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Research Article

Difficulties Challenges and Management Outcome of Panfacial Fractures Done At Tertiary Center of Kathmandu Valley

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Abstract

Background:

Facial fractures are one of the common fractures among whole body skeleton fracture. Panfacial fractures resembles a therapeutic and management challenges to oral and maxillofacial surgeons. We carried out this study to determine the etiology, injury characteristics and management outcome of pan facial fractures at Dental Department- Patan Academy of Health Sciences, Lalitpur.

Methods:

A retrospective hospital-based study of panfacial fractures patients was carried out at Dental Department-Patan Academy of Health Sciences, Lalitpur hospital from January 2021 to December 2024. Data was collected and analyzed using SPPS.

Results:

200 Pan facial Trauma Patients were analyzed. Males to females by a ratio of 24:1. Their ages ranged from 13 to 63 years with a mean of 30±12 years Most injuries were due to road traffic accidents (78%), and by falling from height in 12%. Mandibular fractures were the most common type of injuries. Open reduction and internal fixation by using plates and screws was the commonest surgical technique, used in 97.8% of cases. The most common complications were limited mouth opening, malocclusion. The mean duration of hospital stay was 11.13±2.23 days.

Conclusions:

Road traffic accident (RTA) was the most common cause of pan facial injuries in our locality and the young adult males were the most commonly affected victims. The majority of maxillofacial fractures were treated by open reduction and internal fixation.

Key Words: open reduction and fixation; pan facial fracture; oral intubation; submental intubation

Introduction

Any accidents are crucial and difficult to manage when its multiple. Panfacial fractures are more difficult and resemble major challenges to oral and maxillofacial surgeons as these fractures, affect the upper, middle and lower regions of the face.[1,2] involving entire bone of face and cranium too. In most of the cases pan facial fractures are associated with soft tissue injuries, dentoalveolar bone, teeth and loss of anatomical relations. Severe pan facial fractures if not managed properly lead to complicated functional and aesthetic facial deformities, improper occlusion and panfacial injuries can impact the quality of life of the patient or limit social interaction. There is no consensus regarding the modality of treatment and principles of management.[3-7]

Panfacial fractures involve fractures of several bones of face, including mandible, maxilla, zygomatic complex, most often nasoorbitoethmoid (NOE) and frontal bone. They are commonly accompanied with malocclusion, facial deformity, diplopia, enopthalmos, and soft tissue injuries. 1 There is no clear classification of Panfacial fractures in the literature. [2] The most common cause is motor vehicle accident and direct

assault and fall from heights.[3] The incidence of oral and maxillofacial trauma in general rapidly increasing specially in developing countries.[4]

In spite of the decrease in the incidence of pan facial trauma from road traffic accidents due to the improvement in safety measures such as airbags and seat belts, Mapase, injuries due to interpersonal violence continue to rise.5 About 20% of maxillofacial injuries patients have an associated head injury.

Treatment of panfacial fractures can be difficult and challenging, because in most of cases its difficult to get the fixation point to re-establish bone continuity.[7]

Due to advancement in diagnostic aids in a decade has made more easier to face the challenges encountered during operations. Because of these surgical approaches to the fracture changed, wide exposure of fracture, immediate reconstruction of buttresses, three-dimensional computed tomography and rigid fixation systems made the changes for the better.[1,8]

The surgeon's difficulty and challenge is to restore complete aesthetic,occlusion, anatomical and functional repair of the facial skeleton.[8]

Sometimes due to difficulty in approach and anatomical structures located nearby fracture site fixation may not be proper and persistent facial deformity could happen due to failure of direct exposure of all fracture lines or due to unstable fixations in some cases of residual post-traumatic facial deformity leading to secondary corrective surgery in future.1 Hence panfacial fractures are difficult and challenging in operating some of the cases. Complicated cases involving other long bone fractures, neuroglogical involvements often requires intensive care unit and multidisciplinary involvement for other co-morbidities.

There are two school of thoughts for management of panfacial trauma that is top down and outside in or bottom up and inside out has been used to describe the standard approaches for panfacial fracture management. In our cases we from top to bottom. For cases where the maxilla and mandible have fractures that interrupt the geometry of dental arches.Kelly et al suggested reducing and stabilizing hard palate as guide for mandibular reconstruction.2

Gruss et al recommended zygomatic arch reduction and malar projection firstly aiming to re- establish the outer facial frame before NOE or inner facial frame is reduced while Melville preferred Top to Bottom sequence if NOE was involved in the panfacial trauma. [1,9]

It is quite less that because of facial trauma patient losses his/her life that is life threatening condition is less frequent however, it is almost associated with dangerous sequala, such as airway obstruction. [10,11].

