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Profile of Mandibular Condyle Fracture Patient in Head and Neck Surgery Division in Dr Soetomo General Academic Hospital on Period January 2022-December 2024

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KEYWORDS
facial nerve injury, mandibular condyle fracture, open reduction internal fixation

ABSTRACT
The incidence of mandibular condyle fractures is high, but the treatment is still controversial. Not all fractures are surgically treated. Patients with certain indications and considerations underwent surgery due to the complications of surgery that can occur, such as infection, malocclusion, facial nerve injury, nonunion, and TMJ ankylosis. To find out the profile of patients with mandibular condyle fractures who underwent surgery. This research is a quantitative study using descriptive-analytic research with a retrospective observational study design, using data from the medical records of Dr Soetomo General Academic Hospital the period January 2022 – December 2024. The results of this study showed that 35 patients with mandibular condyle fractures underwent surgery. Patients were dominated by male gender, 23 males (65.71%) and 12 females (34.28%), with an average age of 30 years. The mode of injury on all patients is caused by motor vehicle accidents. A total of 23 patients with unilateral condyles fracture (65.71%). All of the patients underwent surgery with the extraoral approach, 22 patients with the preauricular approach (68.85%) and 13 patients with the retromandibular approach (37.14%). A total of 3 patients (8.57%) experienced complications of peripheral facial nerve (N. VII) injury. The surgical management of mandibular condyle fractures is challenging. Overall, the patient who performed surgery according to indications gave good results.

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INTRODUCTION

Maxillofacial trauma is one of the most common types of trauma, with mandibular fractures being the most frequently encountered, having an incidence rate of 31.9% (Wusiman et al., 2020). Several previous studies have examined the patterns of maxillofacial fractures. A meta-analysis study conducted by Mohammadi et al. in 2023 revealed that the primary causes of maxillofacial fractures are motor vehicle accidents (33.8%), falls from a height (20.7%), violence (9.9%), and sports-related injuries (8.1%). In terms of geographical distribution, maxillofacial fractures occur most frequently on the African continent (48.3%). In Asia, the leading cause is falls from a height (27.6%), whereas in the Americas, the predominant causes are violence and sports-related accidents (13.3%).

Anatomically, the mandible consists of several parts, including the condyle, ramus, angle, corpus, symphysis, alveolar, and coronoid process (Saraf et al., 2022). Among these, mandibular condylar fractures have the highest incidence (29.1%), followed by mandibular angle (24.5%), mandibular symphysis (22%), mandibular alveolar (3.1%), mandibular ramus (1.7%), and the mandibular coronoid process, which has the lowest incidence at 1.3%[3].

Previous research has also shown that the strongest part of the mandible is the symphysis, while the weakest points are at both ends of the mandibular condyle (Zhou et al., 2016). Mandibular fractures are more common than other facial bone fractures due to the mandible's prominent position, making it more vulnerable to impact. Trauma occurring in the anterior part of the mandibular corpus is the most common cause of mandibular condylar fractures (Sancar et al., 2023). The force exerted on the corpus

is transmitted to the mandibular condyle. Since the mandibular condyle is located within the glenoid fossa, trauma to the ipsilateral mandible often results in a fracture of the contralateral mandibular condyle (Chen et al., 2019). This anatomical design helps protect the base of the skull by preventing the displacement of the condyle into the middle cranial fossa, while also influencing the direction of force impacting the symphysis (Demir et al., 2023).

The mandibular condyle plays a crucial role in maintaining airway patency, occlusion, mastication, speech articulation, and facial skin sensation. Fractures of the mandibular condyle can disrupt these functions. Physical examination of patients with mandibular condylar fractures often reveals trismus, malocclusion, and crepitation (Basu & Perry, 2021).

To date, the indications for surgical intervention in mandibular condylar fractures remain controversial. Several factors must be considered in the management of mandibular condylar fractures, including the location of the fracture, degree of angulation, degree of luxation of the mandibular condylar head, fracture type (simple/complex), dental status, presence of other maxillofacial fractures, patient condition, and the presence of foreign body invasion into the temporomandibular joint (Saputro et al., 2020). Based on this background, this study aims to analyze the profile of patients undergoing surgery in the head and neck surgery division of Dr. Soetomo Hospital, Surabaya, from January 2022 to December 2024.

METHOD

The study design used in this research was a retrospective descriptive study design. The inclusion criteria included patients with mandibular condyle fractures admitted to the emergency department of the head and neck surgery division in Dr Soetomo Academic General Hospital who underwent surgery for three years in the period January 2022 – December 2024. The exclusion criteria were patients with mandibular condyle fractures that did not undergo surgery and patients with incomplete medical record data.

