The priorities and emergency treatments of multisystem injuries associated with maxillofacial traumas

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ABSTRACT

Background: The purpose of this study is to evaluate the care of multiple trauma victims with maxillofacial injuries in terms of epidemiological distributions, types of injuries, the related different modalities of surgical treatments delivered, and their complications.

Materials and Methods: This prospective study was performed on 50 patients with multiple traumas including maxillofacial injuries, caused by different etiological factors, who were brought first to the surgical emergencies department of the Medical City then referred to the Maxillofacial unit in the Specialized Surgeries Hospital, Baghdad, Iraq, during the period from April 2007 to April 2008. Information was documented prospectively from the time of the emergency call to discharge (or death).

Results: the age range was from 6 to 63 years, with the most frequent age group for injury being ranged between 21-30 years. The male to female ratio was 6:1. The missile injuries accounted for 90% of multiple traumas with maxillofacial injuries, while civilian injuries accounted for 10% of the cases. The mechanisms of injury, concerning war injuries, were gunshot injuries 46% and blast injuries 44%, while concerning civilian injuries: road traffic accidents 8% and stabbing injuries 2%. Among 50 people injured, 3 (6%) died.

Conclusion: The priority during initial treatment is the achievement of patent airway, hemostasis, and the maintenance of vital tissues oxygenation.

Keywords: Maxillofacial traumas, multiple traumas, emergency treatments **(Received: 16/9/2019; Accepted: 28/10/2019)**

INTRODUCTION

According to the WHO, trauma from industrial accidents, everyday perils, and individual or collective violence causes 3.5 million deaths a year worldwide. The major causes of multiple traumas include car accidents, gunshot injuries, and pedestrian/auto-accidents, crush injuries, and falls. Trauma causes considerable losses of productivity, and hence causes social and economic damage [(1)]. It is vitally important to determine the factors that influence the outcome for patients with multiple injuries, because reduction in mortality and morbidity could result in social and economic gains. Many studies have attempted to identify pre-hospital and in-hospital factors related to the outcome of severely injured patients. One of these factors is the time.

In trauma care, the timing of intervention is essential. Much of "**the golden hour**", the time after a trauma in which swift and adequate treatment is of vital importance to improving patient's outcome, usually passes in the pre-hospital phase. Current pre-hospital trauma systems focus on delivering patients, without unnecessary delay, to hospitals within the golden hour. However, scientific evidence supporting these systems, based on the principle of "the golden hour", is lacking [(2)].

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The influence of pre-hospital trauma care and the level of medical expertise needed; Pre-Hospital Trauma Life Support (PHTLS) vs. Advanced Trauma Life Support (ATLS) are the subject of discussions all over the world. On-site physician-provided ATLS is often associated with invasive, time-consuming interventions, leading to increased on-scene times (OSTs). Increased OSTs may be associated with increased mortality in severely injured patients [(3, 4)].

Injury is the leading cause of death worldwide among those aged 5 to 44 years. In the United States, it is the leading cause of death in the 1 to 44 year age group and the third leading cause of death overall. Of the deaths due to injury, 50% occur in the field, 30% occur in the first 24 hours, and 20% are late deaths due to multiple organ failure (MOF). Of the early deaths, 30% to 50% are due to exsanguinations [(5)].

Advanced Trauma Life Support (ATLS) is widely accepted and used to treat traumatized patients pre-hospitally. The supporters of ATLS assume that ATLS techniques improve survival by providing a definitive airway and preventing aspiration, cervical spine clearance, decreasing hypotension, correcting fluid and electrolyte imbalances [(6)].

Trauma can be classified according to both the mechanisms (blunt and penetrating trauma) and circumstances surrounding the trauma

(unintentional, intentional, self-inflicted, and assault) [7].

The multiply injured patients must be received at the resuscitation room by a trauma team led by an ATLS-trained senior surgeon. [8] Facial injuries should alert the examiner to the possibility of airway compromise, cervical spine injuries, or central nervous system, injuries, the latter which is best assessed by Glasgow Coma Scale [9, 10,]. First and always first is the maintenance of:-A-Airway with cervical spine control, B-Breathing and ventilation, C-Circulation with hemorrhage control and D-Disability, neurosurgical status and E-Exposure i.e. taking off the clothes to uncover the hidden injuries.[11]

The aim of this study is to evaluate the care of multiple trauma victims with maxillofacial injuries in terms of epidemiological distributions, types of injuries, the related different modalities of surgical treatments delivered, and their complications.

