J Anesth (1994) 8:346–348

Journal of
Anesthesia

Airway management in a patient with pseudoankylosis of the mandible following frontotemporal craniotomy

MASAHIKO KAWAGUCHI[1], TAKANORI SAKAMOTO[1], HIDEYUKI OHNISHI[2], MAKOTO TAKAOKA[2], and JUN KARASAWA[2]

Departments of [1] Anesthesiology and [2] Neurosurgery, Osaka Neurological Institute, 2-6-23 Shounai, Takara-machi, Toyonaka, Osaka, 561 Japan

Key words: Pseudoankylosis, Craniotomy, Laryngeal mask

Introduction

Since the temporalis muscle is one of the principal elevators of the mandible, postoperative scarring or fibrosis can produce pseudoankylosis of the temporomandibular joint, resulting in severe limitation of mandibular opening [1–5]. Coonan et al. [2] reported pseudoankylosis after temporal craniotomy as a cause of difficult intubation, and advocated the use of fiberoptically guided intubation, blind nasotracheal intubation, or tracheotomy for airway management. We herein describe a patient with pseudoankylosis of the temporomandibular joint following the frontotemporal craniotomy, in which the airway was successfully managed with a laryngeal mask (LM) and fiberoptic bronchoscope for general anesthesia.

Case report

A 57-year-old man with subdural effusion was presented for elective subduroperitoneal shunt. He had a history of cerebral infarction. Four months earlier, he was admitted to our hospital for removal of a pituitary adenoma. Computed tomography (CT) and magnetic resonance imaging (MRI) revealed that the pituitary tumor had invaded superiorly to right cavernous sinus, internal carotid artery, and optic trunk, and inferiorly to clivus, ethmoid sinus, and sphenopid sinus. The physical examination was unremarkable except for mild hemiparesis on his left side. Right frontotemporal craniotomies and orbitozygomatic osteotomies had been performed for the removal of extradural lesion 3 months earlier and the intradural lesion 1 month earlier. Both operations were uneventful. Airway management for general anesthesia are usually performed without any difficulty.

Preoperative physical examination showed that the maximum mandibular opening was limited to 20 mm (Fig. 1). Forced opening of the mouth caused discomfort over the temporal region. Lateral and protrusive movements were normal. Radiologic examination revealed no significant changes in the joint itself or surrounding structures. According to the patient's history, physical examination, and radiological findings, the patient was diagnosed with puseudoankylosis of the mandible following craniotomy.

The patient received atropine 0.5 mg and ranitidine 50 mg intramuscularly 30 min before surgery. Monitoring prior to induction of anesthesia included ECG, indirect blood pressure, pulse oxymeter, and capnography. The patient was given 100% oxygen with a mask for 5 min. Anesthesia was induced with thiopental 200 mg and succinylcholine 100 mg following neuromuscular block by vecuronium 1 mg. The airway was easily maintained with a face mask. At this point, maximum mandibular opening was 25 mm. Tracheal intubation was attempted with laryngoscopy; however, the larynx could not be seen (Cormack and Lehane [6] grade IV).

A size-3 LM was inserted without difficulty. After a 5.0-mm fiberoptic bronchoscope was passed through a 6.0-mm endotracheal tube, the combination was inserted into the LM and advanced through the grille. The glottis was clearly visualized through the bronchoscope, which was further advanced into the trachea, and the endotracheal tube was then passed over the bronchoscope into the trachea. After the bronchoscope was

Address correspondence to: M. Kawaguchi
Received for publication on June 2, 1993; accepted on December 13, 1993

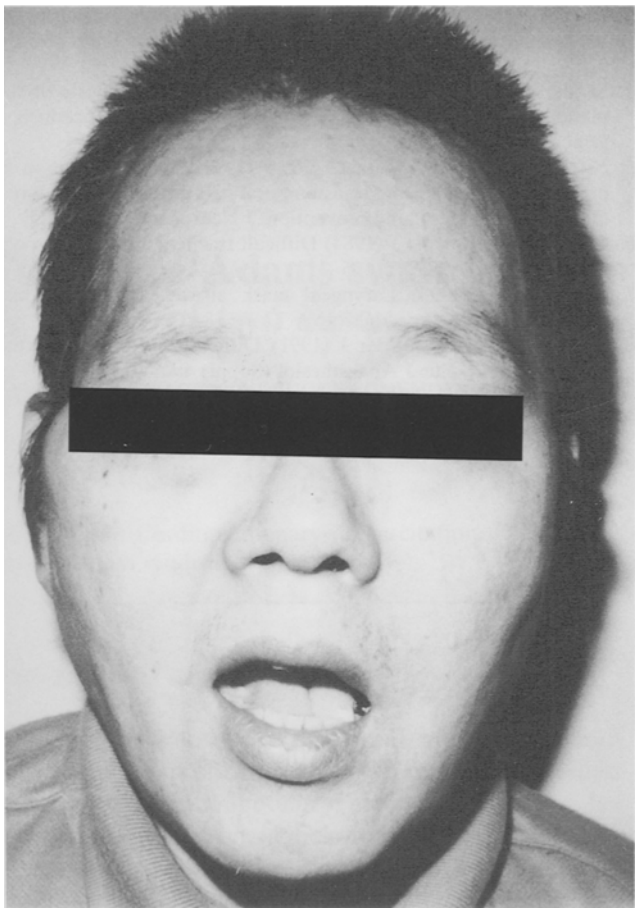

Fig. 1. Preoperative physical examination showed mandibular opening limited to 20 mm

removed, the anesthesia system was connected to the endotracheal tube, and the connectors of the LM and the tube were taped.

