Research Journal of Biological Sciences 4 (6): 738-742, 2009
ISSN: 1815-8846

The Epidemiology of Mandibular Fractures in Qazvin Province, Iran a Retrospective Study (1995-2005)

[1]M. Khorasani and [2]B. Khorasani
[1]Department of Oral and Maxillofacial Surgery, School of Dentistry,
Qazvin University of Medical Sciences, Qazvin, Iran
[2]University of Welfare and Rehabilitation Medicine, Tehran, Iran

Abstract: Mandible is the only mobile bone of the facial skeleton that plays a major role in mastication, speech and deglutition. Among the maxillofacial trauma, mandible is the high risk exponent. Fractures of the mandible comprise between 40 and 62% of all of facial fractures. The purpose of this study was to evaluate the epidemiology of mandibular fractures in Qazvin province (1995-2005). In this descriptive and cross sectional study the charts of 204 patients with 304 mandible fractures treated at Rajaii and Ghods hospital were retrospectively reviewed. Age, gender and job of patients, etiology of fracture, treatment methods, site of fracture, type of radiography and seasonal Variation were recorded and inserted into spss software. Two hundred and four patients with 304 sites of fractures had refered to Rajaii and Ghods hospital. Data showed that 76% of all of patients were men and 39.7% of all patients were in the 21-30 years old age group. Occupationally, most of patients were workers (20.8%). The most common site of fracture was in body (41.77%) followed by the condyle (14.8%) and symphysis (14.15%). Car accident (37.1%) and motor accident (17.5%) was responsible for the majority of the fractures. About 69.2% of the patients sustained only one fracture and 30.8% of them sustained >1 fracture site. In this study panoramic radiography had been used commonly (89/2%). About 34.3% of the patients sustained other facial fractures and 28.9% sustained other injuries. The most common signs and symptoms were pain and swelling. The majority of fractures (31.4%) had happened in the summer. The finding of this study, compared with similar studies reported in the literature, support the View that pattern of mandibular fractures Vary form one country to another and as such can provide a guide to design of programs towards prevention and treatment. It is recommended to obey the traffic rules and make the drivers to use safety devices during driving.

Key words: Mandible, trauma, fracture, maxillofacial, panoramic radiography, chest X-rays

INTRODUCTION

The daily increasing development and growth of industry, mechanization of life style is the reason for high number of car accidents and resulted injuries are severe and associated with fractures of different parts of the body. Among these, high percentage of patients have maxillomandibular fractures (Peterson *et al*., 2003).

In facial traumas, mandible is more vulnerable because of its position in the face (Abbas *et al*., 2003). Fractures of mandible constitutes 40-62% of all facial fractures. Gratten and Hobbs reported that 39% of car accident victims had facial injuries and among these 68% had fractures of mandible. Males are be affected 3-7 times more than females (Peterson *et al*., 1992). Fractures of mandible is diagnosed based on clinical signs such as pain, malocclusion, trismus, hemorrhage, ecchymosis, laceration, crepitation, fractured or extruded tooth, deviation when opening and closing mouth and radiological signs. Anatomical location of factures is largely dependent on mechanism of injury, socioeconomic conditions, racial and ethnic background (Kwon and Laskin, 2001).

In this study, the epidemiology of fractures of mandible in recent decades was surveyed (1995-2005) to provide precise and comprehensive statistical information so that accidents can be prevented, the complications and expenses can be reduced and the roads traffic condition can be improved.

MATERIALS AND METHODS

This research is a cross-sectional, retrospective and descriptive study. The medical records of the patients that

Corresponding Author: M. Khorasani, Department of Oral and Maxillofacial Surgery, School of Dentistry,
Qazvin University of Medical Sciences, Qazvin, Iran

referred to the hospitals of Ghazvin province between the years 1995-2005 were studied. The study was carried out using census sampling of the records of 204 patients with fracture of mandible. Informations including age, gender, domicile, job of patient, cause and location of fracture, symptoms, seasonal variation treatment methods, the type of Radiography and multiple fractures sites in the mandible were recorded in a form. Data were analyzed by descriptive statistics using SPSS software.