Post-operatively there may be many complications associating reconstruction of panfacial fractures, like malocclusion which can be managed with, orthodontic treatment or orthognathic surgery. Nerve damage due to fractures can be managed conservatively or many times that gets recovered on due course of time. Sometimes most difficult complications like malar asymmetries, diplopiaenophthalmos, and telecanthus. 12,13 occur.

The aim of this study was to describe our own experiences in the management of panfacial trauma including etiological pattern, and management outcome of these fractures in our institution. The study provides basis for establishment of treatment guideline and planning for preventive strategies.

Methods

Study design

Postoperative study including all patients presented with pan facial trauma in the period from January 2021 to December 2024 in the Oral AND Maxillofacial Surgery Unit at Dental Department, PAHS., and met the inclusion criteria. All cases with pan facial trauma either pure facial trauma or poly traumatized patients, all age groups.

Exclusion criteria

- Patients with only one facial trauma, e.g. symphysis fracture
- Patients with pure soft tissue injury only.
- Demographic data includes: name, age, sex, occupation, social level, address, were registered.

Pattern/Mechanism of injury

Road traffic accident, accidental injuries, fall from height, injuries at work, physical assault, sport injuries.

Type of oral and maxillofacial injury

Soft tissue injuries, facial bones fractures: mandible,maxilla, zygoma, nose, periorbital, forehead, registered.

Associated injuries:

Central nervous system, nasal frcture, cardio-thoracic, orthopedic, ocular, injury was reported. All cases diagnosed with clinical evaluation and by radiological (OPG,CT-FACE) investigations.

X-Ray Skull and face, Ortho-pantamogram,

Three-dimensional CT with recon of face. Data of surgical treatment of injuries included, date of admission, date of surgical treatment in relation to date of trauma, date of discharge.

Modality of surgery i.e. mini-plates and screws, Arch bar and wire, Interdental wire, mixed. Overall mortality (within the first 30 days post-traumatic).

Over all morbidity

Malunion, malocclusion, nonunion, ankylosis, infection, tempromandibular joint (TMJ) dysfunction, facial pain, sensory affection (hypothesia, hyperthesia, paresthesia).

Follow up

Clinical, Radiological (if indicated). Up to 6 months postoperative as following, once weekly first month. Every two weeks second month, every month, the last four months. In this retrospective study, all pan facial trauma patients admitted to the Dental ward of Patan hospital over period from January 2021 to December 2024 were included.

Trauma patients are mostly seen at the emergency department where resuscitation is carried out according to Advanced Trauma Life Support (ATLS) principles. Once patients are stable then they are sent to dental oral and maxillofacial unit and are admitted in the dental ward. Patients who needed ICU are admitted in ICU wards, respectively and respective departments are consulted for required treatment of other involved body parts. Sometimes multi-departments operate together for the benefit of patients.

During this study, all panfacial injury patients seen at the ER and dental departments were, after informed, taken written consent, consecutively recruited into the study. Patients who came to ER department with facial trauma, we never faced the mortality till date.

Data related to the study was obtained from the patient; when this impossible, history was obtained from either the relative or police attending with the patients.

The causes of injury were classified as road traffic accidents (RTAs), assault from others, and falling from height. The mandibular fractures classified according to Ivy and Curtis classification, the fracture maxilla classified as

Lefort I, II, and III. [14,15] Data analysed using the (SPSS) for. A p-value of less than 0.05 considered significant.

Results

During the period under present study, 200 patients were included. 192 (96%) patients were males and females were 8 (4%) with a male to female ratio of 24:1. Their ages ranged from 13 to 63 years with a mean of 30±12years. Road traffic accident resembling for 156 (78%) of all cases. Of these, 106 (53%) injuries were related to motorcycle accidents affecting passenger's motorcyclists, and pedestrian.

Variables	No. of Patients	Percentage
RTA	156	78
Motor car accident and	106	53
Motor cycle accident	50	25
Firearm injury	2	1
Falling from height	34	17
Machine injury	2	1
Falling of hard object	6	3

Table 1: Distribution of patients according to cause

out of 200 panfacial injuries, 116 (58%) with soft tissue injuries which included contusion, lacerations and abrasions. The mandible was commonly involved in 176(88%) of patients (Table 2).

