution of patients according to consultation time.

Consultation time in hours	Effective	Frequency (%)
]6 - 24]	07	29.2
]24 - 72]	**10**	**41.6**
]72 et plus]	07	29.2
Total	**24**	**100**

Road traffic accidents were the main cause of these fractures, 87.4% (Table 4), followed by fights 8.4% (n = 2). Facial deformity such as swelling represented 87.4% (n = 21) and sagging 8.4% (n = 2). The ophthalmological signs encountered were subconjunctival hemorrhage 95.8% (n = 23), a decrease in visual acuity 70.8% (n = 17) and enophthalmos 25% (n = 6). The main physical signs found were periorbital ecchymosis 66.7% (Figure 1), infraorbital hypoesthesia 37.5% (n = 9), stair-stepping sensation 29.2% (n = 7) and limitation of mouth opening 12.5% (n = 3). All patients had undergone maxillofacial CT scan and Zingg B type fractures were present in 54.3% (Table 5).

Shift-type displacements were observed in 91.7% (Table 5, Figure 2). The therapeutic means used were: surgery 91.7% (n = 22) and orthopedics 8.3% (n = 2).

Table 4. Distribution of patients according to etiology.

Etiology	Effective	Frequency (%)
Road traffic accident	**21**	**87.4**
Brawls	02	08.4
Work accident	01	04.2
Total	**24**	**100**

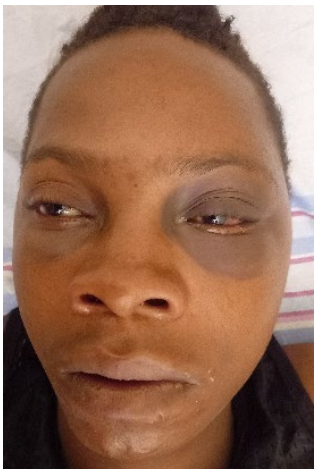

Figure 1. Front view with left periorbital bruise.

Table 5. Distribution of patients according to the Zingg classification.

Classification de Zingg	Effective	Frequency (%)
A2	02	08.4
A3	04	16.7
A2 + A3	05	20.6
B3	13	54.3
Total	**24**	**100**

Figure 2. Coronal section of facial CT.

The time to treatment exceeded 72 hours in 66.7% with an average of 192 hours (Table 6). The subciliary approach associated with the tail of the eyebrow was used in 68.18% and the subciliary approach alone in 22.72% (n = 5). The materials used were the combination of miniplate and steel wire in 50% (Figure 3 and Figure 4), miniplate alone in 36.35% and steel wire alone in 4.55% (n = 1). The duration of hospitalization was between 7 and 14 days in 58.3% (n = 14) and less than 7 days in 41.7% (n = 10). Immediate complications were marked by hypoesthesia in 20.8% of cases and late complications and sequelae encountered were: infraorbital hypoesthesia 9.1% (n = 2), chemosis 4.55% (n = 1) and enophthalmos 4.55% (n = 1).

Table 6. Distribution of patients according to the time taken to treatment time taken to treatment (hour) Effective Frequency (%).

]24 - 72]	06	33.3
]+72 hours]	**18**	**66.7**
Total	**24**	**100**

Figure 3. Image of fracture osteosynthesis using a mini plate.

Figure 4. Image of osteosynthesis of the fracture using steel wire.

4. Discussion

4.1. Epidemiological Aspects

Orbitozygomatic fractures are very common pathologies in maxillofacial trauma. They are the most common fractures of the midface after those of the nasal bones, this is due to the prominence of the zygomatic bone [1] [2]. In the study by Traoré *et al.* in Morocco, these fractures represented 19% of maxillofacial traumas [4]. Millogo *et al.* in Burkina Faso, found an annual incidence of 22.8 cases [5]. The male predominance was very clear with 83.3% and a sex ratio of 5. This male predominance is found by several authors in Africa [7]-[9]. This male predominance could be explained by the fact that men are more active than women in everyday activities and therefore are more exposed. The profile of affected patients is that of young adults with an average age of 35 years ± 8 years as reported by most authors [10]-[12]. Road traffic accidents were the main cause of orbitozygomatic fractures, *i.e.* 87.4%. This result is also superimposable on those found by many authors with a frequency varying between 60% and 93.75%.

