Foreign body from the lightbulb sheath of a Trachlight™ in the endotracheal tube

To the Editor:

Trachlight™ (Laerdal Medical Corp., Armonk, NY, USA) is a modified lightwand device which is suitable for both oral and nasal intubations. While very few complications of minor upper airway trauma have been reported,[1] we report a recent complication concerning a foreign body in the endotracheal tube (ETT) from the disconnected lightbulb sheath of the Trachlight™.

A 27-yr-old female with bilateral facial microsomia was admitted to hospital for breast reduction surgery. The preoperative airway assessment revealed limited mouth opening, micrognathia bilateral mandibular hypoplasia, and a thyromental distance of 4.3 cm. As difficult tracheal intubation was anticipated, the initial plan was to attempt lightwand-guided intubation under sevoflurane inhalational anesthesia with maintenance of spontaneous ventilation. When adequate anesthesia was achieved, orotracheal intubation proceeded using a Trachlight™ preloaded with a 7.5-mm polyvinyl chloride ETT. The wand was withdrawn from the ETT with some difficulty, however, and we noted a naked lightbulb in the wand tip and the lightbulb sheath missing from the distal end of the wand. An immediate search of the oral cavity and laryngopharynx using a direct laryngoscope failed to locate the lightbulb sheath. We proceeded with fibreoptic bronchoscopy which confirmed the presence of a white foreign body from the disconnected lightbulb sheath in the lower part of the ETT. After the ETT was carefully removed, reintubation was successfully completed using a fibreoptic bronchoscope. Inspection of the removed ETT revealed that the disconnected lightbulb sheath was lodged in the ETT above the cuff (Figure). It was estimated that this wand had been used more than 20 times in both oral and nasal intubations.

Although the lightwand intubation technique has been practised for many years, there are only four reported incidents of instrument disarticulation relating to a Flexilum™ flexible surgical light,[2,3] a Vital Signs lightwand,[4] and a lighted stylet.[5] Structural damage of the Trachlight™ has not previously been reported. Although the wand is designed as a reusable device,[1] disconnection of the lightbulb sheath may be a consequence of repeated sterilizing and handling[2]. Also, repeated insertion of the internal stylet into the wand and the force required to remove the wand with the precurved internal stylet from the ETT may cause the lightbulb sheath to loosen.

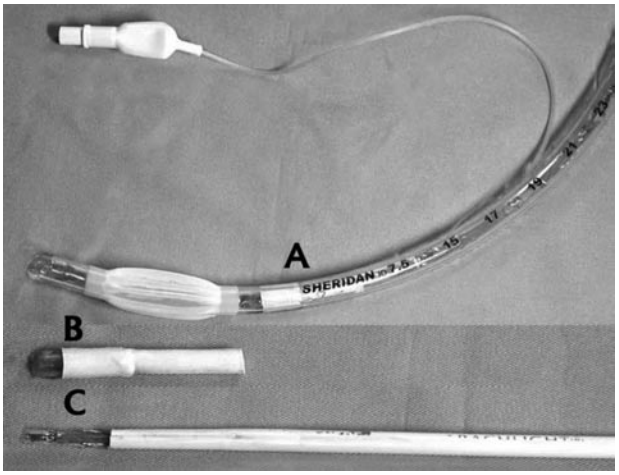

FIGURE A) The disconnected lightbulb sheath was lodged in the endotracheal tube above the cuff. B) The disconnected lightbulb sheath. C) The wand without lightbulb sheath exposing a naked lightbulb in the tip.

