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Research Article

Airway Management Incidences in Facial Trauma Cases. Did Tracheostomy Indicated?

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ABSTRACT

Aim: Analyse the patients records which is the most commonly used method in airway management and how many cases of tracheostomy are done?. Exploring potential methods for managing airways in patients with craniofacial trauma.

Methodology: (387) patient's case sheath analysed. Demographical information's include (age, gender, cause of injury) and site of trauma with method of airway management recorded.

Result: Fighting are the most common cause of injuries in age group (31-40 years) male patients. Zygomatic bone is the highest injured single bone, maxillary and nasal bones are both injuried forming the highest percent. Tracheostomy forming the least percent to be used as emergency airway managements.

Conclusion: Patients who have suffered maxillofacial injuries present a difficult challenge for airway management. The clinical situation, trauma characteristics, and a series of other factors determine the strategy for securing the airway. In order to provide the best possible care for a patient, it is essential to have knowledge of the specific characteristics of the difficult airway, experience with the proper procedures for managing it.

KEYWORDS

Airway Obstruction, Tracheostomy, Maxillofacial Injuries, Incidence, Otolaryngology.

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Introduction

Trauma is a significant health issue in today's society. Because of its life-threatening nature and long-term morbidity, facial trauma requires specific attention [1]. Some examples of high-velocity trauma that can cause facial injuries are car accidents, sports injuries, falls, and gunshot wounds. Airway management, cervical spine stabilisation, and bleeding control should be the top priorities for these patients.

In facial injuries, managing the airway is a whole different issues [2]. It is possible that not all cases of craniofacial injuries are amenable to a single, universal strategy of intubation [3].

Intubation techniques differ depending on the type of injury, surgical procedure, and operating time. It is necessary to consider different methods and tools for airway control depending on the surgical needs. Managing these patients effectively requires an understanding of facial skeletal structure and the most prevalent types of fractures. Researchers have documented the management of airways in these patients using a variety of procedures, including tracheostomy, blind nasal intubation, nasal intubation, and oral intubation [4]. Every method has advantages and disadvantages. Because precise plating of different mandibular and maxillary fractures necessitates surgical intermaxillary fixation in normal dental occlusion, nasal intubation is preferable to oral intubation in cases of pan-facial trauma [5]. If we perform nasal bone reduction alongside maxillary and mandibular plating, we have two options for airway management: oral intubation or tracheostomy.

Johannes Scultetus (1595-1645) mentions tracheostomy as a potentially life-saving technique in cases where the patient is experiencing respiratory distress. A few historical sources report that the practice of tracheostomy dates back to the year 100 BC [6]. On the other hand, this procedure has become increasingly common since roughly the middle of the nineteenth century. This is because physicians became more receptive to the procedure as a means of providing immediate relief to patients who were suffering from acute laryngeal obstruction. At that time, the majority of cases were associated with diphtheria [7]. Tracheostomy is a surgical procedure that involves the creation of a stoma between the person's skin and their trachea in order to alleviate upper airway obstruction [7].

Aims

The study aims to analyse the patients records which is the most commonly used method in airway management and how many cases of tracheostomy are done?. Exploring potential methods for managing airways in patients with craniofacial trauma, primary care in emergency situations, pertinent anatomy, challenges in establishing a patent airway. In addition to improve the clinical outcome of facial trauma patients, there should be reciprocated cooperation between the anesthesiologist, maxillofacial surgeon, and ENT surgeon (for emergency tracheostomy, if needed).

Material and Methods

Study Design and Ethical Approval

A retrospective statistical analysis study was conducted in Al-Salam Teaching Hospital among facial trauma patients who underwent surgical management. The study follows the ethical principles of Declaration of Helsinki. Approval to conduct this study was obtained from the Institutional Review of the Authorised Scientific Committee in Nineveh Health Directorate with the numbered session 259 in 4/ 9 / 2024 with research number 2024134 (No. 35509, Date 1/9/2024).

Inclusion and Exclusion Criteria

All patients aged from 1year to above 50 underwent surgical intervention for facial trauma are included in the study. Exclusion criteria are patients need other types of surgery, Facial soft tissue injuries treated in the outpatient setting, incomplete patient's data.

Sample Size

The sample size was (387) patient's case sheath.

Method

From January 2023 - January 2024, In Al-Salam Teaching Hospital 387 male and female patients who underwent facial trauma surgeries as either an emergency or elective procedure. A thorough medical history, including the date and nature of the accident as well as any preexisting conditions was recorded. Vital signs such as respiration rate, temperature, blood pressure, pulse, and oxygen saturation levels. Thorough assessment of the injuries to the face and jaw. All documented data are recorded from the patient's files (age, sex, mode of injury, type of facial fractures, methods of airway management and their associated complications).