Anesthesia was maintained with sevoflurane and nitrous oxide in oxygen. Ventilation was controlled, and muscular relaxation was achieved with supplementary doses of vecuronium. Anesthesia and surgery were uneventful. At the end of surgery, the trachea was extubated without complications.

Discussion

Pseudoankylosis of the temporomandibular joint is the result of extraarticular abnormalities that produce persistent limitation of jaw movement. Potential causes of pseudoankylosis include fibrosis resulting from burns, chronic infection, myositis ossificians, radiotherapy, and trauma, malformation of the coronoid process, primary myopathy, and foreign bodies [2,5]. These conditions are distinguished from true ankylosis to be an intraarticular abnormality.

There have been several reports about pseudoankylosis of the temporomandibular joint following temporal craniotomy [1–5]. If the procedure involves sectioning of the temporalis muscle, fibrosis of the muscle produces pseudoankylosis during and after healing of the surgical wound. However, in spite of the large number of neurosurgical procedures undertaken, the incidence of pseudoankylosis is very low [3,4]. This usually resolves within 6 months, but patients rarely require coronoidectomy and detachment of the temporalis muscle fibers from the mandible.

Nitzan et al. [5] reviewed 11 patients with pseudoankylosis following transtemporal neurosurgical procedures. They demonstrated skull base surgery as a risk factor. In skull base surgeries, the temporal muscle is often dissected down below the zygoma into the temporal fossa to provide low zygomatic and orbital exposure. This is compatible with the present case, in which the patient received frontotemporal craniotomy and orbitozygomatic osteotomy.

Patients who have had surgery in the region of the temporal fossa require a careful preoperative assessment of the temporomandibular joint. Limitation of mandibular opening makes conventional tracheal intubation difficult, and thus blind nasotracheal intubation [1] and tracheotomy [2] have been performed in patients with pseudoankylosis. Fiberoptically guided oro- or nasotracheal intubation is considered to be another alternative method. However, these techniques are uncomfortable and stressful for awake patients.

The LM has been proposed as a routine airway for general anesthesia and as an aid in the management of a difficult airway [7]. When intubation is difficult, the LM can be used as an airway intubator (conduit) for an intubating tracheal stylet or fiberoptic bronchoscope [7,8]. Since the distance between the grille of the LM and the glottis is a few centimeters, insertion of a fiberoptic bronchoscope into the trachea through the LM is easier than conventional fiberoptic oro- and nasotracheal intubation. Insertion of the endotracheal tube into the trachea over the bronchoscope is also easy. Additionally, since this technique can be performed under general anesthesia, it is not stressful for the patient. In general, the anatomy of the pharynx is normal even though mandibular opening is limited. Therefore, if the LM pass over the mouth, it is not difficult to place the LM in the correct position and subsequently to intubate using a bronchoscope.

In summary, we described a patient with limitation of mandibular opening resulting from pseudoankylosis following frontotemporal craniotomy. Preoperative assessment of mandibular joints is important in patients with a history of the surgery in the region of the temporal fossa. The combined use of the LM and fiberoptic

bronchoscope greatly aided us in the airway management of this patient.

References

1. Barry H, Hendler DDS, Thomas M, et al. (1981) Fibrous ankylosis of the mandible following frontotemporal craniotomy. J Neurosurg 55:836–837
2. Coonan TJ, Hope CE, Howes WJ, et al. (1985) Ankylosis of the temporomandibular joint after temporal craniotomy: a cause of difficult intubation. Can Anaesth Soc J 32:158–160
3. Khosla VM (1970) Pseudoankylosis of mandible produced by temporal muscle fibrosis: report of case. J Oral Surg 28:521–522
4. Sanders B, Thorpe W, Kallal R (1974) Pseudoankylosis of the mandible secondary to transcoronal neurosurgical procedure. J Oral Surg 32:909–911
5. Nitzan DW, Azaz B, Constantini S (1992) Severe limitation in mouth opening following transtemporal neurosurgical procedures: diagnosis, treatment, and prevention. J Neurosurg 76:623–625
6. Cormack RS, Lehane J (1984) Difficult tracheal intubation in obstetrics. Anaesthesia 39:1105–1111
7. Benumof JL (1992) Laryngeal mask airway. Indications and contraindications. Anesthesiology 77:843–846
8. Silk JM, Hill HM, Calder I (1991) Difficult intubation and the laryngeal mask. Eur J Anaesthesiol (Suppl) 4:47–51