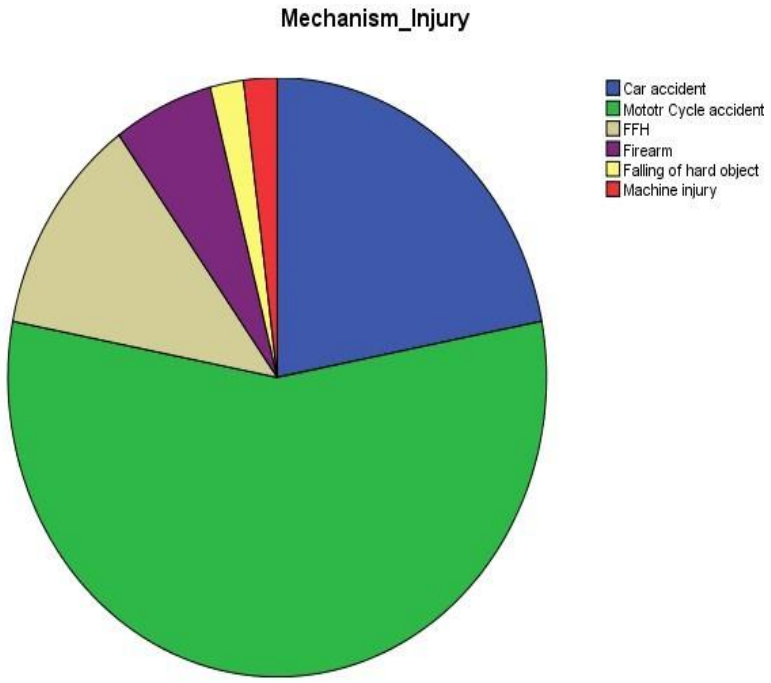


Figure 1: Incidence of pattern of injury.

Injury site	No. of patients	Percentage
Mandible	176	88
Parasymphyseal	96	54.5
Condyle	44	25
Symphyseal	4	2.3
Coronoid	20	11.4
Comminuted	4	2.3
Body	20	11.4
Dentoalveolar	8	4.5
Ramus	4	2.3
Angle	8	4.5

Maxilla	164	79.5
Maxilla	164	79.5
Lefort 1	128	78
Lefort 2	28	17.1
Dentoalveolar	8	4.9
Palatal splitting	24	14.6
Zygoma	180	90
Nasal bone	76	38
Frontal bone	64	32
Orbit	64	32
Soft tissue	116	58
Associated injuries	132	66

Table 2: Maxillofacial fractures (n=50).

Associated injuries	Frequency	Percentage
Neurosurgery	52	39.4
Orthopedic	44	33.4
Abdominal injuries	16	12
Thoracic injuries	12	9
Ocular	8	6

Table 3: Associated injuries (n=33).

132 patients (66%) had associated injuries. Of these, head(39.4%) and musculoskeletal (33.4%) regions c were inpatients who had associated head injuries, 28 patients(53.8%) mild injuries (Glasgow Coma Scale [GCS]: 13-15), 12 (23.1%) with moderate injuries (GCS: 9-12), and 12 (23.1%) with severe injuries (GCS: 3-8).

Surgical treatment was required in 180 (90%) of patients under general anesthesia with nasal endotracheal tube in 132(73.3%) of patients, submental endotracheal intubation in 44 (24.4%) of patients and oral endotracheal tube in 4 patients (2.2%) only.

Tracheostomy was done in four cases (2.2%) only open reduction and internal fixation by plates and screws was done in 176 (97.8%) being the most common surgicalprocedures performed. Intermaxillary fixation (IMF) was done in 140 (77.8%) of patients either with arch bars or eyelet wiring methods.

Titanium mesh was used in 24 (13.3%) patients for orbital blow out fractures commonly affected (Table 3).

Variables Intubation method	No. of patients	Percentage
Nasal	132	73.3
Submental	44	24.4
Oral	4	2.2
Tracheostomy	4	2.2
Titanium mesh	24	13.3
Plates and screws	176	97.8
Arch bar	140	77.8

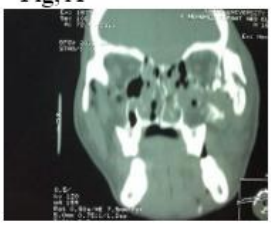
Table 4: Operative parameters.

