

CLINICAL CHARACTERISTICS AND X-RAY IMAGES OF THE MAXILLARY SINUS FRACTURES IN 31 PATIENTS WITH MIDFACIAL TRAUMA

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ABSTRACT

Purpose: We aimed to describe some clinical and radiographic characteristics of MSFs patients at the Department of Maxillofacial and Plastic Surgery, the Military Hospital 103.

Methods: Prospective, cross-sectional descriptive study.

Results: The mean age of patients was 32.14 ± 13.18 ; male/female ratio = 5.2/1. The main cause of maxillary sinus fractures was traffic accidents. Common clinical symptoms: sharp pain, swelling in cheekbones, upper jaw, nose bleed (100%); loss of continuity of the maxillary zygomatic arch (70.9%); limited mouth opening (80.6%); numbness in cheeks, nose, upper lip (67.7%); limited eye movement, double vision, reduced visual acuity (6.4%). Most patients broke 3 walls of the maxillary sinus (93.6%). Computed tomography scan helps to accurately and fully detect broken walls of the maxillary sinuses and other lesions in the maxillofacial region, helping to choose the right treatment method.

Keywords: Maxillary sinus fractures, midfacial trauma.

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1. INTRODUCTIONS

Maxillary sinus fractures (MSFs) are common injuries in midfacial trauma. The main cause is usually traffic accidents [1], [2], [3], [4]. MSFs are often accompanied by a fracture of the maxillary-zygomatic arch, greatly affecting function and aesthetics. If not diagnosed early, accurately, and promptly treated, MSFs can leave many sequelae, such as facial deformities, numbness of the nose, cheeks, and upper lips, affect the eye sockets, and limit the opening of the mouth and maxillary sinusitis.

In order to improve the ability to accurately and fully diagnose MSFs lesions, thereby providing timely treatment and the best functional and aesthetic results for patients, we carried out this study to describe some clinical and radiographic characteristics of MSFs patients at the Department of Maxillofacial and Plastic Surgery, the Military Hospital 103.

2. SUBJECTS AND METHODS

2.1. Subjects

31 patients with a confirmed diagnosis of MSFs in midfacial fractures were treated at the

Department of Maxillofacial - Plastic Surgery, Military Hospital 103, from May 2021 to May 2022.

Exclude patients with a history of trauma to the maxillofacial region; Patients with disease or malocclusion - maxilla before trauma; The patient has undergone surgical intervention at other medical facilities; The patient who did not agree to participate in the study.

2.2. Methods

- Design: Prospective, cross-sectional study

- Process: The patients admitted to the hospital were examined, detected clinical and subclinical symptoms, and confirmed the diagnosis (the gold standard was mid-face fracture images, including MSFs). The collected information was recorded in the study medical record.

- Research features:

+ General characteristics of patients: age, sex, and cause of injury.

+ Clinical features: local swelling, numbness, sharp pain in cheekbone, nose bleed, limited

opening of the mouth, manifestations affecting eye socket, eyeball (limited eye movement, double vision).

+ Paraclinical characteristics: blood count, blood biochemistry, coagulation; diagnostic imaging (multi-slice computed tomography of the skull with axial, coronal, sagittal, 3D rendering).

- Research ethics: the research protocol was approved by the hospital ethics committee, and patient information was kept confidential and used only for research purposes.

- Data processing: According to medical statistical methods, using Excel software.

3. RESULTS AND DISCUSSION

3.1. General characteristics of patients

Table 1. Distribution of study patients by age and sex (n = 31)

Age	Sex		Total
	Men	Woman	
16-29	10 (32.2%)	1 (3.2%)	11 (35.4%)
30-49	13 (41.9%)	3 (9.6%)	16 (51.6%)
50-59	2 (6.4%)	1 (3.2%)	3 (9.6%)
≥ 60	1 (3.2%)	0	2 (5.7%)
Total	26 (83.9%)	5 (16.1%)	31 (100%)

Patients aged 16-62 years (mean 32.14 ± 13.18 years old); in which, the majority of patients were 16-49 years old (87.0%). The ratio of male/female patients = 5.2/1. This result is consistent with the studies of Do Thanh Tri (ratio of male/female patients is 5/1 [2]), Nguyen Thi Quynh Lan (ratio of male/female patients is 6/1 [3]).

More men than women may be due to the fact that men tend to participate in activities and occupations with more risk factors for injury.

- Causes of trauma (n = 35):

+ Traffic accident: 28 patients (90.3%).

+ Occupational and daily-life accidents: 3 patients (9.7%).

90.3% of patients with MSFs were due to traffic accidents - higher than the results of Do Thanh Tri (80% [1]) and Le Dang Thuyet (84.2% [2]). In Vietnam, many studies have also shown a very high rate of injuries caused by traffic accidents. This is not only a social issue that needs attention, but in treatment, doctors need to pay close attention because traffic accidents often happen suddenly, causing direct trauma mechanisms, often complicated injuries, and heavy damage to many organs.