This study used total sampling to collect medical records. All patients admitted to the emergency room were examined with imaging of head X-ray and or head CT and 3D reconstruction. Patients diagnosed with mandibular condyle fractures that meet the criteria for surgery were included in this study (Al-Moraissi et al., 2018). The patients underwent open reduction internal fixation (ORIF) by the head and neck surgery division doctors. The results of the surgery were evaluated one-day post-operative. Patients with facial nerve injury were recorded.

RESULT AND DISCUSSION

This study was conducted from the medical records of mandibular condyle fracture patient in Dr Soetomo Academic General Hospital Surabaya from January 2022 to December 2024. In total, there were 35 research subjects. The demographic characteristics of the patients are shown in Table 1 below.

Table 1. Characteristics of Patients Demography

Category	2022	2023	2024	N
Gender				
Male	7	2	14	23 (65.71%)
Female	3	4	5	12 (34.28%)
Age (years)				
Mean	37.9	29.17	26	30
Minimum	15	15	14	14
Maximum	67	50	55	67

Mode of injury Motor vehicle accident	10	6	19	35 (100%)
Type of fracture site Linear Comminuted	2 8	5 1	11 8	18 (51.4%) 17 (48.6%)

In 2022 there were 10 patients, in the 2023 there were 6 patients, in 2024 there were 19 patients. The distribution of mandibular condyle fracture patients that underwent surgery are shown in figure 1 below.

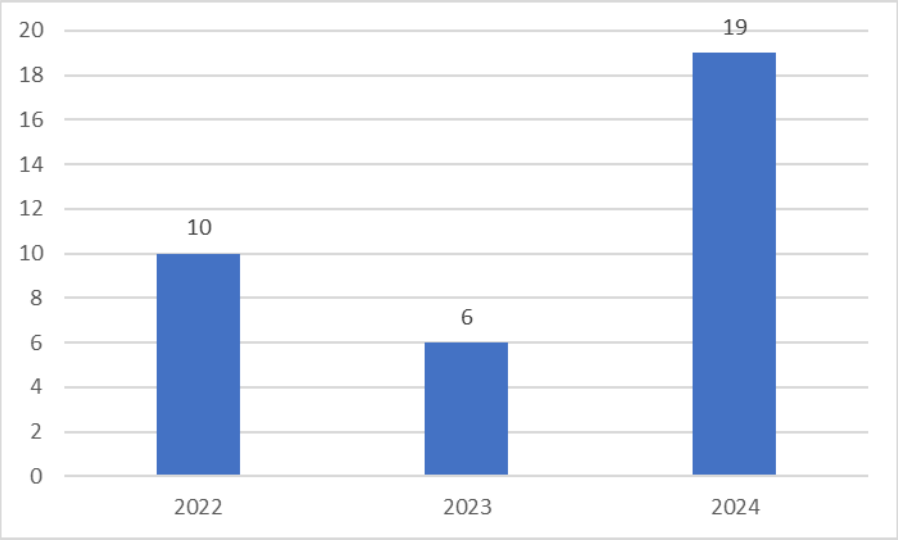

Figure 1. Distribution of Mandibular Condyle Fracture Pati

Based on the type of fractures, there were 23 patients with unilateral condyle fracture (65.71%) and 12 patients with unilateral condyle (34.28%). The distribution of mandibular condyle fracture is shown in table 2.

Table 2. Distribution of Mandibular Condyle Fracture

Type of fractures	2022	2023	2024	N
Unilateral condyle fracture	5	3	15	23 (65.71%)
Bilateral condyle fracture	5	3	4	12 (34.28%)

Based on the location of mandibular condyle fracture, there were 30 patients with other maxillofacial fracture (85.71%) and 5 patients with mandibular condyle fracture only (14.28%). The distribution of mandibular condyle fracture as single or multiple fracture is shown in table 3 below.

Table 3. Distribution of Mandibular Condyle Fracture as single or multiple fracture

Type of fractures	2022	2023	2024	N
Mandibular condyle fracture with other maxillofacial fractures	9	5	16	30 (85.71%)
Mandibular condyle fracture without other maxillofacial fractures	1	1	3	5 (14.28%)

Based on the surgical approach, there were 10 patients with the preauricular approach (28.57%) in 2002, 4 patients with the preauricular approach in 2023 (11.42%), and 8 patients with the preauricular approach in 2024 (22.85%). The distribution of surgical approaches every year is shown in Figure 2 below.

