

Management of a Series of TMJ Ankylosis (28 Cases)

V Abraham^{1*}, AG Varghese², Gandhi³, I Singh⁴ and C Mathai⁵

¹Professor of Anaesthesia, Christian Medical College and Hospital, Ludhiana, Punjab, India

²Assistant Professor, Department of Surgery, Christian Medical College and Hospital, Ludhiana, Punjab, India

³Professor of Oro-maxillary Surgery, Christian Medical College and Hospital, Ludhiana, Punjab, India

⁴Associate Professor of Oro-maxillary Surgery, Christian Medical College and Hospital, Ludhiana, Punjab, India

⁵Resident of Anaesthesia, Christian Medical College and Hospital, Ludhiana, Punjab, India

*Corresponding Author: V Abraham, Professor of Anaesthesia, Christian Medical College and Hospital, Ludhiana, Punjab, India.

Received: September 02, 2020; Published: October 19, 2020

Abstract

Introduction: Temporomandibular joint ankylosis is a unique disease where fracture of the mandibular condyle or any other cause leads to ankylosis of the joint. TMJ ankylosis is an important functional pathology that restricts mouth opening. We are discussing the anaesthesia management of a series of patients with TMJ ankylosis who had come for surgical management.

Conclusion: Bilateral TMJ ankylosis renders the airway difficult with no option of vocal cord visualization in the wake of limited mouth opening or no opening. This situation can be very dangerous in children and adults. For both fibro-optic intubation and blind nasal intubation technique proper oxygen and monitoring are necessary throughout the procedure.

Keywords: Temporomandibular Joint Ankylosis; Anaesthesia Management

Introduction

Temporomandibular ankylosis is characterized by the formation of a bony mass which replaces normal temporomandibular joint (TMJ) articulation. TMJ are highly specialized bilateral joints comprising of an articulation between the cranium and the mandible. The commonest cause of TMJ ankylosis is trauma and inflammatory conditions like otitis media, mastoiditis, hematogenous infection¹, rheumatoid arthritis, Paget's disease, ankylosing spondylitis, pseudohypoparathyroidism, psoriasis and burns patients also play a role in its etiology [1,2]. TMJ ankylosis can lead to multiple problems if not detected and treated early. Post traumatic TMJ ankylosis is on the rise especially in developing countries like India, due to the delay in treatment as these closed condylar fractures are not apparent [3]. Fracture of the mandibular condyle in childhood and subsequent organization of the hematoma result in the formation of varying sizes of juxta-articular bone and ankylosis or consolidation and immobility of the joint. The growth of bone in juxta-articular tissue may be similar to that seen in myositis, ossificans traumatica, often seen following elbow fractures where in an osseous bridging is formed without any effect on the anatomical condition of the joint [4].

Ankylosis of the temporomandibular joint involves fusion of the mandibular condyle to the base of the skull. When it occurs in a child, it can have devastating effects on the future growth and development of the jaws and the teeth. Furthermore, in many cases it has a profoundly negative influence on the psychosocial development of the patient, because of the obvious facial deformity, which worsens with growth [5]. The anaesthetic management of paediatric patients with TMJ ankylosis presents a real challenge to the anaesthesiologist. Technically, it encompasses both management of paediatric patients and difficult airway

scenario.

In a growing child, unilateral involvement causes facial asymmetry with fullness on the affected side. This results in vertical shortening of ramus on the affected side, shortening of body length and the anterior depth of the mandible. Thereby chin is deviated to the ipsilateral side. In bilateral ankylosis, the face is usually symmetrical but the mandible is retrognathic. Both the mandibular rami are short with ante-gonial notching, bird face deformity, receding chin, narrow maxilla protruding upper incisors with nil or few millimeters mouth opening are the features of bilateral TMJ ankylosis. Mandibulo-hyoid distance is shortened in both unilateral as well as bilateral ankylosis. Hyoid

bone which masks the position of the inlet of larynx, is situated at a higher cervical vertebral position C3 which normally is at the level of C4 [6]. Untreated cases may lead to malnutrition and poor oral hygiene.

Case Study

28 patients with TMJ ankylosis- 10 Patients were intubated by blind nasal technique and 18 patients were intubated by fibro-optic technique.

Preop assessment and preparation

A detailed history and physical examination was done in all patients. It is very important to take a history of snoring. Extreme precaution has to be taken while prescribing sedative medication to such patients; sedatives, opioids and even anaesthetic agents reduce the pharyngeal muscle tone and may lead to upper airway collapse. They also reduced arousal and ventilator response to hypoxemia and hypercapnia [7].

