

Partial airway obstruction caused by dissection of a reinforced endotracheal tube

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EDITOR:

Ventilatory problems during surgery in the prone position may be a serious complication [1]. We report an incident where there was dissection of a reinforced endotracheal tube that led to its partial obstruction. This case shows an unexpected complication from reusing products intended for single use.

A 62-yr-old female (weight 68 kg) who was scheduled for total laminectomy with posterior lumbar fusion for lumbar stenosis was intubated

with a 7.0-mm reinforced endotracheal tube (Safetyflex; Mallinckrodt[®], Athlon, Ireland). Her lungs were ventilated with a mixture of sevoflurane 1.5 MAC (minimum alveolar concentration) in oxygen (35%) and nitrous oxide (65%). Her peak airway pressure (P_{peak}) was 25 cmH₂O and end-tidal CO₂ (ETCO₂) was 36 mmHg at the beginning of anaesthesia without wheezing. P_{peak} increased to 30 cmH₂O and ETCO₂ to 40 mmHg in the prone position. Approximately 30 min after prone

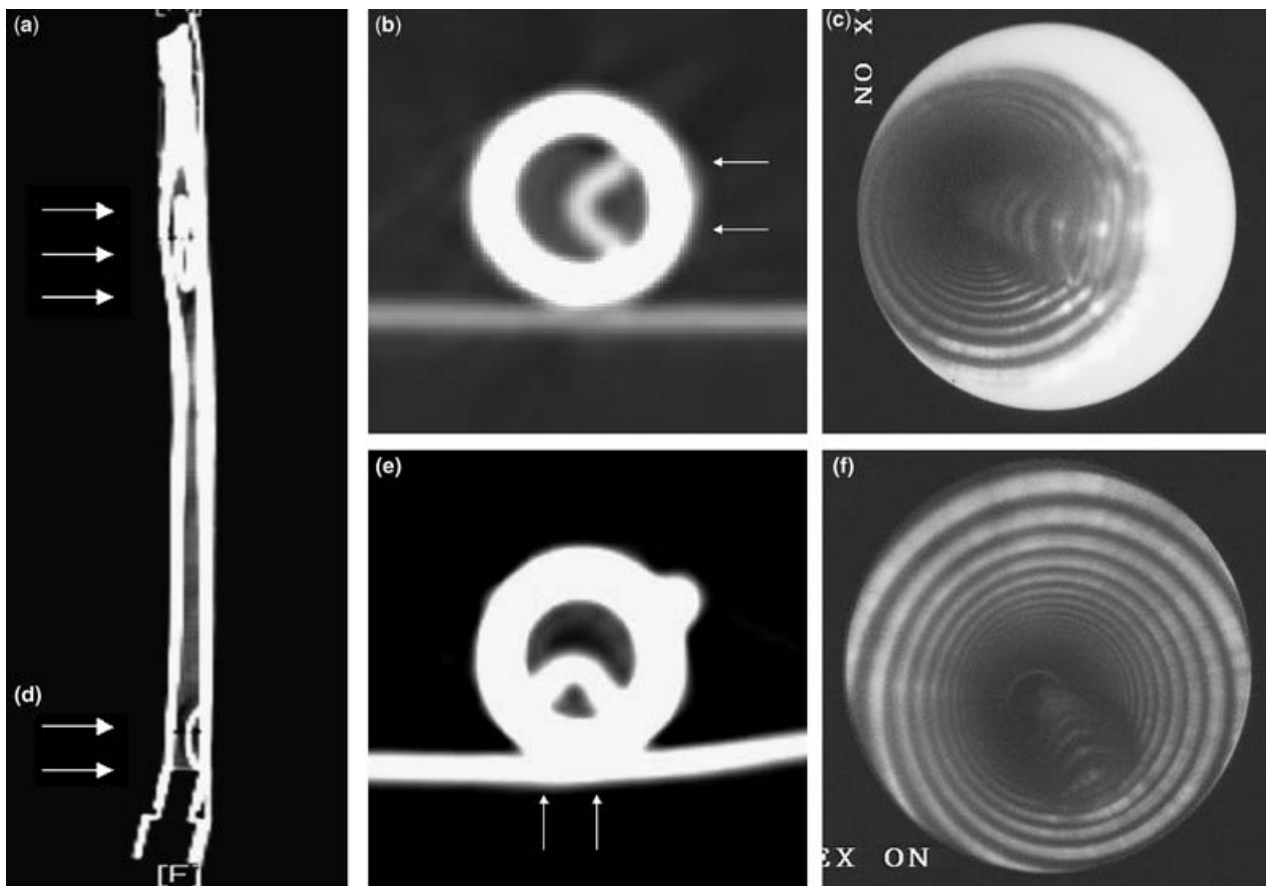


Figure 1.