Statistical Analysis

Rhe data analysed through Exile program. No. of patients and percent are recorded.

Result

More than five hundred patient's case sheath are reviewed. Three hundred eighty-seven are included in this study for different reason such as incomplete data records including airway managements.

Table 1 focus on the descriptive details of the demographic information for the patients including:

1. Age Groups distribution: six age groups are allocated age groups 21-30 shows the upper most percent (26%) while age group more than 50 shows the lowest (8%).
2. Gender: Male shows the highest than female (58%).
3. Cause of Injury: are divided into five categories includes Fall from height (FFH), Car accidents, motor cycle, fight and sports. FFH and car accidents are near the same percent (25%) while fighting recording the peak cause for injuries. Sports show the minimum cause of injuries (4%).
4. Number of Bone Injured Distribution: bone fractured are varied from single bone injuried (43%), two bones (19%), three bones (21%) and more than 3 bones (Pan facial fractures) recorded (17%). Near half of cases where single bone traumatized.
5. Final variable where the airway management diverse into (No need for intubation, oropharyngeal airway used only, oral intubation, nasal intubation and ultimate tracheostomy as a emergency life saving measures.

Age and Gender are also analysed according to cause of injuries (Table 2) shows in age group from 1 year to 10; fall from height is the common cause of injury. In age group 11-20 the maximum cause where motor cycle accidents on the contrary in age group 21-30 years car accidents are common cause. Fighting are frequent cause in age group (31-40) and fall from height are the cause in cases more than 41 years.

Table 1: Descriptive Analysis of the Study Sample.

Variables		No. of Patients 387	% of Patients
Age	1-10 Y	39	10
	11-20 Y	61	16
	21-30 Y	**100**	**26**
	31- 40 Y	**90**	**23**
	41-50 Y	65	17
	More than 51 Y	32	8
Gender	**Male**	**226**	**58**
	Female	161	42
Cause of Trauma	**FFH**	**97**	**25**
	Car Accident	**95**	**25**
	Motor Cycle	73	19
	Fight	**105**	**27**
	Sports	17	4
Number of Bone Injured Distribution	Single bone	169	43
	2 bones	73	19
	3 bones	80	21
	More than 3 Bones (Pan)	65	17
Airway Management	No need for intubation	263	70
	Oropharyngeal	72	19
	Oral	21	6
	Nasal	13	3
	Tracheostomy	9	2

Table 2: Age Groups Distribution according to Cause of Injuries in the Sample.

Variables		Cause of Injuries										Total
		FFh		Car		Motor		Fight		Sports		
		No. of Pt.	%	No. of Pt.	%	No. of Pt.	%	No. of Pt.	%	No. of Pt.	%	
Age Groups	1-10	32		7		0		0				39
	11-20	11		10		25		15				61
	21-30	0		39		21		27		13		100
	31- 40	18		13		9		46		4		90
	41-50	20		17		18		10				65
	More than 51	16		9		0		7				32
Total		97		95		73		105		17		387

Table 3: Gender Distribution according to Cause of Injuries in the Sample.

Variables		Cause of Injuries										Total
		FFh		Car		Motor		Fight		Sports		
		No. of Pt.	%	No. of Pt.	%	No. of Pt.	%	No. of Pt.	%	No. of Pt.	%	
Gender	Male	40		51		56		68		11		226
	Female	57		44		17		37		6		161
Total		97		95		73		105		17		387

Gender also analysed in relation to trauma cause in both male and female fighting are the upper most cause of injury (Table 3).

Bone Injured Distributions

Bone trauma divided into single bone, 2 bones, 3 bones and pan facial bones fractured (17%). Figure one highlighting the single bone type which injured; mandible and zygomatic bones fractures are the highest percent (24%, 23%) consequently. Figure 2 focus on bone injuries in relations to nasal bone (2 bone injury). More than half of cases where maxillary bone fracture adjuvant to nasal bone injury.

In regard to three bone fractures including nasal bone (Figure 3), more than fifty of cases recording fracture maxilla, mandible and nasal bones trauma (51%).