MATERIALS AND METHODS

This study included 50 patients with multiple traumas including injuries in the maxillofacial region. The age range of the patients was 6-63 years and the study period extended from April 2007 to April 2008.

For every patient in the study a standardized case sheet was performed, which consisted of three main topics: preoperative, operative and postoperative information. The information collected from the patients in the case sheet included the followings: the pre-operative notes which included personal information, medical history, etiology of trauma, associated injuries, extra- and intra-oral examination, radiographic assessment, diagnosis, laboratory investigations, consultations with other specialties and medications. This was followed by the operative and post-operative notes. Diagnosis was based on history, clinical and radiological examinations [12]. The pre-operative preparations included the followings: preliminary measures (ABCDEs), namely; A (airway), B (breathing), C (circulation), D (disability) and E(exposure) [13],airway assessment and the need for gaining a surgical route to airway has been made. Circulatory status is also evaluated to determine the quantity of blood or fluid needed to be transfused after blood grouping and cross matching [14, 15], meanwhile O-negative blood group was used. Then after, investigations, consultations, and medications were written and requested followed by the immediate surgical operations and post-operative follow-up and rehabilitation

RESULTS

Among 50 patients in this study, 43 patients (86%) were males and 7 patients (14%) were females. The Male: Female ratio was 6:1. The age range of the patients was 6-63 years with a mean age of 32.98 years. Of the 50 patients, 45 (90%) sustained war injuries; these were gunshot injuries 46% and blast injuries 44%, while 5 patients (10%) sustained civilian injuries; road traffic accidents (RTAs) in 8% and stabbing injuries 2%. Twenty patients (40%) presented with compromised airway who underwent tracheostomy **(Fig. 1)** and 30 (60%) with clear airway. Sixteen patients (32%) were with frank hypovolemia, 38 patients (76%) were fully conscious, while 10 (20%) were semiconscious and 2 (4%) were unconscious. Thirty two patients (64%) presented with mandibular fractures, 15 (30%) with maxillary fractures, 9 (18%) with dentoalveolar fractures, 8(16%) with orbital fractures, 6 (12%) with zygomatic complex fracture, 5 (10%) with isolated nasal fracture, 3 (6%) with frontal bone fracture and 1 (2%) with nasoethmoidal fracture. Thirty three patients (66%) had concomitant orthopedic injuries, 16 (32%) with head injury, 15 (30%) with ocular injuries, 11(22%) with chest injuries, 9 (18%) with abdominal injuries and 2 (4%) with spinal injuries. The involved specialties were as follows: 24 (48%) otolaryngology, 19(38%) cardiothoracic surgery, 17(34%) orthopedic surgery, 11 (22%) ophthalmology, 9(18%) plastic surgery, 8(16%) general surgery and 1 (2%) urosurgery.

The immediate surgical managements have been established first to save lives and second to do preliminary surgical treatments until more sophisticated methods employed later on. **Table-1** demonstrates the immediate resuscitating measures, while **table-2** shows the immediate surgical operations as teamwork. Three patients (6%) died during the emergency treatment.

Table 1: Immediate resuscitating measures

Type of management	No. of patients	%
Tracheostomy	18	36%
Cricothyrotomy	1	2%
Endotracheal intubation	1	2%
Chest tube placement	7	14%
Ligation of major bleeders	4	8%

Table 2: Initial surgical teamwork treatments

Type of treatment	No. of patients	%
Laparatomy	11	22%
Craniotomy	1	2%
Amputation	4	8%
Eye enucleation	3	6%
Orthopedic treatment	8	16%
Maxillofacial treatment	* 41	82%

*The remaining 9 patients were delayed until the other more urgent surgeries done for them

Figure 1: Patient with severe maxillofacial injury, the airway was secured by a tracheostomy.

