Temporomandibular joint interpositional gap arthroplasty under intravenous (I.V) conscious sedation

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Abstract Ankylosis may be defined as the fusion of joint surfaces. Temporomandibular joint (TMJ) ankylosis is a condition that may cause chewing, digestion, speech, esthetic and psychological disorders. It is a devastating disorder resulting in inability to open the mouth. As a result of this, General anaesthesia, is very difficult to administer because laryngeal inlet is not directly visualized. Even the blind nasal intubation is difficult because of small mandible and tongue fall following relaxation. There are various techniques to overcome these challenges. At times these techniques fail and tracheostomy has to be done. All the risks associated with difficult intubation, and general anaesthesia can be avoided if the surgery is done under conscious sedation. Conscious sedation, a simple but safe and effective method of anaesthesia is described here, which allows successful temporomandibular joint interpositional gap arthroplasty.

Keywords Conscious sedation · Temporomandibular joint ankylosis · Temporomandibular joint interpositional gap arthroplasty

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Introduction

Temporomandibular joint ankylosis is defined as fusion of joint surfaces by bone or fibrous tissue. Inability to open the mouth in temporomandibular joint ankylosis results in inability to maintain oral hygiene, inability to chew the food properly and aesthetic problems [1,2,3]. This leads to dental caries, malocclusion, weight loss, and growth retardation [4].

The surgical treatment of temporomandibular joint ankylosis is known as temporomandibular joint interpositional gap arthroplasty. The surgical treatment of temporomandibular joint ankylosis poses a significant challenge because of the great difficulty in administering general anaesthesia.

Temporomandibular joint interpositional gap arthroplasty is done under general anaesthesia with nasotracheal intubation. General anaesthesia and nasotracheal intubation are the main problems of surgery in temporomandibular joint ankylosis. It is difficult to intubate, [5] the patient of temporomandibular joint ankylosis as the

laryngeal inlet is not visible. If services of flexible fiber optic bronchoscope are not available, blind nasotracheal intubation is performed, which also fails at times and therefore tracheostomy is required. All these problems can be solved to some extent by using intravenous conscious sedation.

Conscious sedation induces a state of consciousness that minimizes pain and discomfort through the use of pain relievers and sedatives. Patients, who receive conscious sedation usually are able to respond to verbal commands throughout the procedure, communicating any discomfort they experience to the provider. A brief period of amnesia may erase any memory of the procedure.

Temporomandibular joint interpositional gap arthroplasty can be done under conscious sedation. This helps avoiding the unnecessary, difficult blind nasal intubation, associated trauma to the pharynx and vocal chords and emergency tracheostomy, wherever the facility for flexible fibreoptic bronchoscope is not available. Conscious sedation is simple, safe, and effective method of conducting

temporomandibular joint interpositional gap arthroplasty.

Methods

After getting a written informed consent from all subjects, 50 cases of ASA physical status grade I or II, admitted for temporomandibular joint ankylosis surgery, were enrolled in the study as per protocol, between August 2005 to April 2008.

In most cases, the initial inter incisor distance was ≤ 8 mm and the duration of involvement ranged from 8–18 years, an average of 10 years. Inclusion criteria included the young and cooperative subjects with unilateral bony temporomandibular joint ankylosis, scheduled for temporomandibular joint interpositional gap arthroplasty. Obsolete patients, patients over sensitive to the respiratory depressant effect of opioids, patients with any cardiac and/or respiratory disease, patients allergic to local anaesthetic agents and patients requiring intraoral procedure like coronoidectomy were excluded from the study.

Fig. 1 Showing start of procedure without tracheostomy/tracheal intubation

Fig. 2 Patient opening his mouth after removal of ankylotic chunk

Fig. 3 Postoperatively patient showing his tongue

Fig. 4 Showing start of procedure without tracheostomy/tracheal intubation

Fig. 5 Patient opening his mouth after removal of ankylotic chunk

Fig. 6 Postoperatively patient showing his tongue

All subjects were fasted for 12 hrs to eliminate the risk of aspiration during surgery. No sedative premedication was given preoperatively. Intravenous line established and 5% DNS started in the operating room. Standard monitoring with non-invasive blood pressure (NIBP), electrocardiography and pulse oximetry was done. Flexible fiber optic laryngoscope and instruments for tracheostomy were kept ready for emergency access to a definitive airway. All subjects received injection Glycopyrrolate 0.004 mg/kg body wt IV and injection Ondansetron 0.08 mg/kg body wt IV followed by slow injection Fentanyl 4µg/kg IV plus injection Midazolam 0.05 mg/kg body wt IV.