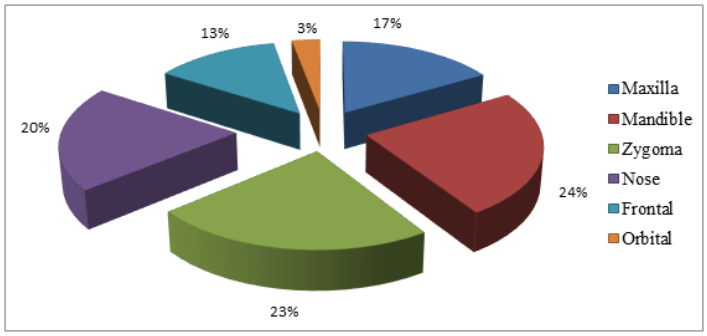

Figure 1: Single Bone Injuries in the Sample.

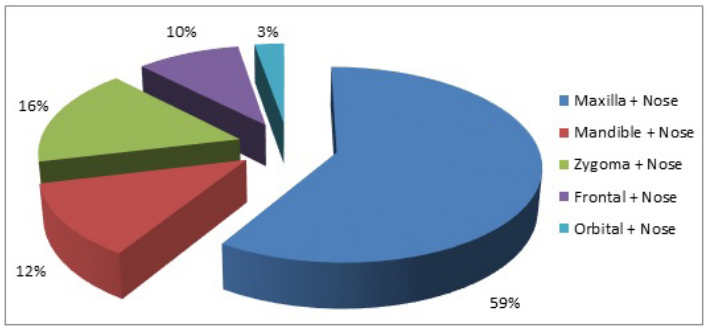

Figure 2: Two Bone Injuries including Nasal Bone in the Sample.

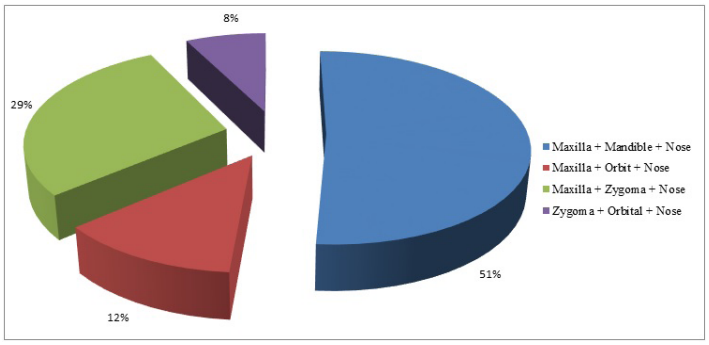

Figure 3: Three Bone Injuries including Nasal Bone in the Sample.

Airway Management

Most of trauma cases (70%) with good airway support and don't need any interventional protocols whether oral, nasal or tracheostomy as life saving measures. Tracheostomy are needed in only 2% of cases while oropharyngeal devise support needed in 19% of cases (Figure 4).

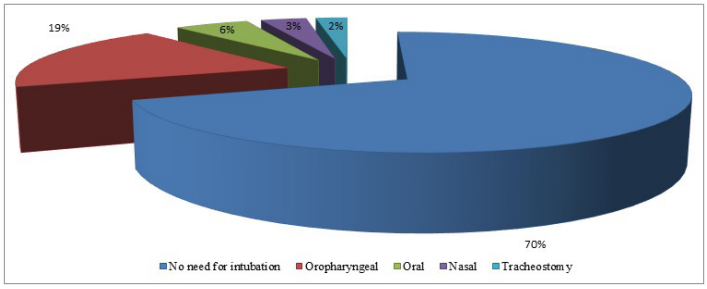

Figure 4: Airway Management in Facial Trauma Cases.

Discussion

Trauma has been designated as the overlooked affliction of contemporary civilization. It accounts for thousands of deaths in both developed and developing countries [8]. In patients with craniofacial injuries, airway management is crucial since a compromised airway can be fatal.

Gruen et al. discovered that the most frequent factor associated with patient mortality, which accounted for 16% of inpatient deaths, was the inability to intubate, secure, or protect the airway [5]. Patients with facial trauma, there are a number of options for managing their airway. However, selecting a specific technique depends on a number of factors, including the severity of the facial injury, its anatomy and composition, the type of surgery chosen, any associated injuries (such as head or cervical spine injuries), bleeding, and the anesthesiologist's level of expertise [5]. Oral occlusion during surgery by intermaxillary fixation is necessary to ensure that the teeth align correctly with fracturing pieces and their inflexible attachment. Thus, surgeons favor receive nasotracheal intubation since it allows them to function independently and dental occlusion accuracy [9]. As a principles surgeries for fractures zygoma and nose mostly operated with oral intubation. When intraoperative intermaxillary fixation was necessary, the airway was controlled using the nasotracheal intubation approach, either with fiberoptic guidance or under direct view [10]. The worst outcome from a facial injury is obstruction of the airway with the possibility of delayed airway blockage brought on by naso-oro-pharengeal edema which can be solved with the use of tracheostomy. As well as severe bleeding brought on by a maxillofacial trauma is also thought to be one of the causes of an severe occlusion of the airway which indicate to use tracheostomy procedure [11].

