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Preauricular Incision Approach as a Management of Zygomaticomaxillary Complex Fracture Reduction: A Case Report

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Abstract

Introduction: A zygomatico maxillary complex fracture is a facial bone fracture that commonly occurs as a centrally and laterally protruding zygomatic area. The effective surgical approach and exact reduction of the displaced fracture is the most important task in the treatment of a zygomatic fracture, from the aesthetic point of view. Determination of surgical approach and the fixation point of zygomatic arch fracture is one of the most challenging procedure. The purpose of this case report is to find out that the preauricular incison approach is one of the effective methods for reduction of zygomaticomaxillary complex fracture.

Case Report: A 53 years old male patient presented with right zygomatico maxillary complex fractures. Diagnosis of right side tetrapod zygomatico maxillary complex fracture deformity was done by clinical examination and confirmed by computed tomography which included 3-D reconstruction view. The authors performed 4-point fixation using the preauricular approach to counter the disadvantages of the coronal approach. The results and usefulness of preauricular approach with 4-point fixation are reported in this study.

Conclusion: Preauricular incision is an effective surgical approach for the reduction of zygomatic arch fracture. 4-point fixation using the easier-to-manipulate preauricular approach would be more useful than the conventional method that uses the coronal approach. Satisfactory reduction that showed exact correction was observed. In an outpatient follow-up, no complication such as nonunion or malunion was found, and facial symmetry was also shown. In addition, the preauricular scar was hardly observed.

Keywords: zygomaticomaxillary complex fracture, preauricular incision, reduction, fixation

Introduction

The zygoma arc is an important anatomical structure that supports the shape and aesthetics of the face. Facial deformity generally occurs in zygoma fractures which result in aesthetic disturbances. Deformities that occur in patients with zygoma fractures can result in psychological disorders in the future if not treated. The incidence of zygoma fractures ranges from 51.99% of all oral and maxillofacial fractures. Traffic accidents are one of the most common etiologies of zygoma arch fractures. The anatomical structure of the zygoma bone is

closely related to the orbital, maxillary, and Temporo Mandibular Joint (TMJ) bones, so fractures in that area can also cause visual disturbances, occlusion, opening and closing of the mouth. [1,3,5]

The anatomy of the zygoma bone is closely related to the maxillary, frontal, temporal, and sphenoid bones. Zygoma fractures can occur alone or with other bones in the middle third of the face, called a zygomaticomaxillary complex fracture. Based on clinical examination, zygomaticomaxillary complex fracture are characterized by crepitus on palpation, facial asymmetry, hematoma, and bleeding in the periorbital area. Visual disturbances can occur due to fracture involvement of the zygoma bone with the bones around the orbital, such as the orbital rim or sphenoid. In disorders of opening and closing the mouth, generally, zygoma fractures cause displacement around the arch, which can obstruct the mandibular coronoid. [2,3,5]

Treatment of zygoma fractures is currently a challenge for oral and maxillofacial surgeons. Difficulty in reduction, as well as high risks, are challenges by oral and maxillofacial surgeons. The majority of treatment for zygoma fractures is only by closed reduction. However, fractures with lateral displacement and comminuted will not be stable if treated only with closed reduction. One of the risks of open reduction internal fixation in zygoma arch fractures is an injury to the facial nerve and bleeding. Several surgical approaches are used to perform the open reduction of zygoma fractures, such as gillies, subciliar, maxillary vestibular, and preauricular. Several surgical approaches aim to maximize visibility, exposure, and precision in performing open reduction. [1,2,5]

The Gillies incision approach is one of the most frequently performed approaches for the open reduction of zygoma arch fractures. The incision starts from the temporal direction towards the zygoma bone. However, Gillies incision has a fairly high risk of surgery. The risks that can occur include bleeding due to the involvement of the superficial temporal artery and damage to the facial nerve. In addition, the Gillies incision approach requires a longer operating time and much bleeding. The preauricular approach is an alternative for reducing the deficiencies of gillies.[1,3,4]

