Original Research

Oral and maxillofacial trauma caused by road traffic accident in two university hospitals in Malaysia: A cross-sectional study

Rifqah Nordin [a], Normastura Abdul Rahman [b], Muhd Fazlynizam Rashdi [a], Azizah Yusoff [b], Roselinda Abdul Rahman [b], Saperi Sulong [c], Amrizal Muhd Nur [c], Noorhayati Abdul Razak [b], Mohd Nazimi Abdul Jabar [a], Mohd. Ismail Ibrahim [d], Norlen Mohamed [e], Sharifah Hapsah Raja Ahmad [a], Roszalina Ramli [a,*]

[a] *Department of Oral and Maxillofacial Surgery, Faculty of Dentistry, Universiti Kebangsaan Malaysia & UKM Medical Centre, Kuala Lumpur, Malaysia*
[b] *School of Dental Sciences, Universiti Sains Malaysia, Kubang Kerian, Kelantan, Malaysia*
[c] *International Centre for Case-Mix and Clinical Coding, Faculty of Medicine, Universiti Kebangsaan Malaysia, Kuala Lumpur, Malaysia*
[d] *Department of Community Medicine, School of Medical Sciences, Universiti Sains Malaysia, Kubang Kerian, Kelantan, Malaysia*
[e] *Malaysian Institute of Road Safety Research, Kajang, Selangor, Malaysia*

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ABSTRACT

Background: Maxillofacial injuries are one of the most common injuries among the road traffic accident (RTA) cases in Malaysia. The aim of this present study was to compare the pattern of maxillofacial injuries, severity and risk factors in two university hospitals in Peninsular Malaysia. The predictors of maxillofacial fractures were also quantified.

Study design: This is a prospective cross-sectional study conducted in Universiti Kebangsaan Malaysia Medical Centre (UKMMC) and Hospital Universiti Sains Malaysia (HUSM) from July 2010 to June 2011. Information related to demographics, socioeconomics, injury site and severity together with hospitalisation details were collected for analysis.

Results: A total of 278 maxillofacial patients were included in this study. Majority of the patients were single young Malay males with low socioeconomic status. Mid-facial fractures were more common than mandibular fractures in both hospitals. Among the concomitant injuries, orthopaedic injuries were shown to be the commonest in both hospitals. Most of these patients had mild Injury Severity Score (ISS).

The final predictors for facial fractures in UKMMC were gender and the ISS while age group, gender, type of combined injuries and the ISS were shown for HUSM.

Conclusions: Midfacial fractures were the most common maxillofacial fractures in both hospitals. HUSM patients showed more severe injury patterns compared to UKMMC patients. Significant predictors for facial fractures were the Injury Severity Score for UKMMC while age, gender and type of combined injuries were shown for HUSM.

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1. Introduction

Road traffic accident (RTA) is the most common cause of injuries and currently the fifth principal cause of death in Malaysia with 5.8% [1]. Statistics provided by the Malaysian Institute of Road Safety Research (MIROS) showed that in 2010, there were 414,421 road accidents resulting in 28,269 casualties and 6872 deaths [2]. In 2002, an estimated 1.2 million people were killed and 50 million injured in motor vehicle accidents worldwide, costing the global community about USD518 billion [3]. Each year, we see a step up pattern in the number of motor vehicle accidents and they are estimated to be the top three principal causes of mortality and morbidity globally by 2020 [4].

Injuries to the facial skeleton are rarely fatal but pose numerous long term consequences physiologically, functionally and aesthetically. Post traumatic stress disorder is a common outcome in traffic related trauma [5] and strong correlation has been shown between patients' perception of their facial disfigurement and anxiety and depression scores [6].

Malaysia is part of the ASEAN countries and geographically it is divided into Peninsular and East Malaysia. Peninsular Malaysia

is bounded by Thailand in the northern part, Indonesia on its west, Singapore at its southern part and East Malaysia on its east. Malaysia is a multi-ethnic and multi-cultural country with total population of 28.3 million with Malays and the *bumiputeras* comprising the majority (67.4%), Chinese, 24.6%, Indians, 7.3% and others 0.7% [7].

As other developing nations in the world, the number of vehicles in the country was reportedly rising with a total of 628,239 registered motorcars and 609,596 registered motorcycles in 2012 [8]. Rapid motorisation and industrialisation contributes to the increase in population especially in the Klang Valley which is located in the Central Region of Peninsular Malaysia. Geographically, Klang Valley comprised Kuala Lumpur and part of Selangor. The East Coast Region comprising states of Kelantan, Trengganu and Pahang and these states are not as populous compared to the Central Region and also with less number of vehicles [7].