Computed tomographic picture and fibrescopic view of the inside of the endotracheal tube. (a–c) distal part and (d–f) proximal part. Arrows indicate the area of dissection.

Correspondence to: Yeon Soo Jeon, Department of Pain Medicine and Anesthesiology, Saint's Vincent Hospital, The Catholic University of Korea, 93-6 Chi-dong, Paldal-gu, Suwon Gyeonggi-Do 442-723, South Korea. E-mail: likewinds@vincent.cuk.ac.kr; Tel: +82 31 249 7273; Fax: +82 31 258 4212

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positioning, P_{peak} increased to 40 cmH₂O and $ETCO_2$ increased to 45 mmHg. We could not pass a suction catheter beyond a distance of 24 cm from the entrance of the tracheal tube. Using a fibroscope, we could see the appearance of a meniscus and a crescent shape on the inner wall. Because of the prone position, we could not change the tube but managed to maintain ventilation, saturation and $ETCO_2$ within the normal range by a change of ventilatory mode for the remaining 5 h of the procedure. After returning to the supine position at the end of the operation, we extubated the patient and her self-respiration was good. Unfortunately, we found mild left lower lobe atelectasis post-operatively, which responded to physiotherapy. Her lung condition had returned to normal without complication by the second postoperative day.

Examination of the reinforced tube showed two internal blisters, one at the entrance and one at 24 cm from the entrance. Examination using a rigid fibroscope and computed tomography (Fig. 1) showed a dissection of the inner layer of the tube. The dissection had caused longitudinal blisters of 2.8 and 4.2 cm length and reduction of the internal diameter to 3.5 and 2.9 mm at the proximal and distal parts, respectively.

We assumed that the damage of the tube was caused by faulty manufacture. However, we subsequently discovered that the cause was multiple reuse of the single-use tube. Similar complications have been reported during anaesthesia with use of N₂O [2,3] or even without N₂O [4], exposure of heat, ethylene oxide [4–6] and glutaraldehyde solution [6] and stretching of a reinforced endotracheal tube [6]. The tube in this case had been

cleaned after each use with hypochlorous acid (Medilox solution; Hicro-S[®], Soosan GIC Co Ltd, Seoul, Korea) after ultrasonic cleansing for 30 min. We should bear in mind that repeated reuse of reinforced endotracheal tubes that are designed for single use is unwise.

Y. S. Jeon, Y. S. Kim, J. D. Joo, E. G. Kang
J. H. In, J. W. Choi, S. M. Cho
Department of Pain Medicine and Anesthesiology
Saint's Vincent Hospital
The Catholic University of Korea
Suwon, South Korea

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Changes in renal function in valvular and coronary patients

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EDITOR:

I read with interest the article by Landoni and colleagues [1] regarding acute renal failure and mitral valve surgery. Acute renal failure is one of the most serious complications of cardiac surgery, with high morbidity and mortality, although the subject is still not completely understood. Most of the research related to valve surgery and cardio-

pulmonary bypass (CPB) is from the 1960s and 1970s [2,3]. The current practice of valve surgery, recent development in CPB and new postoperative strategies offers us a different situation.

Early work in valvular surgery patients stated that CPB was the main cause of renal dysfunction and acute renal failure. There are a number of papers, showing that, contrary to this belief, CPB is not the main cause of this morbidity. However, most of this work has been performed in patients undergoing coronary artery surgery [4,5].

A recent study by our group (unpublished results) [6] shows that in valvular surgery patients (mitral

Correspondence to: Guillermo Lema, Department of Anesthesiology, Pontificia Universidad Católica de Chile, Santiago, Chile. E-mail: glema@med.puc.cl; Tel: +56(2) 6863415; Fax: +56(2) 6394409

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