The preauricular incision approach starts from the anterior of the tragus. Generally, the preauricular incision approach is often used to perform TMJ surgery. However, this approach can be used as an alternative for zygoma fractures because of the anatomical position of the zygoma bone, which is close to the TMJ. The preauricular incision approach provides adequate visibility for reducing zygomaticomaxillary complex fractures. In addition, scars resulting from preauricular incisions are not visible. In contrast to the Gillies incision approach, which involves a plane of dissection toward the temporoparietal fascia, the preauricular incision involves a deeper dissection between the temporalis fascia and the muscles around the zygoma bone. [1,2,4]

Case Report

A 53-year-old man presented with a fracture of the right zygomaticomaxillary complex due to a motorcycle accident three days ago. The facial deformity seen on the right side is due to displacement of the zygomaticomaxillary complex fracture. In addition, the patient's right ocular has limited movement accompanied by enophthalmos and diplopia. The results of a head CT scan with 3-dimensional reconstruction showed that there was a fracture line of the right zygomaticomaxillary complex at 4 points, including the zygomaticotemporal suture, zygomaticomaxillary, zygomaticofrontal, and infraorbital rim. The patient has made informed consent regarding all the risks that occur before the procedure.

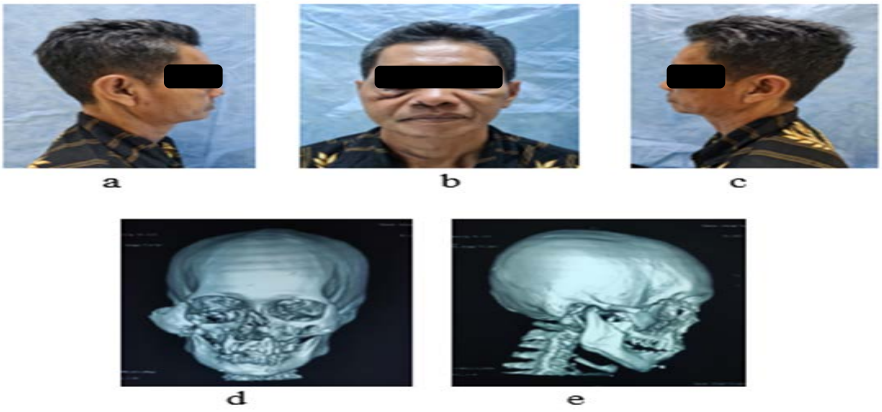

Figure 1: Clinical examination on images (a), (b), (c) and CT scan of the head with 3-D reconstruction in figure (d), (e)

The patient had performed surgery using several approaches, preauricular incision, lateral orbital rim, and intraoral vestibule. The preauricular incision creates approximately 1 cm from the anterior of the tragus then the muscle is dissected layer by layer until it reaches the fracture line in the zygomaticotemporal area. Then the fracture line was explored through a lateral orbital rim incision which was made approximately 2 cm from the lateral orbital rim to reach the fracture line in the zygomaticofrontal area. The fracture line of the zygomaticomaxillary is achieved by approaching the incision in the subciliary region. After all fracture lines can be explored, the zygoma bone is reduced and fixed at 4 points. Three points include zygomaticotemporal, zygomaticomaxillary, and zygomaticofrontal using mini plate 1.6 and infraorbital rim using mini plate 1.2. In this case report, there were several intraoperative obstacles, including difficulty in reducing and fixing the zygoma bone due to the fragile type of comminuted fracture. The patient was then evaluated one week and three months after surgery. Facial morphology was symmetrical, and facial nerve had no neurological deficits. Postoperative complications such as malunion or nonunion were not seen, and the scars were barely visible.

