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จัดพิมพ์โดยอนุมัติคณะกรรมการคณะแพทยศาสตร์ศิริราชพยาบาล
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Zygomatic Fracture at Siriraj Hospital

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Abstract : **A prospective study was made of patients with zygomatic bone fractures at Siriraj Hospital from January 1st, 1995 to December 31st, 2000 to evaluate their etiology, types of fracture, complications of fracture, operative techniques used and the results of treatment. Out of 2,127 cases that presented to the Facial Fracture Clinic, Division of Trauma Surgery, Department of Surgery during this period, there were 431 cases of fractured zygoma. Most of the cases, which were more common in males, were caused by traffic accidents. The peak age-incidence was 21-30 years old and the most common type of fracture was trimalar. Common complications of fracture were sensory impairment, limitation of opening the mouth and diplopia. In order to reduce the fractures, a Gillies' approach was used in 210 cases, an infraorbital approach in 203 cases, Dingman's approach in 87 cases and a Gingivo- buccal approach in 20 cases; and internal fixation was applied in 216 cases. The floor of the orbit was repaired in 36 cases. The post-operative wound infection rate was 1.1%. The authors conclude that zygomatic fracture is a common facial fracture caused by traffic accidents. Open reduction with or without internal fixation by a variety of approaches provides good functional and cosmetic results with very few complications.**

Key words : Zygomatic fracture, Facial fracture

เรื่องย่อ : **อุบัติเหตุกระดูกโหนกแก้มหักในโรงพยาบาลศิริราช**

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กระดูกโหนกแก้มหักพบได้บ่อยในการบาดเจ็บของใบหน้า แต่ข้อมูลของผู้ป่วยและการรักษายังมีน้อยมาก จึงได้ทำการศึกษาผู้ป่วยกระดูกหน้าหักที่มารับการรักษาในโรงพยาบาลศิริราช เป็นเวลา 6 ปี ตั้งแต่

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1 มกราคม 2538 ถึง 31 ธันวาคม 2543 โดยบันทึก อายุ, เพศของผู้ป่วย, สาเหตุ, ประเภท และผลแทรกซ้อนของภาวะกระดูกโหนกแก้มหัก, การผ่าตัด และผลการรักษา พบว่ามีผู้ป่วยกระดูกหน้าหัก 2,127 ราย เป็นกระดูกโหนกแก้มหัก 431 ราย เป็นผู้ป่วยชายร้อยละ 80 ช่วงอายุที่พบมากที่สุดคือ 21-30 ปี และสาเหตุส่วนใหญ่เกิดจากอุบัติเหตุบนท้องถนน อาการที่พบบ่อย ได้แก่ ภาวะใบหน้าชาบริเวณส่วนที่หัก (ร้อยละ 43.4), ภาวะอ้าปากได้จำกัด (ร้อยละ 9) และการเห็นภาพซ้อน (ร้อยละ 7) ประเภทของการหักที่พบมากที่สุดคือการหัก 3 ตำแหน่ง บริเวณรอยต่อของกระดูก สำหรับผู้ป่วยที่รับการรักษาด้วยการผ่าตัด 270 ราย ใช้การงัดกระดูกให้เข้าที่เพียงอย่างเดียว จำนวน 54 ราย ใช้ลวดและ/หรือแผ่นโลหะดามกระดูก จำนวน 216 ราย ตำแหน่งแผลผ่าตัดที่ใช้บ่อย ได้แก่ บริเวณขมับ ใต้ตา และขอบตาด้านข้าง ผู้ป่วยจำนวน 36 รายได้รับการผ่าตัดซ่อมแซมกระดูกรองพื้นเบ้าตา โดยใช้แผ่นซิลิโคน จำนวน 30 ราย แผ่นกระดูกจากร่างกายส่วนอื่น 5 ราย และตาข่ายไททาเนียม 1 ราย จากจำนวนผู้ป่วยที่เข้ารับการผ่าตัดทั้งหมด พบภาวะแผลติดเชื้อหลังผ่าตัดจำนวน 3 ราย คิดเป็นร้อยละ 1.1 ผลการรักษาด้วยการผ่าตัด สามารถแก้ไขความผิดปกติทั้งในด้านรูปลักษณ์และการทำงานให้ผู้ป่วยได้ดี และมีผลแทรกซ้อนหลังการผ่าตัดน้อยมาก

INTRODUCTION

Injury as a result of accident is a major problem for medical services nowadays. The head and the face are the second most common areas to be injured. Zygomatic fracture is one of the most common facial fractures treated at Siriraj Hospital each year.[1] However, there is still very little information about this kind of fracture reported in Thailand.

We studied the etiology, types of fracture, complications of fracture, operations and results to evaluate and understand this kind of fracture.

