Successful intubation using a specially bent lighted stylet to fit the upper airway passage of a patient with ankylosis of the temporomandibular joint and deep cervical abscesses — A case report —

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A bent lighted stylet has demonstrated effectiveness for intubating patients with difficult airways. We report a case of successful intubation using a lighted stylet that was bent to configure the upper airway passage in a patient with ankylosis of the temporomandibul joint and a small inter-incisor gap with diffuse submandibular abscesses. We suppose that lighted stylets with different bends can be used in difficult airway cases. The usefulness of a bent lighted stylet to fit the upper airway passage needs further evaluation for additional clinical application. (Anesth Pain Med 2016; 11: 113-116)

Key Words: Instrument, Intratracheal intubation, Temporomandibular ankylosis.

Lighted stylets (LSs) are frequently used in Korea operating theaters for tracheal intubation of general anesthesia. However, LSs are an alternative to direct laryngoscopy for cases with anticipated intubation difficulties. LSs enable easy intubation in some difficult intubation cases with less time [1]. Some reports have indicated that LSs with different bend than the standard j shape could be useful to intubate patients with temporomandibular (TMJ) ankylosis [2,3]. However, an alternative bend may be useful when using a LS as an intubating tool in cases where use of a conventionally bent LS compromises the airway during intubation, as in cases with large and diffuse deep cervical abscesses and difficult airway features. We report a case of successful intubation using a LS with a bend different from the “j” or “double bend” for a patient with a difficult airway and deep neck abscesses with soft tissue swelling that restricted the maneuvering of the intubating devices inside the upper airway space.

CASE REPORT

An 84-year-old female patient presented to our anesthesia department for emergency drainage of necrotizing fasciitis of the right submandibular area under general anesthesia. A deep cervical infection developed from a dental problem around the right lower third molar 3 days ago. Her body weight, height, and body mass index were 66.9 kg, 149 cm, and 31.5 kg/m², respectively. A head and neck computed tomography (CT) scan revealed necrotizing fasciitis in the right submandibular space and peritonsillar fossa and multifocal abscesses in the retropharyngeal space and peritracheal area displacing the oropharyngeal and hypopharyngeal space, larynx, and upper part of the trachea to the left (Fig. 1A). Her trachea was deviated to the left and trachea showed mild to moderate narrowing along the tracheal deviation down to the C7 vertebrae level (Fig. 1B). A preanesthetic physical examination revealed a short webbed neck with a relatively small chin forming an obtuse angle (Fig. 1B, 105° on CT image) to the mandible and severe extension/flexion limitations in the c-spine. Her thyro-mental distance (TMD) was 5.5 cm. She showed
Fig. 1. Transverse (A) and midline sagittal (B) computed tomography image of the patient’s head and neck. These images show the submandibular abscesses with necrotizing fasciitis displacing the larynx and upper trachea to the left with mucosal swelling inside the laryngeal cartilage at the C5 level (A), and tracheal displacement to the left with peritracheal swelling down to the C7 vertebral level (B). Arrows indicate the deep cervical abscesses. C1: body of the first cervical vertebrae, C5: body of the fifth cervical vertebrae, HO: hyoid bone, Lx: larynx, M: mandible, T: tongue, VC: vocal cord.