3.2. Clinical characteristics of patients

- Swelling of cheekbones - upper jaw: 31 patients (100%).

- Numbness in cheeks, nose, and upper lip: 21 patients (67.7%).

- Sharp pain in cheek - maxilla: 31 patients (100%).

- Nose-bleeding: 31 patients (100%).

- Loss of zygomatic - maxillary bone continuity: 22 patients (70.9%).

- Limit opening of mouth: 25 patients (80.6%).

- Limited eye movement, double vision, reduced visual acuity: 2 patients (6.4%).

In our study, 100% of patients had symptoms of swelling, sharp pain in the cheekbones, and upper jaw, and nosebleeding. This result is consistent with Le Dang Thuyet's study (100% of the patients had swelling, severe pain in the cheekbones - upper jaw [4]), but higher than the study of Do Thanh Tri (94.5% of the patients with swollen, sharp pain; 85.5% of patients had nosebleeds). Symptoms of nose-bleeding are caused by broken sinus walls, blood flows into the sinuses through the middle nasal passage.

There are 67.7% of patients with numbness symptoms; higher than the results of Do Thanh Tri's study (56.4%[1]), but lower than in the study of Mario F.G (75% [4]).

The rate of patients with limited mouth opening was 80.6%; higher than the study of Le Dang Thuyet (76.3% [2]).

In this study, 6.4% of patients showed symptoms of orbit and eyeball (limited ocular movement, diplopia, decreased visual acuity); This result is lower than the study of Le Dang Thuyet (10.5% [2]) but higher than the study of Do Thanh Tri (3.6% of patients with limited eye movement, 1.8% of patients with double vision [1]).

70.9% of patients had a loss of zygomatic-maxillary continuity. This is a clinical symptom to confirm the rupture of the anterior and posterior walls outside the maxillary sinus.

3.3. X-ray and computed tomography scan results

- X-ray results (n = 31):

+ MSF combined with zygomatic arch fracture: 28 patients (90.3%).

+ The location of the MSF: 9 (29%) on the right side; 20 (64.5%) on the left side and 2 (6.5%) on both sides.

On conventional radiographs, surgeons cannot fully evaluate bone lesions (especially lesions in the upper wall, posterior outer wall, and inner wall of the maxillary sinus).

- Computed tomography scan results: All 31 patients underwent computed tomography. The results of the computed tomography scans fully detected bone lesions in general, and the MSFs in particular (Table 2).

Table 2. Location of MSFs (n = 31)

Number of broken maxillary sinus walls	Location of the broken maxillary sinus wall				Total
	Anterior	Superior	Posterior-outer	Inferior	
4 walls	0	0	0	0	0
3 walls	29 (93.6%)	27 (87.1%)	29 (93.6%)	2 (6.4%)	29 (93.6%)
2 walls	0	0	0	0	0
1 wall	2 (6.4%)	0	0	0	2 (6.4%)
Total	31 (100%)	27 (87.1%)	29 (93.6%)	2 (6.4%)	31 (100%)

Out of 31 patients with MSFs, 29 patients (93.6%) broke 3 sinus walls; in which, 27 patients (87.1%) broke the anterior, upper, and posterior outer walls and 2 patients (6.4%) broke the anterior, inner, and posterior outer walls; 2 patients (6.4%) broke the anterior wall of the maxillary sinus.

The maxillary sinus is a cavity of the maxillary bone, with a pyramidal structure consisting of four walls (anterior, upper, wall, posterior outer wall), and one apex (towards the cheekbone) [5]. Fractures of the mid-face in general and cheekbones in particular, often accompanied by damage to the maxillary sinus. This result is also consistent with the results of other authors.

On computerized tomography with axial, coronal, and sagittal planes, it is possible to accurately and fully detect superficial and deep lesions, and fracture properties of the maxillary sinus walls. Through the processing software, a 3-dimensional image can be recreated, which can be rotated in different directions to investigate the lesions. Thus, appropriate treatment methods are proposed, bringing optimal results in terms of function and aesthetics for the patient.

4. CONCLUSIONS

Our study of 31 patients with MSFS in midfacial fracture trauma, at the Department of Maxillofacial - Plastic Surgery, 103 Military Hospital, from May 2021 to May 2022 shows that:

- The mean age of patients was 32.14 ± 13.18 years old. The ratio of male/female patients = 5.2/1. The main cause was traffic accidents (90.3%).

- Common clinical symptoms: sharp pain, swelling in cheekbones, upper jaw, nosebleeding (100%); loss of maxillary - zygomatic arch continuity

(70.9%); the limited opening of the mouth (80.6%); numbness in cheeks, nose, upper lip (67.7%); orbital and ocular manifestations such as limited eye movement, double vision, decreased visual acuity (6.4%).

- There were 29 patients (93.5%) with MSF on one side; two patients (6.5%) with MSF on both sides; 29 patients (93.6%) broke three maxillary sinus walls, and two patients broke one maxillary sinus wall (6.4%).

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