Emergency management of temporomandibular joint dislocation with manual reduction

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Abstract

Objective: Present serial case management of temporomandibular joint dislocation in emergency unit and to provide information on emergency handling in the case of temporomandibula joint especially for dentist.

Methods: Data of temporomandibular joint dislocation cases were collected from October 2016 to March 2017 with a cross sectional study presented by Oral and Maxillofacial Resident in RSUD Dr Soetomo Surabaya.

Results: Nine patients were managed. In total males accounted for 66.67% of the patients and yawning was the most frequent etiological factor. Acute TMJ dislocation had the highest frequency in this study.

Conclusion: Temporomandibular joint dislocation is one of the problem in dentistry that requires direct management and could cause complications if immediate treatment is not given.

Keywords: Dislocations, Manual Reduction, Temporomandibular joint

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Introduction

The temporomandibular joint (TMJ) is a specialized joint between the mandible and the temporal bone of the skull. The condyle of the mandible articulates bilaterally in a concavity known as the glenoid fossa or the mandibular fossa. Biomechanics of the TMJ is under neuromuscular control, comprising the muscles of mastication, the ligaments associated with it and neural transmission carried by the mandibular division of the trigeminal nerve.1-3

Dislocation of the TMJ is due to either imbalance in the neuromuscular function or structural deficit. Alteration in the neuromuscular function occurs due to laxity of the articular disc and the capsular ligament, long standing internal derangement and spasm of the lateral pterygoid muscles. Structural deficit involves arthritic changes in the condyle, i.e., flattening or narrowing, decrease in the height of the articular eminence, morphological changes of the glenoid fossa, zygomatic arch and squamotympanic fissure.4,6 It can be partial (subluxation) or complete (luxation), bilateral or unilateral, acute and chronic protracted or chronic recurrent.1-3 The most common type of temporomandibular joint (TMJ) dislocation is acute episodes of anterior dislocation, although dislocations may occur in any direction with various associated fractures.4 Age and changes in dentition also has a definite role in dislocation.6,7 Other causes include over function, i.e., forceful this fracture separates the relationship between maxillary wide opening of the mouth while yawning, laughing, vomiting, or seizures, dental treatments like third molar extractions root canal treatments or endotracheal intubation, laryngoscopy and trans oral fiber optic bronchoscopy.8 Certain antipsychotic medications may also lead to dislocation. Some syndromes are also associated with it such as the Ehlers Danlos syndrome, orofacial dystonia, and the Marfan syndrome.9,10 Individuals in the second and third decades of life appear to be more predisposed to this condition11, though TMJ dislocation has been reported in children and the elderly.12 Women are more likely to develop TMJ dislocation, but the reason for this female predisposition is not yet fully understood.13

TMJ dislocation is a very painful distressing and restless condition in which patient had problem in closing and opening the mouth and also inability to chew the food properly.11 In acute dislocation, pain in the pre auricular region is present, but chronic recurrent dislocation is rarely associated with it. Usually bilateral and at times unilateral dislocation may lead to deviation of the chin to the contralateral side. Palpation over the preauricular region may suggest emptiness in the joint space. The patient may look anxious.14

Clinical history and examination are the most important tools in diagnosing TMJ dislocation.15 Treatment depends on patient status and varies from simple reduction to surgical intervention, simple reduction to surgical intervention. The latter is usually necessary only for chronic recurrent and chronic persistent dislocations16 and in acute forms nearly all cases are managed by
hand reduction. The traditional intraoral reduction method, although effective, has some disadvantages: it requires a great effort, especially in patients with strong mastication musculatures; local or systemic analgesics and muscle relaxants systemic analgesics and muscle relaxants or sedatives are necessary occasionally; risks of bite injury regarding hepatitis, AIDS, syphilis, or other transmittable diseases; and patient discomfort regarding the physicians hand in his/her mouth.17

Case Report

All cases of TMJ dislocation at the emergency unit in General Hospital Dr Soetomo treated by oral and maxillofacial resident from October 2016 until march 2017 were cross sectional studied. The informations retrieved from patients’ case notes included age, sex, the immediate event preceding the dislocation, the type of dislocation, the treatment modality used, and any reported complications. Procedures were performed by 4th year oral and maxillofacial residents with a good level of oral and maxillofacial emergency case management especially experience in manual techniques, who had performed a large number of under-observation reductions before the study was conducted.

Within the period reviewed, 9 patients were managed, including 6 males (66.7%) and 3 females (33.3%), which produced a male:female ratio of 2:1 figure 1. The patient’s age ranged from 22 years to 82 years with a mean age of 44.77 years table 1. Peak incidence was noted in patients in the fourth decade of life; however, males predominated in most of the age groups.