RESULTS

From the total 204 cases afflicted with mandibular fracture, 155 (76%) were male and 49 (24%) were female. The peak of incidence occured in the ages of 21-30 and the lower in ranks were 11-20 and 31-40. Most patients resided in city and the suburban areas. Occupationally, 20.87% workers, 20.32% self-employed, 19.8% students and 1.5% were soldiers. As to the time of the fracture, most of them happened in summer (31.4%) and next in rank were spring, fall and winter (19.6%). The type of X-ray requested in most cases were panoramic radiography (Table 1). Total requested radiographies were >100% due to overlapping of multiple requested X-rays. In other words, for each patient, >1 X-ray have been requested. From the total 304 fractures in 204 patients, the most common site of fracture was in body (41.77%) and next were Condyle and Symphysis (14/8%, 14/5%) (Fig. 1).

Table 1: Distribution of mandibular fractures according to X-ray requested

X-ray	Number	%
Panoramic	182	85.20
Chest X-ray	75	36.70
Waters view	72	35.20
Pos. Ant mandible	20	9.80
Skull X-ray	15	7.35
Lateral neck	13	6.30
CT scan	11	2.30
Brain CT	8	3.90
Ant. neck	3	1.40
Submento vertex	2	0.90
Lat. Cephalogram	1	0.50

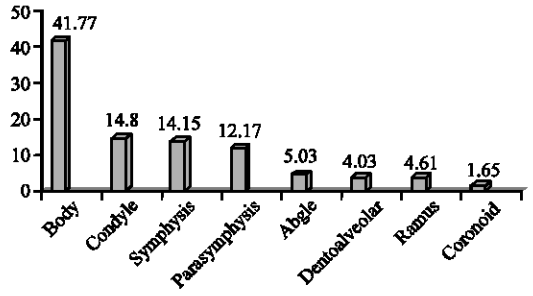

Fig. 1: Distribution of mandibular fractures according to site of fractures

About 56.4% of the fractures were unilateral and 27% were bilateral and 14.2% in the midline (symphysis). The prevalence of fractures of one area of mandible (69.2%) was more compared with two areas (28.9%) and three areas (10.9%). Unilateral fractures in the body was 71.65% and the bilateral fractures of the same area was 25.2%, the unilateral fractures of the Condyle was 64.25% and the bilateral ones of the same area was 33.34%. As to the frequency of double-area fractures, the combination of Symphysis and body fractures was more prevalent and next in rank was the combination of Condyle and body (Table 2).

Car accident (37.1%) and motor accident (17.5%) were responsible for the majority of the fractures (Fig. 2).

The most common symptom was pain (85.3%) and after that were inflammation, laceration, hemorrhage, loose teeth, limitation of jaw movement, tenderness and etc. (Table 3).

Synchronic fractures of body, alveolus and symphysis in 50% of the cases and fractures of condyle, body and alveolus and the fracture of condyle, body and ramus each with the frequency of 25% were the next ranks. From total 204 cases, 28.9% had injuries of other

Table 2: Distribution of double-area fractures in mandible

Fracture	Number	%
Symphysis-body	13	22.0
Condyle-body	11	18.6
Angle-body	9	15.3
Condyle-symphysis	6	10.2
Dento alveol-condyle	4	6.8
Ramus-body	4	6.7
Ramus-condyle	3	5.1
Dento alveol-body	3	5.1
Angle-condyle	2	3.4
Dento alveol-angle	2	3.4
Ramus-dento alveol	1	1.7
Angle-symphysis	1	1.7
Total	59	100.0

Table 3: Distribution of mandibular fractures according to signs and symptoms

Fracture	Number	%
Pain	174	85.3
Swelling	152	74.5
Laceration	133	65.1
Bleeding	130	63.7
Tooth mobility	121	59.3
Limitation of movement	105	51.5
Tenderness	96	47.0
Mal occlusion	64	31.4
Deformity	40	19.6
Hematoma	37	18.1
Deviation	31	15.2
Tooth loss	25	12.2
Ecchymosis	24	11.7
Anesthesia	22	10.8
Debility on swalloing	19	9.3
Trismus	17	8.3
Headache	16	7.8
Unconscious	7	3.4