The aim of this present study was to compare the pattern of maxillofacial injuries, severity and hospitalisation in two university hospitals located in two different regions (the Central and East Coast Regions) in Peninsular Malaysia. The predictors of maxillofacial fractures were also quantified.

2. Methods

2.1. Study design

This was a prospective cross-sectional study involving oral and maxillofacial trauma patients caused by motor vehicle accidents.

2.2. Study population and setting

The patients were recruited from two centres, the Universiti Kebangsaan Malaysia Medical Centre (UKMMC) and Hospital Universiti Sains Malaysia (HUSM). Ethical approval for this study was provided by the UKM Research Ethics Committee, Universiti Kebangsaan Malaysia and the Human Research Ethics Committee of Universiti Sains Malaysia. The UKMMC is located in Bandar Tun Razak, Kuala Lumpur, in the Central Region of Peninsular Malaysia. This hospital has approximately 1000 beds. On the other hand, HUSM is located in the East Coast of Peninsular Malaysia in the state of Kelantan with approximately 750 beds. Kuala Lumpur and Kelantan have a total population of 1,674,621 and 1,539,601, respectively with Malays made up the majority followed by the Chinese and Indians [7]. These centres were selected for the purpose of hospital costing study which was the main component of this research. The results of costing, however is discussed elsewhere. These hospitals are under the governance of the Ministry of Higher Education (MOHE). All other hospitals in these regions are mainly under the management of Ministry of Health (MOH). The difference between the two ministries is in allocation of financial support as the MOH hospitals are more heavily subsidised compared to the MOHE hospitals. At this stage of research, our aim was to have the baseline data for MOHE hospitals only. Altogether in Selangor and Kuala Lumpur, there are two MOHE or university hospitals and eight tertiary referral MOH hospitals while in Kelantan, there are two main tertiary hospitals including HUSM (the other one is a MOH hospital). The two selected hospitals have all the clinical specialties that deal with trauma.

All patients were recruited at the Emergency Departments in both hospitals between July 2010 and June 2011. The inclusion criteria were (i) patients with oral and maxillofacial injuries whether as single injury or with other concomitant injuries, i.e. head and neck, thoracic, abdominal and limbs injuries, (ii) Abbreviated Injury Scale (AIS) ≥ 1, (iii) RTA occurred within the respective geographical regions. On the other hand, the exclusion criteria

involved (i) fatal cases, (ii) cases that were transferred to other hospitals for further management, (iii) patients who refused to participate or could not understand English or Malay Language.

Informed consent was taken from all patients. For unconscious patients, consent was gained from their close relatives.

2.3. Data sources

All data were collected using specifically designed injury pro forma which contained the following information: (i) socio-demographic details, (ii) type and anatomical description of injury, (iii) severity and AIS/ISS scoring, (iv) Glasgow Coma Scale (GCS) upon arrival to the Emergency Department, and (v) length of stay. The Abbreviated Injury Scale (AIS) is an anatomically based, consensus derived, global severity scoring system that classifies each injury by body region according to its relative importance on a 6-point ordinal scale [9]. The calculation of Injury Severity Score (ISS) was described by Baker et al. [10]. The data were collected immediately after admission or the next day for inpatients to ensure co-operation and comfort.

2.4. Statistical analyses

The data were analysed quantitatively using the Predictive Analytics SoftWare (PASW, formerly SPSS) statistics version 18.0 (SPSS Inc., Chicago, IL). Descriptive, univariate and multivariate statistics were employed in this study.

Descriptive statistics results were shown in the form of frequencies, percentage, mean, standard deviation (SD), median and inter-quartile range (IQR) where appropriate.

Univariate associations employing Pearson chi square test, Fisher's exact test and Mann Whitney test were aimed to evaluate the differences between the two hospitals. Binary logistic regression analysis was employed to examine the association between predictors and facial fractures (with and without fractures). Stepwise logistic regression was used to quantify the effect of predictors. The significant level was set at 0.05.

3. Results

Patients who were eligible were approached and all agreed to participate. In total, 156 patients from UKMMC and 122 from HUSM were recruited between 1st July 2010 and 30th June 2011.

An average of 13 and 10 patients were recruited from UKMMC and HUSM in a month (Table 1).

3.1. Demographic details

Table 2 shows the demographic details of the study population. The mean age of the patients was 28.3 years old in UKMMC and 29.2 years old in HUSM. Majority of patients were in the age group of 16–25 years for both hospitals (48.1% in UKMMC and 54.1% in HUSM).

Table 1
Total number of maxillofacial trauma cases due to RTA recruited at UKMMC and HUSM per month.

	Number of patients		Total
	UKMMC	HUSM	
Range/month	4–25	1–27	
Mean (SD)	13.0 (6.8)	10.2 (8.9)	23.2 (11.4)
Total patient	156	122	278