Acute dislocations were the most common types of presentation, accounting 77.77%, respectively, of all the cases reviewed and were predominantly bilateral (77.7%). Only two patients (22.3%) had a known infectious disease; patients had history of hepatitis which were treated in the hospital. An analysis of etiological factors in 9 of the patients table 1 showed yawning (66.7%) to be the main etiological factor followed by singing (11.1%), shouting (11.1%), and eating (11.1%). All case received treatment with manual reduction two case treated with extraoral manual reduction technique (22.3%) and 7 case treated with intraoral manual reduction technique (77.7%). All cases were given suppositoriumuscular relaxation drugs (stesolid containing diazepam supp.5 mg).

In this study, manual reduction in acute TMJ dislocation is divided in three methods based on intraoral (the Hippocratic, wrist pivot), extra oral approaches is divided in three methods based on intraoral (the Hippocratic, pivot), extra oral approaches and a combination between the two approaches. In intraoral approach, The physician, applying bimanual intraoral force on the mandibular molars of the patient in an inferior and then posterior direction, will reduce the dislocated condyle back into the glenoid fossa figure 4. Before the procedure, the operator must use handscon and the thumb is coated with gauze to prevent accidental biting from the patient.

The traditional method of TMJ dislocation reduction, although successful, has several disadvantages, including risk of bites (hepatitis, AIDS, syphilis, or other transmittable diseases). Therefore, there have always been efforts to avoid putting fingers in the patient’s mouth.17

This study presents two cases with infectious disease; hepatitis; which had a history of admission to the hospital. Based on that reason, the reduction of TMJ dislocation was managed by extraoral approach. Extra oral reduction approach can be explained as follows with the physician places one hand on each of the patient’s cheeks. On one side, the thumb is placed just above the anteriorly displaced coronoid process and the fingers are placed behind the mastoid process to provide a counteracting force. On the other side, the fingers hold the mandible angle and the thumb is placed over the malar eminence. To reduce the dislocated jaw, one side of the mandible angle is pulled anteriorly by the fingers, with the thumb over the malar eminence acting as a fulcrum. While the mandible angle is pulled anteriorly, steady pressure is applied on the coronoid process of the other side, with the fingers behind the mastoid process providing counteracting force. The mandible is rotated by this maneuver and the dislocated TMJ is usually reduced one side. Once side of the dislocation is reduced the other side will usually return to its normal position spontaneously figure 5.

Complications are uncommon in this procedure. The most frequent problem is the inability to reduce the dislocation. If the first attempt at reduction is unsuccessful, consider administering a mild sedative, such as diazepam, to relax the masticatory muscles. Another potential complication is subcondylar fracture, which may occur if too much force is applied in a posterior direction during repositioning. Although this complication is rare, it may occur in elderly patients or in patients with severe osteoporosis. The primary force during reduction should always be downward. Early recurrent redislocation is a clinically significant risk. It is therefore important to provide the patient with instructions in preventive aftercare.18

In muscular spasm management, all case in this study...
Table 1. Parameters for each patient in the study

| Sex/Age | Type of dislocation | Duration (day) | Site | Event leading to dislocation | Infectious disease | Technique reposition |
|---------|---------------------|----------------|------|-----------------------------|-------------------|---------------------|
| F/22    | Acute               | -              | Bilateral | Singing                     | -                 | MR IO               |
| M/23    | Acute               | -              | Bilateral | Yawning                     | -                 | MR IO               |
| F/32    | Acute               | -              | Unilateral | Yawning                     | -                 | MR IO               |
| M/38    | Acute               | -              | Bilateral | Yawning, Hepatitis          | MR EO             | MR IO               |
| M/42    | Acute               | -              | Bilateral | Yawning, Hepatitis          | MR EO             | MR IO               |
| M/44    | Acute               | -              | Unilateral | Eating                      | -                 | MR IO               |
| M/52    | Chronic/Recurrent   | -              | Bilateral | Yawning                     | -                 | MR IO               |
| F/68    | Chronic/Recurrent   | -              | Bilateral | Yawning                     | -                 | MR IO               |

(note: MR: Manual Reduction; IO: Intra Oral; EO: Extra Oral)

Discussion

Temporomandibular joint dislocation is a common presentation that is usually reported as an acute episode of unilateral or bilateral displacement of condyles anterior to articular eminence. In complete dislocation, condyles lie completely out of the glenoid fossa. Often, failure to diagnose or inappropriate treatment in the initial stage results in prolonged malposition of an acutely displaced condyle leading to chronic protracted dislocation. Untreated cases of acute TMJ dislocation will transform into chronic episodes of TMJ.10