MATERIALS AND METHODS

A prospective study was made of patients with facial fractures who presented to the Facial Fracture Clinic, Division of Trauma Surgery, Siriraj Hospital from January 1st, 1995 to December 31st, 2000. We recorded the sex and age of the patients, etiology, types and complications of fracture, operations performed and results of treatment.

RESULTS

From January 1st, 1995 to December 31st, 2000; there were 2,127 cases presenting to the Facial Fracture Clinic, Division of Trauma Surgery, Department of Surgery, Siriraj Hospital. We noted 431 patients with zygomatic bone fractures. Three hundred and fifty six cases were male and the most common age-incidence was 21-30 years old (Table 1). Two thirds of the injuries were caused by traffic accidents (Table 2). Most of the cases (95.6%) were recent fractures (diagnosis was made within 2 weeks of injury). We noted right sided fractures in 241 cases (55.9%). Trimalar fracture was the most common type of fracture (Table 3) occurring in 81.2% of the cases. Common complications of fracture (Table 4) included sensory impairment (43.4%), limitation of opening of the mouth (9%) and diplopia (7%). We operated on 270 cases (Table 5) and treated non-operatively in 96 cases. Fourty one cases lost to follow-up, 22 cases refused operation and 2 cases were referred. We performed open-reduction without fixation (fracture site stable after reduction) in 54 cases, open-reduction

Table 1. Age incidence of fracture of the zygoma.

Age (yr.)	Number of cases	%
< 10	3	0.7
10 – 20	103	23.9
21 – 30	152	35.3
31 – 40	94	21.8
41 – 50	46	10.7
> 50	33	7.6
Total	431	100.0

Table 2. Causes of fracture of the zygoma.

Cause	Number of cases	%
Traffic accident	290	67.2
Sports	5	1.2
Assault	100	23.2
Fall	18	4.2
Falling from height	5	1.2
Others	13	3.0
Total	431	100.0

Table 3. Types of fracture of the zygoma[2].

Type	Number of cases	%
Trimalar	350	81.2
Zygomatic arch	30	7.0
Comminuted	24	5.6
Zygomatico-maxillary complex	21	4.8
Frontal process	6	1.4
Total	431	100.0

Table 4. Complications of fracture of the zygoma.

Complication	Number of cases	%
Sensory impairment	187	43.4
Limited open mouth	39	9.0
Diplopia	30	7.0
Blindness	7	1.6
Enophthalmos	1	0.2
Visual impairment	1	0.2
None	166	38.6
Total	431	100.0

Table 5. Treatments of fractured zygoma.

Treatment	Number of cases	%
Operation	270	62.6
Non – operation	96	22.3
Loss F/U	41	9.5
Refuse	22	5.1
Refer	2	0.5
Total	431	100.0

Table 6. Operations for reduction of zygoma fractures.

Procedure	Number of cases	%
Open reduction	54	20.0
Wiring	103	38.1
Plate & Screw	119	44.1
Total	270	100.0

Table 7. Approaches employed to reduce fractures of the zygoma.

Approach	Number of cases	%
Gillies'	210	77.8
Infraorbital	203	75.2
Dingman's	87	32.2
Gingivo-buccal	20	7.4
Bicoronal	5	1.9
Infra & Supra-orbital	2	0.7
Hemicoronal	1	0.4
Medial orbital rim	1	0.4
Total	270	100.0

Table 8. Material used in orbital floor repair of fractures of the zygoma.

Material	Number of cases	%
Silastic sheet	30	83.3
Bone graft	5	13.9
Titanium mesh	1	2.8
Total	36	100.0

Table 9. Associated fractures in patients with fractured zygoma.

Fracture	Number of cases	%
Mandibular	18	46.2
Superior orbital rim	11	28.2
Nasal	9	23.1
Vertical maxillary	1	2.5
Total	39	100.0

with wiring in 103 cases and open-reduction with plate and screw in 119 cases (Table 6). We used Gillies' approach in 210 cases (Table 7), an infraorbital approach in 203 cases and Dingman's approach in 87 cases. We repaired the floor of the orbit with silastic sheet in 30 cases, bone graft in 5 cases and a titanium mesh in 1 case (Table 8). We noted associated facial fractures in 39 cases (Table 9), the most common of which was a mandibular fracture. Re – operation was not needed and postoperative wound infection was noted in 3 cases (1.1%). One month after operation, 90% of the patients got complete recovery from infraorbital sensory impairment. Thirty four patients had postoperative normal mouth opening and others needed dilator to achieve the normal opening during the first month. Diplopia disappeared after operation in 24 patients and 6 patients were referred to ophthalmologist due to minimal upward-gaze diplopia. The visual impairment and enophthalmos were operatively fixed but blindness was still there.

