A difficult extubation: Endotracheal tube ensnarement by a Kirschner wire

Dear Editor,

A 92-year-old edentulous female presented for surgical fixation of bilateral mandibular fractures after sustaining a fall. After induction of general anesthesia, the patient was nasally intubated with a 7.0-cuffed endotracheal tube via the right naris. Arch bars were affixed to both the upper and lower denture. The upper denture was then fixed to the maxilla with Kirschner (K) wires and ligature wire. The lower denture was secured to the mandible with a circumferential wire in the midline and in both posterior quadrants. The dentures were brought into maximum occlusion and secured with interarch ligature wire.

At the completion of the procedure, extubation was planned for the post anesthesia care unit (PACU) to allow the patient more time to wake up so she could better protect her airway. The patient was brought to the PACU breathing spontaneously with the naso-endotracheal tube still in place. Prior to extubation, the patient was suctioned and the cuff deflated, but on withdrawal resistance was immediately met and the endotracheal tube could not be removed.

Several possibilities were entertained including a K wire transfixing the endotracheal tube or that the endotracheal tube was ensnared by one of the circumferential wires. A fiberoptic scope was passed through the endotracheal tube looking for evidence of any internal or external hindrance, none of which was noted.

Lateral and A-P radiographs were then obtained, in which a right-sided K wire appeared to impinge on the endotracheal tube [Figures 1 and 2]. Upon re-examination, a K wire was visualized within the wall of the endotracheal tube, not violating the lumen of the tube. The wire was removed and the patient was subsequently extubated without further complications.

Much is written about difficult intubation but little is written about difficult extubation. Previous case reports of resistance to attempted endotracheal tube removal\(^1\) fall into three main categories: (1) Physical impingement, (2) cuff malfunction, or (3) direct result of the surgical procedure. Careful evaluation of the airway using both fiberoptic and radiographic examination may help in leading to a differential diagnosis. Case reports of endotracheal tubes being transfixed by wires, sutures, or screws as in this report are rare.\(^1\) Other foreign objects such as nasogastric tubes or esophageal stethoscopes can also become ensnared around the endotracheal tube preventing removal. Cuff malfunction can also lead to difficulties when obstruction, kinking, or detachment of

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Figure 1: AP view of skull. White arrows indicate K-wires; K-wire on reader’s left has penetrated endotracheal tube. Black arrows indicate the edge of endotracheal tube.

Figure 2: Lateral view of skull. White arrow indicates K-wire that has inadvertently secured the endotracheal tube. Black arrow indicates edge of endotracheal tube. Rectangle indicates cervical spine.

the pilot tube impedes the deflation of the cuff. A popular practice is to snap the pilot bulb and valve off the pilot tube to deflate the cuff. This stretching maneuver actually occludes the pilot tube preventing cuff deflation. Finally, an endotracheal tube can become incorporated into the surgical field or compromised by the surgical procedure itself, especially during oral-maxillofacial surgery. In one report, the endotracheal tube was mistakenly incised and on removal the slit opened and subsequently caught on the hard palate preventing its removal. Ultimately, when dealing with an endotracheal tube that is difficult to remove, vigilance, sensibility, and caution are of paramount importance.

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