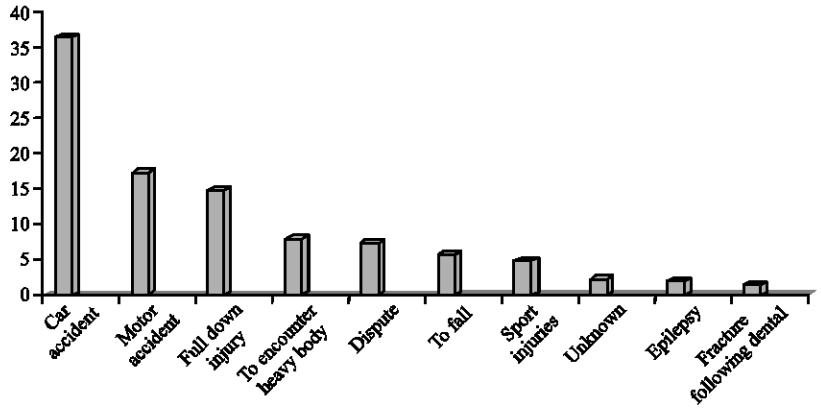

Fig. 2: Distribution of mandibular fractures according to cause of fracture

parts of the body (hand, foot, pelvis, etc.) from these, 70 persons (33.4%) had fractures of other parts of the face and 134 persons (65.7%) had fractures of mandible only. Treatment of mandible fracture was carried out with open reduction in 115 cases (56.4%) and with close reduction in 89 cases (43.6%).

DISCUSSION

In this study, the main cause of mandible fracture was motor vehicle accidents (motorcycle, car). Males share was more than females. There are significant differences in the patterns of maxillofacial fractures in different parts of the world. Data are different in different parts of the world based on habbits, socioeconomic status and racial and ethnic background (Peterson *et al*., 1992).

Anwar and Bataineh (1998), Azevedo *et al*. (1998), Dugan *et al*. (1998), Tan and Lim (1999), Tay *et al*. (1999), Wong (2000), Ogundare *et al*. (2003), Abbas *et al*. (2003), Oginni *et al*. (2006), Ansari (2004), Subhashraj *et al*. (2008), Qudah *et al*. (2005), Sakr *et al*. (2006) and Simsek *et al*. (2007), reported that most patients with mandibular fractures are male. The result of this study was similar to the result of previous studies in their respect. This may be due to the fact that men are more present in the society. Based on this study, most patients were in the age range of 21-30. This was similar to the results of studies conducted by Anwar and Bataineh (1998), Dugan *et al*. (1998), Tan and Lim (1999), Tay *et al*. (1999), Wong (2000), Abbas *et al*. (2003), Oginni *et al*. (2006), Ansari (2004), Subhashraj *et al*. (2008), Sakr *et al*. (2006). Azevedo *et al*. (1998), reported the age range of 16-20 as the most common age of mandibular fracture, perhaps due to a preassumptilon that fighting was the most common cause of the mandibular fractures.

About 20.87% of the patients were workers. Most patients were residing in Ghazvin city or its suburban areas. This indicates that these people are not familiar enough with safety rules of traffic, occupation and sport in these areas.

Based on this study, the most common cause of mandibular fracture was motor vehicles, which was compatible with surveys of Anwar and Bataineh (1998), Fasola *et al*. (2001), Tan and Lim (1999), Wong (2000), Ferreira and Amarante (2004), Abbas *et al*. (2003), Adebayo *et al*. (2003), Ansari (2004), Subhashraj *et al*. (2008), Qudah *et al*. (2005) and Sakr *et al*. (2006).

While, individual fights have been mentioned as the main cause of fracture in the reports of King *et al*. (2004), Ogundare *et al*. (2003), Azevedo *et al*. (1998) and Simsek *et al*. (2007).