Anterior dislocation is the most common case and occurs as a result of the displacement of the condyle anterior to the articular eminence of the temporal bone. They are usually secondary to an interruption in the normal sequence of muscle action when the mouth closes from extreme opening. The masseter and temporalis muscles elevate the mandible before the lateral pterygoid muscle relaxes resulting in the mandibular condyle being pulled out of the glenoid fossa and anterior to the bony eminence. Ideally, acute mandibular dislocation requires immediate effective reduction, which can usually be accomplished with a manual closed technique.19

Acute dislocation is the most common type of presentation, accounting 77.77% of all cases. TMJ dislocation can be distinguished as acute, recurrent chronic or chronic. Acute dislocation occurs due to trauma or distonic reactions, but is usually due to excessive mouth opening like yawning, singing, eating, shouting, seizure, tooth extraction, or dislocation can also occur after an endoscopic procedure. Recurrent chronic dislocation is caused by the same mechanism in acute patients with superficial risk factors for mandibular fossa, loss of joint capsules due to previous dislocation history. Soetomo hospital is a type A hospital and service center in eastern Indonesia. This hospital has a multidisciplinary emergency service specializing in emergency health services. TMJ dislocation is one of the emergencies in the field of oromaxillofacial especially in the acute phase. In acute dislocation, pain in the preauricular region is present and the patient may look anxious.15

Similar to other studies20,21, yawning was the most common etiological factor for TMJ dislocation amongst the patients (66.7%). The pathophysiology of yawning related to TMJ dislocation is not fully understood. It is likely that repeated yawning (especially forceful yawning) leads to a gradual laxity of the restraining joint ligaments over time, with instructions in preventive aftercare.18 In muscular spasm management, all case in this study was treated with supposituria diazepam, in order to prevent complication.

Instructions in aftercare should explain that, during the 2 months following the procedure, the patient should refrain from exceeding an interincisal distance of one finger’s width when opening the mouth and should support the chin with a fist when yawning figure 6.

Figure 1 Sex distribution of patients in the study.

Figure 2 Extraoral presentation showing face asymmetry, mouth open and restricted closure, no laceratum and hematoma; A. Right angle view, B. Front angle view, C. Left angle view

Figure 3 A.Post repositioning treatment showing centric occlusion intraorally and elastic bandage placed. B. Occlusion after repositioning treatment.
Conviction

Temporomandibular joint dislocation is one of the emergency cases in dentistry that requires immediate treatment to prevent complications optimal. Diagnosis of temporomandibular joint dislocation is highly needed. Management of mandibular dislocation in acute conditions can be conducted by manually repositioning with pain management using anesthesia or muscle relaxant.

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TMJ dislocation has been documented in varying age groups. In the present study, a high incidence of TMJ dislocation was noted between the third and fifth decades of life. This result was similar to other findings. The peak age group incidence was 40-49 years. More males than females presented with TMJ dislocation, which was similar to other findings.

The diagnosis of TMJ dislocation is mainly clinical; however, different imaging modalities can assist in patient assessment, treatment planning and follow-up. All cases were diagnosed by only clinical examination only. After post repositioning treatment, the patient given advise to control in oral and maxillofacial clinic for comprehensive treatment including additional imaging modality and multidisciplinary oromaxillofacial approach.

Figure 4 A. The thumb is coated with gauze. Intra oral manual closed reduction. B. Hipocratic. C. Wrist Pivot.

Figure 5 Extra oral manual closed reduction A. in the patient; B. illustration image.

Thus heal and adapt in muscular balance and also preventing redislocation caused by weak and loose capsule. If the joint is normal in the event of a dislocation, this treatment must be adequate to restore function properly. It is also important to ask patients with repeated dislocations the reason the dislocations and, if possible, to suggest preventive measures. However, in the case of dislocation due to loose capsules, there is tendency for recurrent dislocation. In these condition, more definitive treatment is an indicated. Five basic surgical methods have been recommended for the treatment of recurrent mandibular dislocations, that is by tightening the mechanical capsule, binding the joint or mandible to fixed structure, making the mechanical barriers of the condylus pathway, removing the condyle barrier, and reducing muscle pull.

Conclusion

The author would like to thank to Head of Accident & Emergency Departement, General Hospital Soetomo Surabaya, Indonesia and Head of Oral and Maxillofacial Division, Clinic of Dental and Oral Health, Dr Soetomo General and Teaching Hospital Surabaya, Indonesia. The study would not have been thus predisposing such individuals to an increased range of condylar movement.
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Conflict of Interest

The authors report no conflict of interest.

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