


Retrospective study of gunshot wounds in the face in a large hospital in Latin America: a two-year analysis

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Abstract:

Objective: This study aims to compare data relating to gender, age, etiology, fractured areas, procedures performed, follow-up and purpose from September 2013 to July 2015. This retrospective study included patients whose medical records were complete and who presented face fractures due to gunshot wounds. **Results:** A total of 1289 patients diagnosed with fractures in the head and neck region were evaluated, of which only 13 patients had facial fractures caused by firearms. Stabilization of facial fractures with rigid internal fixation should be performed as soon as possible to avoid sequelae to the patient, which was conducted in 8 patients. **Conclusions:** The study found that male and young patients are the most affected by fire injuries to the face due to the high rate of violence, cultural and socioeconomic differences in the city of São Paulo. Fracture stabilization must be performed as soon as possible to avoid future sequelae. Therefore, the study found that the care of facial trauma by firearm does not have a strict protocol; it depends on the extent and severity of each case. **Keywords:** Head Injuries, Penetrating; Gun Violence; Fracture Fixation, Internal; Jaw Fixation Techniques.

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INTRODUCTION

Gunshot wounds are the leading cause of death among men aged 15 to 34 in the United States, originating from suicides, homicides and accidental injuries^{1,2}.

Gunshot wounds are complex and challenging to treat¹. These injuries involve the craniofacial skeleton and generally affect the airways, the central nervous system, and the vascular system, in addition to the psychological issues involved with their sequelae¹⁻⁴.

The injuries caused by a firearm projectile are extensive due to its high kinetic energy¹. Tissue damage generally requires multiple surgical approaches, with limited functional and aesthetic results¹. (Figure 1)

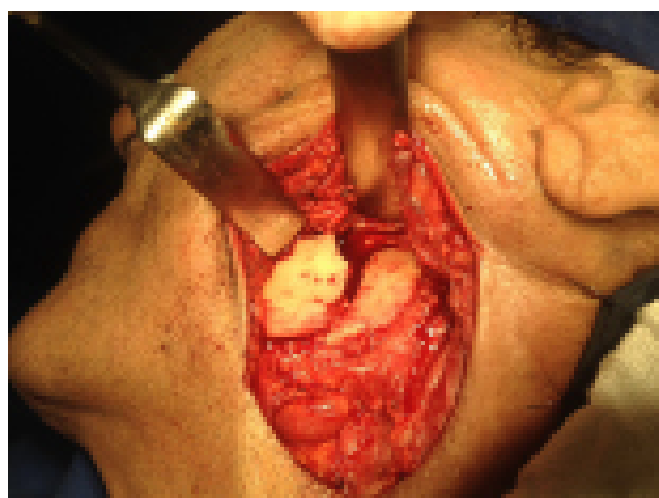


Figure 1 - Destruction of the mandibular angle caused by gunshot. Submandibular surgical access for surgical reconstruction.

Treatment must primarily maintain the airways and stabilize the circulatory system to minimize potentially fatal injuries, with correct clinical evaluation and imaging exams¹⁻⁴.

This study aimed to evaluate the data in the medical records of patients who suffered gunshot wounds in the face, between the years 2013 and 2015, in a public hospital.

MATERIALS AND METHODS

This retrospective study evaluated the medical records of patients' victims of gunshot wounds in the face from September 2013 to July 2015.

Age, gender, injury site, antibiotic administration, treatment, and other injuries were analyzed. The face was divided into thirds, being the lower third (mandible), middle third (from the nasal base to the glabella), and upper third (from the glabella to the apex of the skull).

INCLUSION CRITERIA

Patients with a gunshot wound in the face, with complete medical records, were included.

RESULTS

From September 2013 to July 2015, 1289 patients were diagnosed with fractures in the head and neck region. We excluded 119 patients who had gunshot wounds without the involvement of the face. We included in the study 13 patients who had face fractures due to gunshots. (Table 1)

Table 1 - Clinical findings and treatment data

PATIENT	DIAGNOSIS	ETIOLOGY	AGE	GENDER	ANTIBIOTIC	TREATMENT	OTHER INJURIES
1	Mandible	Attempted murder	61	Male	Clindamycin	IRF	-
2	Mandible	Attempted murder	19	Male	Clindamycin	IRF	-
3	Mandible	Robbery + Attempted murder	63	Female	Clindamycin	IMF	-
4	Right zygoma	Suicide attempt	51	Male	Clindamycin + Ceftriaxone	IRF	Loss of right eye
5	Mandible	Attempted murder	24	Male	Clindamycin	IMF	-
6	Mandible	Attempted murder	62	Male	Clindamycin + Ceftriaxone	IRF	-
7	Right zygoma + Nose	Robbery + Attempted murder	18	Male	Ceftriaxone	Debridement + Fracture reduction	-
8	Maxilla + dentoalveolar	-	20	Male	None	Debridement + Fracture reduction	-
9	Naso-orbital-ethmoid	-	35	Male	None	Debridement + Scleral suture	-
10	Naso-orbital-ethmoid	Suicide attempt	41	Male	None	Debridement and suture	-
11	Naso-orbital-ethmoid	Robbery + Attempted murder	30	Male	Ciprofloxacin	Debridement and suture	-
12	Naso-orbital-ethmoid	-	18	Male	Ciprofloxacin	Debridement and suture	Loss of right eye
13	Frontal and ethmoidal sinus	Robbery + Attempted murder	49	Female	Ceftriaxone	Debridement and suture	-

IRF: internal rigid fixation / IMF: intermaxillary fixation

Of 13 patients, 11 (84.61%) were male, and two (15.38%) were female. Age ranged from 18 to 62 years for men (mean 34.45) and 49 to 63 years for women (mean 56).