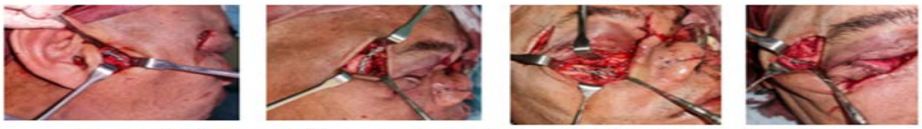

Figure 2. Approach Preauricular incision with fixation at 4 points

Figure 3. Patient follow up for one week after surgery

Figure 4. Patient follow up for three months after surgery

Discusion

The zygoma bone is one of the structures in the oral and maxillofacial area that supports facial esthetics. Reduction of zygoma fractures is one of the essential points in supporting facial esthetics. Reducing zygoma fractures is one of the challenges for oral and maxillofacial surgeons. Reduction of zygoma fractures will be difficult if not done as soon as possible after the fracture. The fibrous tissue that forms and the malunion that occurs will make it difficult to reduce the fracture of the zygoma bone. Most treatments for zygoma fractures only closed reduction because of the high risks and difficulties. However, zygoma fractures with high displacement, unstable fracture fragments, and impaired visual function are indications for open reduction treatment. [2,6,8]

One of the unstable zygoma bone fractures is the zygoma bone fracture which involves four areas the zygomaticotemporal suture, zygomaticofrontal, zygmaticosphenoidal, and infraorbital rim of the zygomaticomaxillary complex. Fractures of the infraorbital rim of the zygomaticomaxillary suture generally result in impaired visual function in patients, so open reduction of zygoma fractures can improve visual function. Several surgical approaches had performed in open zygoma reduction, including gillies, preauricular, subciliary, and intraoral maxillary vestibular incisions. [1,5,7]

Many considerations for the surgical approach are based on how extensive the area of exploration is to reduce fractures, postoperative scar tissue, and the possibility of intraoperative complications. Each surgical approach has advantages and disadvantages of each technique. [1,2,8]

The most common surgical approach to open reduction of a zygoma fracture is through a gillies incision. Generally, Gillies incisions require quite a long operating time, and the possibility of bleeding can occur. The subciliary incision carries a high risk due to its proximity to the ocular and limited exploratory area for zygoma fractures. In contrast, the lateral eyebrow incision area only includes the zygomaticofrontal suture. Preauricular incision is an effective surgical approach for the reduction of zygoma fractures. The preauricular incision provides wide access to explore the apex of the zygoma. [1,7,8]

Generally, a preauricular incision is performed in cases of temporomandibular joint (TMJ) surgery, but in this case, the approach was used as an alternative approach to reducing zygoma fractures. The preauricular incision creates approximately 1-1.5 cm anterior to the tragus. Then blunt dissection is performed layer by layer until it reaches the superficial temporalis fascia. The dissection continues until it comes to the temporal fat pad, which is the landmark of the arch and apex of the zygoma bone. Exploration was performed until it reached the fracture line that occurred in the zygoma bone. [5,7,8]

Precision zygoma fracture reduction is essential in restoring aesthetic function due to defects in zygoma fractures. These conditions can be achieved with good exploration. The 4-point fixation performed on the zygoma fracture is essential in attaining stabilization after fracture reduction. Conventionally, fixation of zygoma fractures is carried out at 2 points, but postoperative asymmetry problems often occur due to pressure and rotational forces from the masseter muscle. In overcoming this problem, 4-point fixation has been carried out, namely the zygomaticofrontal, zygomaticomaxillary, infraorbital and zygomatico temporal sutures to the zygoma arch. [1,7,8]

Postoperative scars with a preauricular incision approach are aesthetically acceptable because they are generally covered by hair. The preauricular approach has advantages, including a shorter operating time and a less visible scar. Consideration of a surgical approach is based on a surgeon's experience and the displacement that occurs in zygoma fractures. The preauricular incision approach is an effective to performing open reduction of zygoma fractures with minimal risk. The disadvantage of the preauricular incision approach is the position of the facial nerve, which

is around the tragus area, so it is necessary to preserve the facial nerve intraoperatively to prevent the risk of facial paralysis. [6,7,8]

Conclusion

Preauricular incision is an effective surgical approach that can be performed to reduce zygoma fractures openly. Preauricular incision has lower risk and shorter intraoperative time than gillies incision. 4-point fixation of zygoma fractures plays an essential role in postoperative fracture stabilization from a facial esthetic point of view. The postoperative preauricular incision scar is aesthetically acceptable because it will appear faint and covered with hair.

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