This was different from the results of this study. The main cause of this difference is the fact that safety rules are less complied with by car drivers and motorcycle riders of developing countries compared with the developed countries. At present study, the cause of 2.1% of fractures was epilepsy. This indicates the necessity of complying with safety rules in these patients. Also, 1.5% of the patients had mandibular fracture at the time of tooth surgery. At present study most of the patient were treated with open reduction, similar to those carried out by Subhashraj *et al*. (2008), Sakr *et al*. (2006), Tan and Lim (1999) and Fasola *et al*. (2001) in Nigeria in their studies. May be, the main cause of this observation was the multiple maxillofacial fractures associated with other injuries outside the maxillofacial region that needed advanced treatment (Fonseca, 1997). In this study, the most common prescribed X-ray was panoramic. Based on the study, body of mandible showed the highest rate of fracture. This was compatible with the results of the studies conducted by Qudah *et al*. (2005), Fonseca and

Walker (1997) and Fasola *et al.* (2001). While, the most common area in the studies of Tay *et al.* (1999), Ferreira and Amarante (2004) was condylar area. Wong (2000), Abbas *et al.* (2003), King *et al.* (2004) and Subhashraj *et al.* (2008) reported parasymphysis as the most frequent fracture in mandible. According to this study, 69.2% of cases had fracture of one area of mandible while, according to the studies of Ogundare *et al.* (2003), Tay *et al.* (1999) and Sakr *et al.* (2006), most patients had bilateral fractures or more anatomical regions were involved. Ogundare (2003) and Subhashraj *et al.* (2008), reported more fractures in the summer in their studies. This was similar to the results of this study which could be related to a higher traffic of motor vehicles in this season.

CONCLUSION

The results of studies about mandibular fractures are different from one society to other based on geographical, economic, cultural, social and religious conditions. In the under-observe society, the main cause of mandible fracture was motor vehicle accidents. Most patients were in the age range of 21-30 and males. Most accidents occurred during summer. Most patients were treated by open reduction method. Since, the main cause of these fractures proved to be motor vehicle accidents, any efforts made to enforce traffic and safety rules in the roads and improve traffic culture can be an effective measure to promote the present situation.

ACKNOWLEDGEMENT

We thank Dr. Leila. Mahdi Hadji mahmoudlou for their contributions.

REFERENCES

Abbas, I., K. Ali and Y.B. Mirza, 2003. Spectrum of mandibular fractures at a tertiary care dental hospital in Lahore. J. Ajub. Med. Coll. Abbottabad, 15 (2) : 12-14. PMID: 14552240

Adebayo, E.T., O.S. Ajike and E.O. Adekeye, 2003. Analysis of the pattern of maxillofacial fractures in Kaduna, Nigeria. J. Oral Maxillofac. Surg., 41 (6): 396-400. DOI: 10.1016/SO266-4356(03)00165-7. PMID: 14614869.

Ansari, M.H., 2004. Maxillofacial fractures in Hamedan province, Iran a retrospective study (1987-2001). Jcranio Maxillofuc Surg., 32: 28-34. DOI: 10.1018/ j.jems.2003.07.010. PMID: 14729047.

Anwar, B. and B. Bataineh, 1998. Etiology and incidence of maxillofacial fractures in the North of Jordan, J . Surg. Oral Med. Oral Pathol. Oral Radiol. Endod, 86: 31-35. DOI: 10.1016/S1079-2104 (98) 90146-9.

Azevedo, A.B., R.B. Trent, A. Ellis, 1998. Population-based analysis of 10766 hospitalization for mandibular fracture in California (1991-1993) J. Truma. 45 (6): 1084-1087. PMID: 9867.53.

Dugan, M.A., M.A. De Gracia, S.D. Villanueva and U.Y. Hg , 1998. The 138 cases of mandibular fractures in four government hospitals from July 1995-1996. J. Philip Dent. Assoc., 49 (4): 59-70. PMID: 10202526.