There were four (30.76%) homicide attempts, four (30.76%) robberies followed by attempted murder, three (23.07%) cases of missing data, and two (15.38%) suicide attempts.

Five patients (38.46%) had mandibular fractures, eight patients (61.53%) had fractures related to the middle third, and only one patient (7.69%) had a fracture of the upper third.

Regarding the use of narcotics before the trauma, one patient reported having drunk alcohol (7.69%) and alcohol associated with marijuana and cocaine in another two (15.38%).

None of the patients evaluated presented infection after hospitalization, even those who did not use a prophylactic antibiotic. All patients evolved without complications.

DISCUSSION

The severity of gunshot wounds is determined by the type and speed of the projectile and the characteristic of the gun, thus causing devastating consequences with difficulties in surgical rehabilitation, aesthetics, and impaired functions⁵.

Men are often more exposed to maxillary and facial trauma due to environmental, cultural and socioeconomic factors⁶, involving car accidents and violence⁷. In this study, the ratio between man and woman was 5.5: 1, mean 34 years, presents results similar to another study, where the ratio was 7,9: 1⁸, while in another, the ratio was 2,4: 1⁷.

This study showed that facial fractures are related to attempted murder in 30.76% and robbery, followed by attempted murder in another 30.76%. Crime and insecurity generate collective fear in the population, where homicide rates are different in each country, with São Paulo being considered one of the most dangerous capitals in the Center-West region of Brazil.

In our study, only 3 cases reported using a firearm involved in trauma, a revolver, considered a low-speed gun⁹. Both patients had fractures of the middle third of the face, and the others had fractures of the mandible (38.46%), middle third (61.56%) and upper third of the face (7.69%). In another study, mandibular and zygomatic fractures account for 80% of all fractures⁷.

In this study, all patients' victims of gunshot wounds were treated first by the specialized trauma team with immediate primary rescue procedures. General stabilization and hemostasis control, airways maintenance, and craniofacial skeleton stabilization are mandatory before any surgical procedures^{4,5,9}.

All patients were treated at the Clinics Hospital of the School of Medicine of São Paulo, a tertiary trauma referral hospital. Different teams approached the patients according to each specialty. The specialties involved were Oral and Maxillofacial Surgery and Traumatology (38.46%), Plastic Surgery (23.07%), Neurosurgery (7.69%) and Ophthalmology (7.69%) and a joint approach to Oral Surgery and Traumatology Maxillofacial and Ophthalmology (15.38%) and Plastic Surgery and Ophthalmology (7.69%).

Stabilization and correction of facial fractures should be carried out as soon as possible, resulting in an aesthetic and functional gain for the patient, avoiding the formation of scars and fibrosis that would make a new approach difficult⁹. Most of the complications are related to displacement, the comminution of fractures, and infection since the projectile introduces bacteria throughout its trajectory^{10,11}.

The temperature reached by the projectile is not sufficient for sterilization. Therefore, antibiotics should be administered less than 6 hours after the trauma¹¹. In addition, there is more significant bacterial proliferation due to tissue necrosis and tissue continuity solution, the administration of antibiotics in short half-life cycles being ideal¹². In this study, not all patients received doses of the drug (prophylactic or therapeutic), yet none had an infection during the hospitalization period.

The stabilization of fractures through intermaxillary fixation should prevent fibrosis formation, ensure comfort for the patient, and maintain the occlusion. The most accepted and used fixation philosophy for the surgical approach is the Arbeitsgemeinschaft für Osteosynthesefragen (AO). In our study, a surgical approach was performed only in eight patients, as they presented dislocated face fractures, functional and aesthetic deficiency whose conservative treatment would not only reposition the involved structures, causing sequelae to the patient in the future. Another study showed that rigid internal fixation maintains the fracture six times more stable than intermaxillary fixation¹³.

The selection of the appropriate surgical technique is as essential for the functional rehabilitation of the patient as time, as the incorrect choice or poor application of surgical procedures can cause postoperative complications, such as infection, facial deformity, deficiency of masticatory and visual function, prolonging hospitalization of the patient in the hospital⁵.

The approach chosen will depend on the clinical status of each patient and the characteristics of the lesions caused in soft and hard tissues. Treatment protocols are created to facilitate the approach, always moving most conservatively.

CONCLUSIONS

This study found that male and young patients are the most affected due to the high rate of violence and socioeconomic differences in the city of São Paulo. The severity of the trauma and the types of injury are directly related to the kind of gun used, the affected region and the patient's recovery and stabilization time. Fracture stabilization must be performed as soon as possible to avoid future sequelae. Therefore, the study found that the care of facial trauma by firearm does not have a strict protocol; it depends on the extent and severity of each case

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