Use of ant sialagogue medication dries the oral secretion making visualization by Fibro-optic intubation (FOI) scope and blind nasal intubation easier. All our patients were given nasal drops otrivin (xylometazoline hydrochloride) at night and in the morning. Our patients were not given any premedication in the morning due to severe facial deformity. 100% oxygen was given in the recovery for half an hour in a semi sitting position. Patients were nebulized with 4% lignocaine in a semi sitting position for fifteen minutes. In the operation theatre, patients gargle with 2% lignocaine. Ketamine 0.2 mg/kg was given IV with 1 mcg/kg of fentanyl. Glycopyrrolate was also given. Bilateral superior laryngeal nerve block given with 0.25% bupivacaine 1 ml on each side. In blind nasal intubation, patients were induced with O₂+N₂O+sevoflurane, and allowed the patients to breathe spontaneously for 45 minutes. As soon as patients are in surgical plane of anaesthesia, endotracheal tube of smaller number size is introduced through the nose and watch the breathing and the movement of the rebreathing bag of mapleson F as it is attached to the endotracheal tube. When it is confirmed by the movement of the rebreathing bag and auscultation during ventilation, long acting muscle relaxant will be given. Fibro optic intubation scope should be introduced after dilating the nostril with the nasopharyngeal tube number 6 or 7. Ketamine 0.2 mg/kg, fentanyl 1 mcg/kg and glycopyrrolate should be given. 100% oxygen should be given through the nostril. An endotracheal tube smaller size number should be inserted over Fibro-optic intubation scope (FOI). As soon as it is confirmed with ventilation and auscultation, long acting muscle relaxant should be given.

Result

According to age

Age	Patients
3 - 5 years	8
6 - 10 years	7
11 - 20 years	8
> 20 years	5

According to sex

Age	Male	Female
3 - 5 years	4	4
6 - 10 years	2	5
11 - 20 years	3	5
> 20 years	4	1

Discussion

Bilateral TMJ ankylosis renders the airway difficult with no option of vocal cord visualization in the wake of limited mouth opening. Problems get compounded in the presence of trismus, associated mandibular hypoplasia affecting the skeletal growth of face and obstructive sleep apnea. TMJ ankylosis is a unique disease characterized by bony or fibrous union between the head of mandibular condyle and glenoid cavity, leading to reduced mouth opening. The most common causes of TMJ ankylosis in paediatric age group are trauma (13 - 100%), local systemic infection (10 - 49%), systemic diseases (10%) like ankylosing spondylitis, rheumatoid arthritis, psoriasis or surgery. The most common causes of bilateral TMJ ankylosis are congenital or post-traumatic [8]. If not treated in time, TMJ ankylosis can lead to multiple problems like poor nutrition due to feeding difficulty, poor oral hygiene, alteration in speech development, poor facial and dentoalveolar development leading to psychological trauma. Children with longstanding bilateral TMJ ankylosis during the active growth phase may have severe bird face deformity due to hypoplastic and retrognathic mandible leading to obstructive sleep apnea, a potentially fatal disorder.

In a growing child, shortening of mandibular rami and narrowing of space between the mandibular angle results in narrow oropharyngeal airway. Further, subatmospheric intrapharyngeal pressure and hypotonicity of oropharyngeal muscle result in airway obstruction and increased airway resistance which may result in cor pulmonale. These structural abnormalities with restricted or no mouth opening are responsible for difficulty in securing airway.

Anaesthetic management in surgery of TMJ ankylosis presents a formidable challenge to the anaesthesiologist in maintenance of airway patency. Inability to open the mouth makes direct laryngoscopy impossible. So, it is very important that intubation has to be done either by fibro- optic intubation scope or by blind nasal technique [9]. Awake fibro-optic intubation with topical anaesthesia is regarded as the safest approach in anticipated difficult intubation. However, in a paediatric patient, awake FOI is hardly ever possible. The safest option probably is FOI under deep sedation or GA with maintenance of spontaneous ventilation [10]. In children below 5 years, blind nasal intubation is the option. In addition to facial asymmetry, malocclusion, anemia, malnutrition, airway obstruction may be present. All these changes make not only intubation but ventilation difficult. With proper preoperative preparation induction with inhalational agent, blind nasal intubation is possible.