10 minutes after the injection of Fentanyl plus Midazolam, the surgeon was asked to infiltrate the operative site with a specially prepared local anaesthetic cocktail. The infiltration cocktail was made up of mixture of Bupivacaine 0.5% with 1:100,000 adrenaline 10ml. plus 10 ml. of normal saline plus Hyaluronidase 1500 units.

First, the entire line of incision starting from the preauricular area was infiltrated with 5–6 ml. of the above solution. Then, the soft tissues below the zygomatic arch were infiltrated with about 4 ml. of the solution and about 2 ml. were infiltrated into the subcutaneous plane over the zygomatic arch.

The mandibular nerve was blocked with about 5 ml. of the solution taking care to avoid intravascular injection. Infiltration of

local anaesthetic was done very slowly with a fine 26G spinal needle (B Braun) to reduce the injection pain, and further local anaesthetic was injected through the previously anaesthetised zone to keep the patient comfortable and cooperative. Slower injection results in a longer time period, ensuring enough time for vasoconstriction, leading to an almost clear, bloodless field. 10 minutes after infiltration of local anaesthetic surgery was started.

Results

Almost all the cases were successfully conducted using this technique of intravenous conscious sedation. We did not encounter any incidence of excessive sedation and airway obstruction. Supplemental oxygen was not used (Figs. 1–6), as in none of our patients oxygen saturation went below 98%. None of the patients complain of pain and discomfort during surgery. All patients were able to assess their mouth opening during surgery (Figs. 2,5). In one case we had to intubate the patient and administer general anaesthesia because of undue long surgery time.

Discussion

Temporomandibular joint interpositional gap arthroplasty is done under general anaesthesia and it poses a great challenge to anaesthesiologists. This surgery is

recognized for difficult intubation since direct visualization of laryngeal inlet is difficult in the absence of mouth opening. Temporomandibular joint ankylosis is associated with micrognathia, retrognathia and pseudomacroglossia that narrows the oropharyngeal passage [6] and may cause obstructive sleep apnoea [7].

These factors result in difficult intubation. Options available for intubations are very little and difficult, namely a blind nasal intubation, [8] flexible fibre optic laryngoscope-aided intubation, bi nasopharyngeal airway, [9] retrograde tracheal intubation, [10] retrograde endotracheal intubation using a pharyngeal loop, [11] and tracheostomy [12]. Blind nasal intubation is associated with high failure rates [12,13] and chances of airway trauma. Flexible fibre optic laryngoscope is the best option but it is a costly affair, and oxygenation between induction of anaesthesia and intubation is a problem. [12] Even flexible fibre optic laryngoscope-aided intubation too could fail. [14] Retrograde transtracheal intubation, is difficult, [10,11,15] and has life threatening complications like tracheal bleed, which could be seldom lethal. [16,17] Obstructive sleep apnoea is another challenge to deal with both during the induction of anaesthesia and during postoperative recovery [5,6]. Vas and Sawant [12] reported that 6/15 patients could not maintain their airway in a supine position and had to be turned into a lateral position for better

ventilation. Many failed intubations end up with tracheostomy [15].

Because of all these risk factors, it could be a fortunate thing to both the doctor and the patient if temporomandibular joint ankylosis surgery could be performed under conscious sedation anaesthesia. It is very safe, simple, and reliable. Patient can be made co-operative with preoperative counseling by the anaesthesiologist during pre anaesthesia check-up (PAC).

Conclusion

We conclude that temporomandibular joint interpositional gap arthroplasty can be done under conscious sedation anaesthesia and is well accepted by the patients. Conscious sedation anaesthesia for temporomandibular joint interpositional gap arthroplasty is simple, safe and effective method devoid of the risks associated with general anaesthesia and difficult intubation.

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