Although structural damage of the Trachlight™ is a rare complication during routine use, the potential for airway complications due to the presence of a foreign body in the ETT or the airways should be recognized. To avoid the occurrence of such complications, several key points must be emphasized. First, although the wand portion of a Trachlight™ is reuseable, there is no information about the average number of uses before mechanical failure. Second, a lightwand device is not intended to withstand great force, especially when it has been reused many times. Excessive force may not only damage or fracture the lighted stylet, but it could also result in airway injuries. It has been shown that adequate lubrication can decrease the force required to withdraw the lightwand stylet after placing the ETT.[5] Further, to minimize the traction forces necessary to withdraw the wand after ETT insertion, care should be taken when using the Trachlight™ to ensure that there is no sharp bend in the wand. If the distal end of the wand has to be sharply angled for intubation needs, an armored ETT should be considered, due to its flexibility compared to a polyvinyl chloride ETT.[5] Immersing a polyvinyl chloride ETT in warm saline solution immediately before intubation will also reduce its stiffness and the memory of its natural curvature, thus facilitating withdrawal of the wand from the ETT. Also, withdrawing the wand along the natural curve of an ETT may make the procedure easier.

Third, after tracheal tube insertion, the wand should be examined to ensure that it has been withdrawn intact. If visible damage of the wand is found and a foreign body in the ETT is suspected, spontaneous ventilation should be continued, insofar as is possible, to avoid forcing the disconnected object distally with positive-pressure ventilation into the tracheobronchial tree.[4] In our particular case, in the absence of cuff inflation, spontaneous ventilation could be provided without undue difficulty via the space between the ETT and trachea. Fourth, the lodging sites of foreign bodies within the airway can be determined by direct laryngoscopy and fibreoptic bronchoscopy. When a diagnosis of a foreign body in the ETT is established, the ETT should be gently removed, after which, reintubation can be performed. A foreign body within the tracheobronchial tree must be immediately retrieved with the aid of flexible bronchoscope biopsy forceps under the fibreoptic bronchoscopy.[2]

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Sublingual airway ultrasound imaging

To the Editor:
A quarter century ago, Dr. Mallampati published an important Letter to the Editor in the *Journal*.[1] In an attempt to predict the likelihood of ease or difficulty of orotracheal intubation, Dr. Mallampati introduced the concept of a simple scoring system based on a non invasive, direct visual examination of the patient's airway.[1] Even with its limitations, the Mallampati scoring system remains one of the most commonly used assessment tools for evaluating a patient's airway.[2] As technology advances, the modalities and techniques used to evaluate the accessibility of the airway have also progressed. However, despite the technological advances of the last 25 years, the search continues for a simple and non invasive technique that will provide a more accurate clinical assessment of the patient's airway.

Ultrasound imaging is a safe, simple, and non invasive modality through which soft tissues can be visualized and identified when combined with a thorough knowledge of regional anatomy. However, there is limited information regarding the feasibility and potential opportunities to use ultrasound imaging for examining the upper airway. In the emergency room setting, ultrasonography has been shown to determine, with reasonable sensitivity and specificity, the correct placement of an endotracheal tube.[3] As well, a recent study has shown that ultrasound imaging is fairly accurate in estimating the glottic diameter.[4] Both of these studies utilized an external, cricoid-level transverse scanning technique to visualize the trachea and the esophagus. In our experience, it is usually difficult, if not impossible, to obtain a stable longitudinal image of the airway when using an external scanning approach over the midline of the anterior neck. Perhaps this is due to the difficulty in maintaining good probe-skin contact over an uneven and curved surface, as is the case for the anterior neck. In our opinion, to increase the reliability of airway examination using ultrasound, both the transverse and longitudinal views of the existing imaging techniques to visualize the trachea and esophagus could be improved.

We have recently used a fast, simple, and non invasive sublingual technique for ultrasonographic airway imaging which is well tolerated in an awake, cooperative adult subject without any need for sedation. By placing a small footprint, high frequency curved array probe (e.g., C11, 11 mm, 8-2 MHz, M-Turbo, SonoSite, Inc., Bothell, WA, USA) into the sublingual fossa, intraorally, we have been able to obtain clear images of oropharyngeal and glottic structures. Generally, a longitudinal view of the larynx can be obtained by placing the probe sagittally and longitudinally under the patient's tongue. Excellent probe-tissue contact is achieved by placing the probe into the sublingual fossa. This approach provides stable images while avoiding contact with the soft palate and circumventing an