6 patients needed redo surgery to correct malocclusion and to control infection. The overall length of hospitalstay ranged from 3 day to 30 days (11.12±12.24 days). Patients with head trauma and with orthopedic injurieshad statistically significant longer hospital stay (P<0.001). In present study, unfortunately 8 patients diedgiving a mortality rate of 4%.

Discussion

Panfacial fracture is a term to define those fractures involving the upper, middle and lower face. 1 The aim of treatment panfacial fracture is prevention of facial deformities, malocclusion. 2 Most of panfacial trauma has other systems injuries like orthopedic or neurosurgery so multidisplinary approach with other specialties is very important to achieve ideal management of those polytraumatized patients. 3

Fig; A Fig; B



Fig; C

Figure 1: Preoperative View; (A) preoperative 3D CT; (B) Preoperative occlusion; (C) coronal view.

Fig; A Fig; B

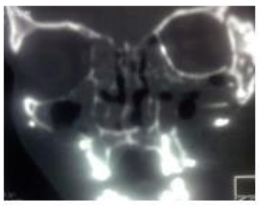


Fig: C

Figure 2: Postoperative view; (A) postoperative 3D CT; (B) postoperative occlusion; (C) coronal View.

It is observed that most of bilateral panfacial fractures were due to road traffic accidents which agree with otherstudies. 5 submental intubation is safe and simple to execute without the need of any specialized instrument. We used submental intubation in 44 patients about 24.4% of cases which was very helpful as it is easy and not interfering with occlusion or fixing the nasal complex fracture. Early intervention prevents postoperative facial deformity or unacceptable results. In present study the timing of surgery is crucial as our protocol of management is to operate the patient as soon as the facial the edema subsided (from 7 to 10 days).

The panfacial trauma commonly affect males, the male predominance in present study agrees with other literatures. 16-20 Males are commonly affected due to their more exposure to trauma risk factors like driving vehicles, sports injuries.

Present study agree with many literatures as the majorities of patients in the present study were young adult in their third decade. 16,18-23 However, this observation in not agree with some studies, the most common age groups affected by pan facial fractures is the 3 rd decade. The etiology of the increased incidence of panfacial fractures in young adults in present study may be due to that people in this period of life are more active regarding sports, hard activities, industry, and high-speed vehicle. The low incidence in the very young and old age groups is due to the low activities of these age groups.

In present study we found that the commonest cause ofpanfacial injuries was road traffic accidents, which agreewith other studies in but in contrast to other studies donein developed countries which reported assaults fromothers as the commonest cause of panfacialfractures. 12,20,23,25-29

Soft tissue injuries were the most commonly occurring type of injury and mandibular fracture was the most frequent type of bony injury. That agree with other studies. 18,26,30 This dominance may be due to that the mandible is the most prominent and only mobile facial bone. While some articles reported maxillary fractures as the commonest site of injury. 19,31,32 This difference in pattern ofinjury may be due to variations in the mechanism of injury and anatomical site of the fractured bone.

Head trauma resembling the majority of co-injuries similar to findings from other studies. 33-35 The incidence of missed injuries has been reported to be higher in patients with associated severe head injuries. 33-35 This is

explaining the high rate of undiagnosed maxillofacial injuries in our patients, most of them had associated severe head injuries.

There are many modalities of treatment of pan facial fractures, but the treatment of choice differs according to on many factors like treatment cost, feasibility in the hospital, medical team decision and skills, all of which may vary from one center to another. most of the patients treated in present study with open reduction and internal fixation, which is consistent with the studies conducted by Kamulegeya et al, Chandra Shekar, Erol et al and Kilasara et al. 18,23,25,36 Open reduction and internal fixation has been reported to be the 1st choice of treatment of panfacial fractures. The average length of hospital stays (LOS) in present study (18.12 days) was found to be longer than that of 2.5 days reported by Martins Junior et al. 37,38 The reason for this difference is that in the present study patients with multiple maxillofacial fractures, associated injuries, and those with associated lower limb fractures had significantly longer hospital stay contributings ignificantly to the overall mean LOS.

Conclusion

Road traffic accident (RTC) was the most common cause of panfacial injuries in our locality and the young adult males were the most commonly affected victims. The majority of maxillofacial fractures were treated by open reduction and internal fixation. Panfacial fractures should be managed by open reduction and internal fixation as soon as possible to reduce the morbidity resulting from these injuries.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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