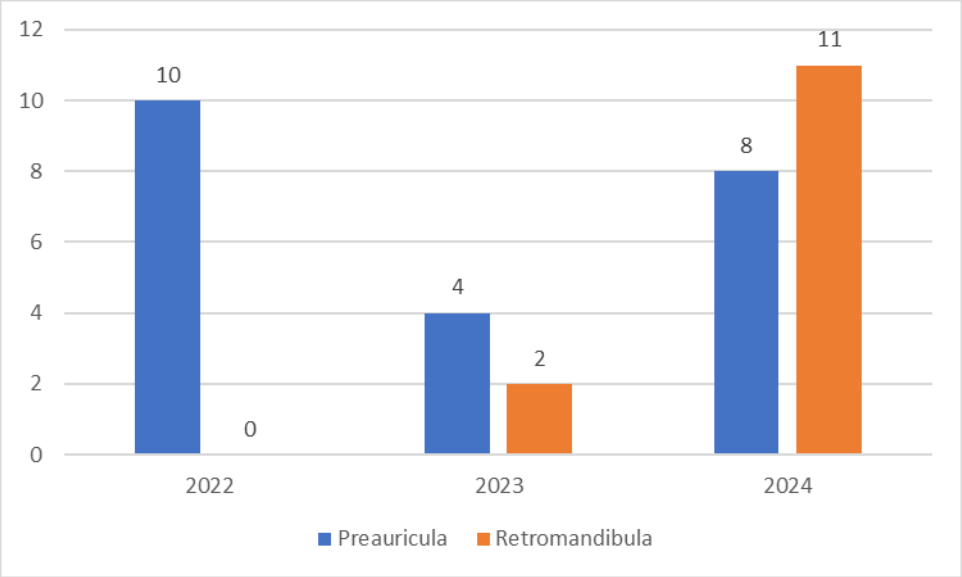

Figure 2. Distribution of surgical approach

Based on the complication of facial nerve injury, there were 3 patients have complication (8.6%) and 32 patients have no complication (91.4%). The distribution of facial nerve injury is shown in table 4 below.

Table 4. Distribution of Facial Nerve Injury Patients

Facial Nerve Injury	2022	2023	2024	N
Facial nerve injury	2	0	1	3 (8.6%)
No facial nerve injury	8	6	18	32 (91.4%)

The management of mandibular condyle fractures is challenging. It can be managed surgically or non-surgically. The surgical management is open reduction internal fixation using one or two plates. The non-surgical management is using intermaxillary-mandibular fixation. With the correct consideration in patient selection, good surgical outcomes could be obtained (Gunardi et al., 2019).

Overall, the result of the surgery was good. In this study, we found 3 patients who have complications of facial nerve injury. Among those patients, all have comminuted and bilateral fractures (Boljevic et al., 2023). Two patients were operated on in the year 2022 with a preauricular approach, and one patient was operated on in the year 2024 with a retromandibular approach. Through the years, the surgical approach has been shifted to the retromandibular approach. According to the study of Ayub et al., both approaches give good results. The study also stated that the periauricular approach has more facial nerve injury than the retromandibular approach. Based on a study by Tandon et al., facial nerve injuries in condylar mandibula fracture surgery were most common from the retromandibular trans parotid approach (12-48%). However, facial nerve injury has been reported in 3-48% of patients who underwent surgery with a preauricular approach (Tandon et al., 2022).

The facial nerve injury in mandibular condyle fracture surgery was associated with the location of the facial nerve. Anatomically, the facial nerve is divided into the temporo-facial branch and the cervico-facial branch. The upper division (temporozygomatic division) lies in the condylar process. The risk factors that increase facial nerve injury were surgical approach due to blunt dissection through the parotid gland and masseter muscle, the excessive traction, or the electro-cauterization used near the facial nerve (Tandon et al., 2022). So, surgeons should be more cautious when doing tissue retraction near the area of the nerve. The retraction could cause neuropraxia or injury to the facial nerve (Barham et al., 2015). The facial nerve palsy could be temporary and usually resolved within 6 months. For further research, patients with facial nerve injuries can be followed up and evaluated.

CONCLUSION

The surgical management of mandibular condyle fractures presents significant challenges. Based on the findings of this study, it can be concluded that the risk of facial nerve injury is an important consideration in the treatment of mandibular condyle fracture patients. However, surgical intervention performed according to appropriate indications has been shown to yield favorable outcomes, reinforcing its effectiveness in managing such cases.

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