Serious facial injuries or anticipated extended intubation may favor tracheostomy whether percutaneous or open surgery which is preferred procedure [1].

In the realm of maxillofacial trauma, a tracheostomy provides an airway that is completely unobstructed from the surgical area and remains highly secure after significant head movement, including repositioning and drilling [12]. Furthermore, tracheostomy is optimal for patients requiring extended ventilation post-surgery [13]. On the contrary pneumo-mediastinum, pneumothorax, posterior tracheal wall damage, subglottic stenosis, tracheomalacia, and the rare but life-threatening tracheoinnominate fistula are all problems that can happen after a tracheostomy [14-16]. A multi-institutional study on tracheostomy procedures analyzed 1,175 patients who underwent tracheostomy tube placement for various reasons, revealing complication rates of 1.4%, 5.6%, and 7.1% for intraoperative, early postoperative, and late postoperative complications, respectively [17]. Therefore, one should decide between an open surgical tracheostomy and a percutaneous dilatational tracheostomy [18].

ENT surgeon's comfort and expertise, along with the patient's selection, determine the outcome. They advise to stabilize

tracheostomy tubes using a commercial tracheostomy tube holder, a commercial tracheostomy tie, a commercial tracheostomy soft collar, or suture them directly to the cervical skin as an anchor. Even they recommend postoperative suturing of the tracheostomy plate until the initial tracheostomy tube change [1]. The kind of facial fracture incurred by the patient, alongside significant neurological or pulmonary trauma, was a critical factor. Patients with bilateral subcondylar fractures, parasymphysis fractures, and Le Fort III fractures as potentially unstable airway cases which might nessessate tracheostomy [19,20].

In study performed by Byung 2018; they enrolled 236 individuals, of which 76 met the early tracheotomies requirements and 160 met the late tracheostomies requirements. According to the comparison of outcomes after matching, early type demonstrated considerably shorter values than late one in terms of the overall duration of the ventilator and the length of care received. According to their article they recommend exploring mechanical ventilation with early tracheostomies for trauma patients who require prolonged mechanical breathing [21].

Otolaryngologists frequently play an important part in the management of airways in both of these settings since they are specialists in laryngotracheal surgery. When dealing with individuals who have suffered substantial face damage, it is essential to be mindful of other severe injuries and to clear the airway using suction. If mask ventilation is possible, oxygenation can occur until a secure airway becomes available. While supraglottic airways may serve as a temporary airway maintenance method, definitive endotracheal intubation is the preferred method. If there is a soft tissue injury or edema present, and anterior mobilization of the soft tissue cannot alleviate this condition, perform an emergent cricothyroidotomy or tracheotomy immediately. Lastly, with the delayed repair of facial fractures, meticulous preoperative planning can produce airways that are safe and do not impede the airway [22].

According to current study, the highest age group affected by trauma are between 21-30 years old the reason may be the recklessness of young people unlike the elderly even so the cause of injuries which is fighting [23]. Fighting can reflect that highest number of single bone fracture more than other categories which mostly occur with car accidents or fall from height [23]. Six percent of patients only are indicated for tracheostomy in the current study associated with severity of craniofacial trauma. In article published by Kerry Ann conclude that "Tracheostomy was utilized as a last resort due to its higher incidence of morbidity-associated and severe complications. Utilization of Tracheostomy was mostly seen in cases where there were contraindications to submental and nasotracheal intubation. Morbidity of Nasotracheal intubation was shown to increase in cases with skull base and naso-orbital-ethmoidal fractures; submental intubation can instead be considered" [24].

Another study published by Noor show that 5% of patients from total (100 patients) are indicated for tracheostomy as a result of maxillofacial trauma caused by car accident (67%) [6].

Conclusion

Patients who have suffered maxillofacial injuries present a difficult challenge for airway management. The clinical situation, trauma characteristics, and a series of other factors determine the strategy for securing the airway.

In order to provide the best possible care for a patient, it is essential to have knowledge of the specific characteristics of the difficult airway, experience with the proper procedures for managing it, familiarity with the various airway devices, and rapid recognition of a failing airway. For the purpose of handling the trauma patient, it is necessary to have professionals who are both skilled and open-minded, as well as a variety of advanced airway equipment.

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