DISCUSSION

The zygoma (cheek bone) is a part of mid-facial bones.[2] Its functions are 1) protecting the globe of the eye, 2) giving origin to the masseter muscles, 3) transmitting part of the masticatory forces to the cranium. 4) absorbing the force of an impact before it reaches the brain.[3] During a 6-year prospective study by the Division of Trauma Surgery, Siriraj Hospital, we noted 431 zygomatic fractures (20.3%) out of 2,127 patients who came to visit us with facial fractures. Three hundred and fifty six cases were male (82.6%). About two thirds of the cases aged between 10 and 30 years. These two incidences were correlated to the incidences of traffic accidents which was the most common cause of injury (67.2%). Out of seventy five female patients, we found that the cause of injury was equally distributed between traffic accident and assault. Fractures were more common on the right (55.9%). Most of the cases were diagnosed as a recent fracture (within 2 weeks of injury) because they came to see us early due to symptoms and signs of fracture such as swelling, deformity, bleeding, sensory impairment, limitation of opening the mouth and diplopia. The most common type of fracture was trimalar fracture (81.2%) which is usually caused by blunt impact of 200-650 pounds.[4] One hundred and eighty seven patients experienced sensory impairment of infraorbital nerve distribution which is usually indicative of a fracture either through the anterior wall of the antrum or involving the bony canal as it traverses the orbital floor.[3,5] Most of them improved after a period of time either conservative treatment or operation was given. We noted limitation of opening the mouth in patients with an isolated zygomatic arch or trimalar fracture which caused compression by a fragment of the zygomatic arch on the temporalis muscle or the coronoid process which can be treated by operative fixation. During operation we usually found a fracture of the orbital floor which can cause diplopia due to entrapment of the orbital structures or herniation of these into the maxillary sinus by a blow out mechanism.[6,7] We performed operations in 270 cases with the following indications : deformity, sensory impairment, limitation of opening the mouth, diplopia, or enophthalmos. We usually did an open reduction via Gillies', Infraorbital subciliary or Dingman's approaches with or without internal fixation. We

always did a semi-open reduction via Gillies' approach first except when we could reduce the fracture site via other approaches. We did gingivobuccal approach when the zygomas were severely displaced and the patients did not want any scar on face. For the patients who had an old fracture with deformity, we needed hemicoronal or bicoronal approach to do the reduction and fixation. We repaired the floor of orbit in 36 patients with diplopia, severely comminuted fracture or enophthalmos, mostly with silastic sheet, via infraorbital rim approach. We used bone graft or titanium mesh in larger defects that included the medial wall of orbit to avoid the presence infection.[8,9] We fixed the fracture sites with wire in 103 cases and plate with screw in 119 cases according to the socio-economic status of the patients and severity of fracture. Mandibular fracture was the most common associated fracture noted in patients with zygomatic fracture. We did not need to reoperate on any patients in our series and all patients were satisfied with the cosmetic and functional results. Only three patients got a postoperative wound infection (1.1%) which was acceptable.

CONCLUSION

Fracture of the zygoma is one of the most common facial fractures. The majority of cases are caused by traffic accidents. The most common complications associated with the fracture are infraorbital nerve compression, limitation of opening the mouth and diplopia. Appropriate approaches for reduction with or without internal fixation provide good functional and cosmetic results.

REFERENCES

1. Siritongtaworn P, Jitapunkul B, Tongswas S. Facial fractures from blunt object injury treated at Siriraj Hospital. Siriraj Hosp Gaz 1991; **43:** 238-43.
2. Jitapunkul B. Maxillofacial Injury, 1st ed. Bangkok : Siriraj Medical Book Center, 1980; **8:** 128-53.
3. Rowe NL. Fractures of the zygomatic complex and orbit. In : Rowe NL, Williams JL. Maxillofacial injuries. New York : Churchill Livingstone, 1985; **1:** 435-537.
4. Nahum AM. The biomechanics of facial bone fracture. Laryngoscope 1975; **25:** 140.
5. Kazan Jian VH, Converse JH. Surgical treatment of facial injuries, 3rd ed. Baltimore : The Williams & Wilkins Company, 1974; **1:** 287-306.
6. Dingman RO, Natvig P. Surgery of facial fractures. Philadelphia : WB Saunders Company, 1964 : 230-35.
7. Schultz RC. Facial injuries. Chicago : Year Book Medical Publishers, 1988: 301-6.
8. Manson PN. The Management of midfacial and frontal bone fractures. In : Georgiade GS, Riefkohl R, Levir LS. Georgiade Plastic, Maxillofacial and Reconstructive Surgery, 3rd ed. Baltimore : The Williams & Wilkins Company, 1997; **1:** 351-76.
9. Manson PN. Facial fractures. In : Aston SJ, Beasley RW, Thorne CHM. Grabb and Smith's Plastic Surgery, 5th ed. Philadelphia : Lippincott-Raven, 1997; **1:** 383-412.