Case Report

Heister mouth gag aided endotracheal intubation in patients with maxillofacial trauma: A case report

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ABSTRACT

Securing the airway in patients with maxillofacial trauma is challenging for the anesthesiologist. Pain and facial deformities limit mouth opening and hence direct laryngoscopy. Fractured bone segments, blood, oral secretions, and tissue edema preclude the use of fiber-optic bronchoscopes for intubation of the trachea. We report a successful attempt of orotracheal intubation with a Macintosh blade in a 25-year-old patient with restricted mouth opening with the use of a Heister mouth gag.

Key Words: Anesthesiologist, case report, intubation, maxillofacial injuries

INTRODUCTION

Management of the airway in maxillofacial injuries continues to be a challenge to anesthesiologists. Mouth opening is restricted due to the pain and the fracture of the maxilla and mandible, and the nasal passage can also be blocked by the fractured segments. The presence of blood, nasal and oral secretions, and tissue edema further compromises the airway. Under such circumstances, the use of fiber-optic bronchoscopes and supraglottic devices may become difficult. We report successful direct laryngoscopy and oral endotracheal intubation in a patient with restricted mouth opening secondary to maxillofacial injuries facilitated with postinduction placement of Heister mouth gag. This device is used by dental surgeons to hold the patient’s mouth open when working in the oral cavity.

CASE REPORT

A 25-year-old male patient with bilateral fracture of the nasal bone, the floor of the orbit, zygomatic arch, and palatal split was planned for open reduction and internal fixation by the dental surgeons after a motor vehicular accident.

Detailed preanaesthetic examination revealed no significant comorbidities or drug allergies. There was restricted mouth opening, and airway examination revealed an interincisor gap of 2 cm. The thyromental distance was 6 cm, and neck flexion and extension were within the normal limits. There was no loose tooth or any other foreign body visible in the mouth. However, clotted blood could be appreciated in the oral and nasal cavity. We anticipated difficulty in laryngoscopy and intubation but assumed mask ventilation to be easy.

After considering the relative merits and feasibility of basic management choices (awake intubation, intubation after general anesthesia, preservation of spontaneous ventilation, use of invasive techniques of intubation, and use of fiber-optic bronchoscope, etc.), we developed the following primary and alternative strategies for intubation:

Plan A – Laryngoscopy and attempted intubation after induction of general anesthesia and administration of...
ultra short-acting muscle relaxant (suxamethonium) after bag-mask ventilation.

Plan B – If the initial intubation attempt was unsuccessful, then a novel method of opening the oral cavity using a Heister mouth gag will be contemplated, followed by repeat laryngoscopy.

Plan C – If the intubation attempt was unsuccessful with Plans A and B due to restricted mouth opening, then oral fiber-optic intubation will be attempted after the return of spontaneous respiration with utmost caution to prevent damage to the oral mucosa to minimize the chance of bleeding. The presence of blood in the oral and nasal cavity precluded fiber-optic intubation as the primary modality of securing the airway.

Plan D – If the intubation attempt was unsuccessful with Plan C, then it was decided to awaken the patient.

Difficult airway cart was kept ready, and after attaching standard American Society of Anesthesiologists monitors, the patient was induced with titrated doses of injection propofol and injection fentanyl (1.5 µg/kg) and after adequate bag-mask ventilation, injection succinylcholine (1 mg/kg) was administered. Plan A was initiated, but the difficulty was encountered in introducing the laryngoscope in the mouth. Hence, according to Plan B, a Heister mouth gag was inserted by attending anesthesiologists between the premolars and its screw twisted to open the mouth. About 3.5 cm of mouth opening could be achieved [Figure 1], which facilitated insertion of Macintosh blade of the laryngoscope and oral intubation of the trachea with an 8 mm ID of flexometallic endotracheal tube (ETT). After checking for bilateral air entry in the chest, the ETT was secured with waterproof adhesive. The surgical procedure was uneventful. The patient was extubated after ensuring complete recovery from the neuromuscular blocker.

**DISCUSSION**

Incidence of difficult intubation or inability to secure the airway is known to cause 16% of the deaths in patients with traumatic injuries. Hutchison et al. described six specific situations associated with maxillofacial trauma, which may complicate the airway: (1) postero-inferior displacement of a fractured maxilla parallel to the inclined plane of the skull base, (2) bilateral fracture of the anterior mandible, (3) hemorrhage, (4) soft-tissue swelling and edema, (5) trauma to the larynx and trachea, and (6) foreign bodies – dentures, debris, shrapnel, exfoliated teeth, and bone fragments.

Accurate preanesthetic evaluation is limited by the presence of tissue edema, disrupted anatomy, and muscle spasms. Flexible fiber-optic bronchoscope-guided endotracheal intubation is limited by the presence of fracture segments, blood, vomitus, and secretions in the patient’s airway. The accomplishment of effective local anesthesia in the traumatized region is difficult. Successful intubation using a fiberscope inserted through an endoscopy face mask, laryngeal mask airway, or intubating laryngeal mask airway is limited by the facial edema and limited mouth opening.

Fractures of the zygomatic arch impinging on the coronoid process of the mandible or fracture of mandibular condyles itself may cause a mechanical obstruction limiting mouth opening, making laryngoscopy and intubation difficult. Trismus caused by maxillofacial fractures may resolve with the neuromuscular blockade; however, differentiating this from a mechanical obstruction before intubation is required and is often difficult. If limited mouth opening is encountered, flexible fiber-optic endotracheal intubation under local anesthesia is the technique of choice for all patients except those with facial fractures. We used a Heister gag to open the airway in a patient with maxillofacial injury with restricted mouth opening.

Lorenz Heister introduced in 1714 a mouth gag consisting of two straight blades or prongs, which are opened by advancing a screw. Currently available Heister gags are typically 13 cm long and made of stainless steel. The blades rest on the incisors or premolars. Mouth gags were originally used to open the mouth of patients with tetanus, dental, or peritonsillar infections and to facilitate surgical procedures in the mouth and throat. Anesthesiologists used the mouth gag to access the upper airway during inhalational anesthesia. The use of an open technique of administering chloroform or ether by poorly trained nonspecialists resulted in an inadequate depth of anesthesia, hence clenching of teeth.

In the modern-day era, Heister mouth gag is rarely used except by surgeons for intraoral surgery and active jaw physiotherapy. This is the first reported case for the use
of a Heister mouth gag for the opening of the airway in a patient with restricted mouth opening.

Research quality and ethics statement
This case report did not require approval by the Institutional Review Board/Ethics Committee. The authors followed applicable EQUATOR Network (http://www.equator-network.org/) guidelines, specifically the CARE guidelines, during the conduct of this research project.

Declaration of patient consent
The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his consent for his images and other clinical information to be reported in the journal. The patient understands that name and initials will not be published, and due efforts will be made to conceal the identity, but anonymity cannot be guaranteed.

Financial support and sponsorship
Nil.

Conflicts of interest
There are no conflicts of interest.

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