The treatment of TMJ ankylosis is stretching exercises in the early stages of the cartilaginous calcification and later surgery to restore the jaw movement [11]. The surgical corrections include condylectomy, gap arthroplasty, interposition arthroplasty and artificial replacement of joint [12]. In paediatric cases, TMJ ankylosis present with difficulty intubation due to reduced mouth opening and limited protrusion of lower jaw.

There are many methods to secure the airway in TMJ ankylosis. Awake nasal fibro-optic intubation and blind nasal intubation are the important ways of securing the airway. Mainly the selection of the technique depends on many factors, the clinical condition of the patient, availability of equipment and expertise of the anaesthesiologist.

In our institution, blind nasal intubation is done in children below 6 years as there is no small fibro-optic intubation scope. Blind nasal technique should be done by an expert as it can cause failure and may lead to trauma and further airway complications on repeated attempts. It is very important to give small amount of sedation taking care of respiration and vital signs and with the inhalational agent. We connect the endotracheal tube and watch the movement of the reservoir bag.

Awake nasal fibro-optic intubation with topical anaesthesia is regarded as the safest approach in patients with TMJ ankylosis with the patient's cooperation. Topical anaesthesia with titrated sedation and gentle communication with the cooperation of the patient will help in FOI. In uncooperative patients, general anaesthesia or deep sedative through a tube inserted through the other nostril should be given.

Spontaneous ventilation should be maintained till the airway is secured. In our case, we used inhalational anaesthesia O₂+N₂O+sevoflurane for blind nasal and FOI.

There are many problems that are encountered during paediatric fibro-optic intubation and blind nasal intubation. Paediatric patients are more prone to laryngospasm. So, a small endotracheal tube should be taken for both procedures and patients should be deeply sedated.

Conclusion

Bilateral TMJ ankylosis renders the airway difficult with no option of vocal cord visualization in the wake of limited mouth opening or no opening. This situation can be very dangerous in children. It is mandatory to keep a difficult intubation cart in the operation theater. For both fibro-optic intubation and blind nasal intubation technique proper oxygen and monitoring are necessary throughout the procedure.

Bibliography

1. Regev E., et al. "Ankylosis of the temporomandibular joint as a sequelae of septic arthritis and neonatal sepsis". *The Pediatric Infectious Disease Journal* 22 (2003): 99-101.
2. Chidzonga MM. "Temporomandibular joint ankylosis. Review of thirty-two cases". *British Journal of Oral and Maxillofacial Surgery* 37 (1999): 123-126.
3. Roy Choudhury A., et al. "Functional restoration of gap arthroplasty in temporo mandibular joint ankylosis. A report of 50 cases". *Oral Surgery, Oral Medicine, Oral Pathology, and Oral Radiology* 87 (1999): 166-169.
4. Sarma UC and Dave PK. "Temporomandibular joint ankylosis. An Indian experience". *Oral Surgery, Oral Medicine, Oral Pathology, and Oral Radiology* 72.6 (1991): 660-661.
5. Straith CL and Lewis JR. "Ankylosis of the temporomandibular joint". *Plastic and Reconstructive Surgery* 3 (1948): 464-466.
6. Cogley M and Vaughan RS. "Recognition of management of difficult airway problems". *British Journal of Anaesthesia* 68 (1992): 90.
7. Shah FR., et al. "Anaesthetic considerations of temporomandibular joint ankylosis with obstructive sleep apnoea: a case report". *Journal of Indian Society of Pedodontics and Preventive Dentistry* 20.1 (2000): 16-20.
8. Yuill E and Howitt SD. "Temporomandibular joint: conservational care of tmj dysfunction in a competitive swimmer". *Journal of the Canadian Chiropractic Association* 53 (2009): 165-172.
9. Wahal R. "Temporomandibular joint ankylosis. the difficult airway". *Journal of Oral Biology and Craniofacial Research* 5.2 (2015): 57-58.
10. Fiadjoe J and Stricker P. "Paediatric difficult airway management devices and techniques". *Journal of Anaesthesiology, Clinical* 27 (2009): 185-195.
11. Devgan A., et al. "Functional restoration by excision arthroplasty in temporomandibular joint ankylosis- a report of 35 cases". *The Indian Journal of Medical Sciences* 56 (2002): 61-64.
12. Saeed NR and Kent JN. "A retrospective study of the costochondral graft in tmj reconstruction". *International Journal of Oral and Maxillofacial Surgery* 32 (2003): 606-609.

Volume 6 Issue 11 November 2020

All rights reserved by V Abraham., et al.