DISCUSSION

A male predominance of victims is evident, which can be explained by mostly male drivers, soldiers, and probably in the places where terror attacks occurred. Most of the patients were between 21-30 years old. The predominance of young age can be explained by the location of many terrorist attacks in restaurants and social meeting places, the presence of young people, soldiers, or activists on the front line, and the young people, especially males, being more physically active therefore they are at greater risk of injury. Gunshot and blast injuries were the most frequent cause in contrast to the civilian ones including RTAs. Most of injuries were caused by bullets and shell fragments from mortars and explosive cars that had caused penetrating wounds [16, 17].Our primary aim with casualties of multisystem injuries is to secure the airway, cervical spine and the circulating volume until more formal treatment could begin [18]. **Triage** must first be done by the casualty residents to assess the in-coming cases and assign them to the various specialties [19]. Concurrent or sequential multidisciplinary operations often take place after management priorities had been agreed. The priority in treatment is to the neurosurgical, cardiovascular, and general surgery departments to deal with more life-threatening injuries first, while maxillofacial injuries can be delayed or managed simultaneously. However the team work is the best i.e. completing all the definite surgeries of all the involved specialties in one operation under the same general anesthesia.

To conclude, the priority during initial treatment is the achievement of patent airway, hemostasis, and the maintenance of vital tissues oxygenation.

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الخلاصة:

الخلفية: في هذه الدراسة تم تقييم العناية الجراحية الأولية للجرحى الذين يعانون من أصابات متعددة أضافة ألى أصاباتهم في منطقة الوجه والفكين وذلك من ناحية أنواع الأصابات والأسبقيات في العلاج وأنواع العلاجات المقدمة لهم وأخيرا المضاعفات.

المادة والطريقة: هذه الدراسة المنظورة أنجزت على ٥٠ مريضا يعانون من أصابات متعددة متضمنة لأصابات الوجه والفكين. لقد كان السبب الرئيسي لهذه الأصابات هو المقذوفات أضافة ألى أسباب مدنية أحرنز تم أنجاز هذه الدراسة في الفترة بين ١ نيسان ٢٠٠٧ ألى ١ نيسان ٢٠٠٨ حصرا في مستشفى الجراحات التخصصية-مدينة الطب-بغداد-العراق.المعلومات المنشورة عن المرضى تم توثيقها من وقت نداء الطوارئ الى خروج المرضى من المستشفى (أو وفاة بعضهم).

النتائج: أعمار المرضى كانت تتراوح بين ٦-٦٣ سنة .الفئة العمرية الأكثر شيوعت كانت تتراوح بين ٢١-٣٠ سنة ونسبة الذكور الى الاناث كانت ٦:١. و٩٠٪ من الاصابات كانت بسبب المقذوفات بينما ١٠٪ من الاصابات كانت بسبب الحوادث المدنية كحوادث المرور والعنف. ميكانيكية الاصابات كانت كالاتي:- بالنسبة للمقذوفات: ٤٦٪ بسبب الطلقات النارية و٤٤٪ بسبب الانفجارات وبالنسبة للحوادث المدنية: ٨٪ بسبب حوادث الطرق المرورية و ٢٪ بسبب طعنات السكاكين. ثلاث مرضى (٦٪) فارقوا الحياة من بين ٥٠ مريضا.أثناء فترة الدراسة بعض الجرحى الذين جلبوا الى قسم الظوارئ كانوا قد فارقوا الحياة في طريقهم الى المستشفى, هؤلاء لم يتم تسجيلهم في البحث.

الأستنتاجات: الاولوية في العلاج الابتدائي هو لتحقيق مجرى تنفسي مفتوح وضمان سلامة العمود الفقري ووقف النزيف والمحافظة على أكسجة الانسجة الحيوية كالدماغ والقلب والرئة والكبد والكلى .الأسبقية في المعالجة كانت من نصيب اصابات الجملة العصبية,الصدر والاوعية الدموية,البطن والاطراف وذلك لعلاج الاصابات الاكثر خطورة بينما اصابات الوجه والفكين كان بالامكان تأجيلها بشكل مؤقت لحين استقرار الوضع العام للمريض أو اجراء العملية بشكل متزامن (وهو الافضل) مع التخصصات الاخرى.