4.2. Clinical and Radiological Aspects

The consultation time was between 24 and 72 hours in 41.7%. This result is comparable to those of Bissa H *et al.* who found an average of 72 hours [6] and Bouguila J *et al.*, where the majority exceeded 24 hours [5]. Facial deformity in the form of swelling was found in 87.4% and sagging in 8.4% of cases. This observation has been reported in several studies [6] [12]. This could be explained by the predominance of facial edema in the first hours following the trauma and can mask the sagging of the cheekbone. Subconjunctival hemorrhage was found in 95.8% of cases. This result is significantly higher than that of Daoudi I *et al.* who found 9.4% [13]. Periorbital ecchymosis is common in orbitozygomatic fractures. Bissa H and Khalfi L, respectively found 31.74% and 91.30% [6] [12]. It was found in 66.7% of cases in this study. Enophthalmos was found in 25% of cases. On the other hand, authors observed a frequency varying between 6.9% and 9.4% [12] [13]. This could be explained by the violence of the trauma in our context, which mainly affects patients not wearing helmets during the accident. Suborbital hypoesthesia due to infraorbital nerve injury must be systematically sought before any therapeutic procedure, as it has a medico-legal interest. Hypoesthesia was found in 37.5%. This result is superimposable to those of Khalfi L and Bouguila J who found respectively 35.1% and 30.6% [11] [14]. The limitation of the mouth opening is due to the incarceration of the temporal muscle in the zygomatic arch during its fracture, causing a contracture of this muscle [1] [15] [16]. In addition, the coronet also abuts on the zygomatic arch, thus limiting mandibular mobility [10]. In this series, this sign was found in 12.5%. On the other hand, Khalfi L and Aissaoui O found respectively 55% and 40% [2] [11]. This difference could be explained by the shorter consultation time in their study and most of the limitations were due to muscle contusions. Disjunction fractures of the zygoma were the most frequent with 54.3% of cases. Indeed, the zygoma would

be more fragile at the level of its attachments. Millogo *et al.* had observed 43.75% of cases of fracture with disjunction [5].

4.3. Therapeutic and Developmental Aspects

The time to treatment exceeded 72 hours in 66.7% of cases in this study. This could be explained by the delay in consultation, reduced financial accessibility of patients, as well as the delay in referring some patients. This result is similar to that of Daoudi I with an average delay of 6.3 days [15]. Khalfi L *et al.* had observed a delay of less than 48 hours in 92% of cases [11]. This difference could be explained by the fact that most of our patients presented with a significant post-traumatic hematoma and edema and the absence of signs of severity on admission. The treatment was essentially surgical in 91.7%. Some authors had found a rate varying between 48% and 68.6% [7] [9]. This difference could be explained by the high number of fractures with displacement in our study. The mini-plate and steel wire combination was the most used in 50% of this series. Some authors used 100% mini-plates [1]. This could be explained by the high cost of mini-plates in our context. The hospitalization duration of 7 to 14 days was observed in 58.3% of cases. On the other hand, for Bouguila J, the majority of patients left the hospital within a week [14]. This difference could be explained by the fact that the treatment was surgical in the majority of cases in this series. Immediate complications were marked by hypoesthesia in 20.8% of cases in our study. This result is similar to that of Khalfi L *et al.* who found 19.2% [11]. Late complications were dominated by hypoesthesia in 9.10% of cases after 6 months of follow-up. This result is comparable to those of Adayef Y and Bouguila J who found 7% and 8.7% respectively [8] [14]. One case of enophthalmos was observed, *i.e.* 4.55%. This result is comparable to that of Daoudi I, who found one case of enophthalmia, or 5% [17].

5. Conclusion

Orbitozygomatic fractures are a common pathology in maxillofacial trauma. Young male adults are most affected, and road traffic accidents are the main etiology. The management of these fractures requires a precise injury assessment to determine appropriate therapeutic indications in order to limit complications and sequelae.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this article.

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