Fasola, A.O., A.E. Obiechina and J.T. Arotiba, 2001. Fractures of the mandibule in children. J. East Afr. Med., 18 (1): 616-618. PMID: 12219970.

Ferreira, P.C. and J.M. Amarante, 2004. Etiology and patterns of pediatric mandibular fractures in Portugal. J. Craniofa Surg., 15 (3): 384-391. PMID: 15111795.

Fonseca, R.J. and R.V. Walker, 1997. Oral and Maxillofacial Trauma. 2nd Edn. Philadelphia. WB Saunders Co, Vol. 1. 17: 479-493.

King, R.E., J.M. Scianna and G.J. Petruzzelli, 2004. Mandible fracture patterns: A suburban trauma center experience. Am. J. Otolaringol., 25 (5): 301-307. DOI: 10.1016/j.amjoto.2004.03.001. PMID: 15334392.

Kwon, P.H. and D.M. Laskin, 2001. Clinician's Manual of Oral and Maxillofacial Surgery. 3rd Edn. Chicago: Quintessence Publishing Co, 20: 387. ISBN: 0-86715-396-2.

Oginni, F.O., U.I. Ugboko, O. Ogundipe and B.O. Adegbehingbe, 2006. Motorcycle related maxillofacial injuries among Nigerian intracity road users. J. Oral Maxillofac Surg., 64 (1): 56-62. DOI: 10. 1016/j.joms. 2005.09.027. PMID: 16360857.

Ogundare, B.D., A. Bonnick and N. Bayley, 2003. Pattern of mandibular fractures in urban major trauma center. J. Oral Maxillofacial Surg., 61 (6): 713-718. DOI: 10.1053/joms.2003.50118. PMID: 12796884.

Peterson, L.J., E. Ellis, M.R. Tucker and J.R. Hupp, 2003. Oral and Maxillofacial Surgery. 4th Edn. St. Louis: The Mosby Co; Chap: 24. ISBN: 0323-01887-4.

Peterson, L.J., A. Indersano, R.D. Marciani and S.M. Roser, 1992. Principles of Oral and Maxillofacial Surgery. Philadelphia, Lippincott Co., 1: 407-413. ISBN: 0-397-51232-5.

Qudah, M.A., K. Al-Taiseer, A.B. Bataineh and M.A. Rawashdeh, 2005. Mandibular fractures in Jordanians: A comparative study between young and adult patients. J. Cranio-maxillofacial Surg., 33 (2): 103-106.

Sakr, K., A.I. Farag and I.M. Zeitoun, 2006. Review of 509 mandibular fractures treated at the university hospital, Alexandria, Egypt. Br. J. Oral Maxillofacial. Surg., 44 (2): 107-111. DIO: 10.1016/j.bjoms.2005.03. 014.

Simsek, S., B. Simsek, A.O. Abubaker and D.M. Laskin, 2007. A comparative study of mandibular fractures in the United States and Turkey. Int. J. Oral. Maxillofacial Surg., 36 (5): 395-397. DIO: 10.1016/j. ijom. 2006. 11.010.

Subhashraj, K., S. Ramkumar and C. Ravindran, 2008. Pattern of mandibular fractures in Chennai, India. Br. J. Oral. Maxillofacial Surg., 46 (2): 126-127. DIO: 10.10 16/j.bjoms.2006.10.004.

Tan, W.K. and T.C. Lim, 1999. A Etiology and distribution of mandibular fractures in the National University Hospital, Singapore. J. Ann. Med. Singapore, 28 (5): 625-629. PMID: 10597344.

Tay, A.G., Y.K. Yeow and B.K. Tan, 1999. A review of mandibular fractures in a cranio maxillofacial trauma center. J. Ann. Acad. Med. Singapore, 28 (5): 630-639. PMID: 10597345.

Wong, K.H., 2000. Mandibular fractures: A 3 years retrospective study of cases seen in an oral surgical unit in Singapore. J. Singapore Dent. I, 23 (1): 6-10. PMID: 11699366.