ankylosis of both TMJs and a mouth opening limitation with an inter-incisor gap less than two finger widths. Her Mallampati classification score was 4, and only the tip of the tongue visible. Blood pressure, heart rate, respiratory rate, body temperature, and blood saturation on room air were 100/60 mmHg, 76 beats/min, 20 breaths/min, 36.6°C and 95%, respectively, in the operating room. No signs of respiratory distress, such as dyspnea or tachypnea, were observed. Laboratory tests revealed creatinine level of 1.34 mg/dl (normal range, 0.5–1.3 mg/dl), which was probably elevated from recent administration of a nonsteroidal antiinflammatory drug medication for gum inflammation. Otherwise, no specific findings were related to her current condition. Informed consent was obtained regarding the risks of failed intubation and airway loss, asphyxia, mortality, and the possibility of an emergency tracheostomy. The patient suffered from dementia and was agitated, so we did not consider awake fiber optic bronchoscopic-assisted intubation. Our anesthesia department was not equipped with visually assisted tracheal intubating devices at that time. We asked the surgeon to create a tracheostomy under local anesthesia before inducing general anesthesia, but the surgeon assured us that bag and mask ventilation would be possible after inducing anesthesia including a muscle relaxant and that he would be ready for an emergency tracheostomy in case of airway loss during induction. The left radial artery was cannulated with a 20 gauge angiocatheter while the patient was awake. A bispectral index (BIS) monitor (A-300, Covidien, Mansfield, MA, USA) was applied to the forehead. All routine anesthesia monitors were applied. Oxygen (100%) was supplied through a tightly sealed anesthesia mask for preoxygenation. Lidocaine 40 mg (2%) was given intravenously and general anesthesia was induced using target controlled infusion of 2% propofol (2% Fresofol MCT, Fresenius Kabi, Graz, Austria) and remifentanil (Ultiva™, GlaxoSmithKlein, Parma, Italy) with the Orchestra™ (Fresenius Vial, Brezins, France) infusion pump. After manual bag and mask ventilation was possible, 12 mg cis-atracurium (NIMBEX™, GlaxoSmithKlein) was given intravenously. Ventilation was quickly compromised and oral airway #5 (Sewoon Medical, Seoul, Korea) was inserted immediately with a 10 cm pillow inserted below the occiput for the sniff position. Upper airway patency was well secured, as confirmed by end-tidal capnography. We maintained tidal volume of 200–250 ml/breath by manually bagging. We removed the oral airway and pillow when the BIS reading reached 30 about 3 min after beginning drug infusion and lowered the head to extend the c-spine of the patient slightly using the hinge on the operating table. A plain 6.5 endotracheal tube over a Surch-Lite™ (Bovie Medical Corp., Clearwater, FL, USA) with a bend to fit the patient’s upper airway passage (UAP bend: stylet bent to pass from the interincisor gap to the larynx along the superior surface, over the middle of the tongue, and down to the epiglottis and larynx on midline sagittal CT scan or lateral film of the head and neck, Fig. 2A), which was different from the conventional “J”-shaped bend (Fig. 2B). The larynx and trachea were located and transilluminated using gentle to-and-fro movements of the Surch-Lite™ tip, and the 6.5 plain endotracheal tube was advanced into the trachea. No blood or pus was suctioned from the oral cavity after intubation. It took 40 sec to intubate the trachea from stopping manually bagging and mask ventilation. Blood pressure, heart rate, and oxygen saturation were 160/70 mmHg, 90 beats/min,
Fig. 2. Preparing the UAP bent lighted stylets. The UAP bend was made following the line from inter-incisor gap to the larynx inlet on an actual size sagittal computed tomography image (A). Comparison of the conventional “J”-shaped bend (upper B) with the bend in the patient’s upper airway configuration (lower B). The UAP bend was made along the patient’s upper airway passage with 3 cm of the tip bent to parallel to the tracheal axis for ease of endotracheal tube entry through the vocal cords. C1: body of the first vertebrae, C5: body of the fifth vertebrae, L1: lower incisor, Lx: larynx, T: tongue, UAP: upper airway passage.

95% just before induction, 90/50 mmHg, 85 beats/min, 98% just before intubation and 130/55 mmHg, 100 beats/min, 98% just after intubation, respectively. The abscess was drained and irrigated with saline. After the operation, she was transported to the intensive care unit and breathing spontaneously with a T-piece and oxygen connected to the endotracheal tube with transport monitors. She remained intubated for the first 48 hours postoperatively due to fear of being unable to resecure the airway after extubation. The endotracheal tube was removed 48 hours postoperatively without any serious airway events with improvement in the neck swelling.

DISCUSSION

Some reports have used a LS to prevent using direct laryngoscopic intubation in cases of an anticipated difficult direct laryngoscopic tracheal intubation [4,5]. Hung at al. [5] reported no correlation between success rates for tracheal intubation using LSs and airway prediction variables, such as the Mallampati score. Thus, intubation using a LS in patients with a high airway score can be accomplished without having difficulties when using direct laryngoscopy. Weis and Hatton [6] reported successful intubation of 20 patients with a LS on the first attempt after failed direct laryngoscopic intubation. Four of the 20 patient had complete TMJ immobility. Kim et al. [7] reported no difference in intubation success rate between using LSs with bend angles of 60° and 90°. Factors predicting difficulties with LS intubation differ from those of direct laryngoscopic intubation [5,8,9-12] and intubation with a LS can be a good alternative to direct laryngoscopy in a patients with TMJ immobility. According to Jeon at al. [3] a double-bent LS is helpful for intubating patients with a small TMD. Bikramjit [2] reported successfully intubating a child with TMJ ankylosis using a LS with curve of a Proseal LMA introducer tool. We needed a way to intubate a patient and avoid conventional intubation difficulties and prevent damaging abscesses and the fragile swollen soft tissue around them. Thus, we used a LS with a bend different from the conventional “hockey-stick shape” or “double bend”. We considered that a LS bent in the configuration of the upper airway passage would reduce the risk of traumatizing the diffuse abscesses around the airway. Thus, we used a LS with the UAP bent to intubate the trachea in the face of almost all known anticipated difficulties for intubation together with deep neck abscesses and soft tissue swelling. LSs with different bends (e.g., UAP bend) would be another choice of using a LS tailored to the patient’s specific airway. UAP bent LSs could be useful to intubate a trachea with an extremely rigid and limited upper airway passage. The clinical usefulness of this method must be tested with more cases to verify our results.

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