A very early stage of obstructive fibrinous tracheal pseudo-membrane formation

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ABSTRACT As result of a short-term intubation (24 hours), we report a rare and poorly known complication: the formation of an obstructive fibrinous tracheal pseudo-membrane (OFTP). The diagnosis and therapy of OFTP were due to its spontaneous expectoration after a long asymptomatic time post extubation (four days): This is a very unusual event. A CT-scan of the chest performed 3 hours after intubation revealed the first step of pseudo-membrane developing.

KEY WORDS Obstructive fibrinous tracheal membrane; endotracheal intubation complications

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Introduction

Obstructive fibrinous tracheal pseudo-membrane (OFTP) is an uncommon and potentially lethal complication seldom seen after endotracheal intubation. OFTP is usually located on the tracheal cuff and sometimes it is difficult to distinguish it from other retained secretions in recently intubated and extubated patients. The development of this fibrinoid material is not completely known. However, OFTP requires an urgent management since causes a life-threatening airway obstruction. Herein, we present a case of a coughing spontaneous expectoration of OFTP.

Case report

A 50-year old man was referred to our Emergency Department after a high-speed street accident. Previous medical history was irrelevant. On the trauma scene, the patient had been evaluated by the Anesthesiologist of the Helicopter Emergency Medical Service with evidence of loss of consciousness (GCS =9) and lack of airway reflexes that requested an oro-tracheal intubation. The Anesthesiologist performed the intubation inside the car with a standard 8-mm cuffed tube; no further details about intubation had been presented. Therefore, the patient was referred to our hospital (Emergency Department - level two). After the standard trauma roentgenograms and the CT-scan of the brain and the chest, he was discharged to Intensive Care Unit with diagnosis of left diaphyseal femoral and right kneecap fractures. He was extubated after 24 hours and maintained in spontaneous ventilation. On the fourth day after extubation, he underwent surgical stabilization of fractures. Before induction of anesthesia, an attempt of nose-gastric tube insertion caused cough. The patient developed stridor and dyspnea; after few minutes, he expectorated a thick, annular, whitish cartilaginous material with improve of respiratory symptoms. A fast flexible bronchoscopy was performed without evidence of tracheo-malacia or granulation tissue in tracheal wall. Following, the synthesis of fractures was executed under general anesthesia without complications. At the end of surgical procedure, the patient returned to ICU for monitoring. He was extubated the day after and post-operative course was uneventful. Thirteen days later a follow-up bronchoscopy revealed a normal tracheal appearance with C-shape rings of cartilage at regular intervals, without stenosis or morphological abnormalities of mucosal surface. Histological examination of the lesion (Figure 1) showed a pseudo-membrane molding the tracheal wall (maximum length 5.5 cm, external and internal diameter about 1.5 and 1.0 cm); microscopic examination presented fibrinous material with polymorphonuclear infiltration and patchy areas of desquamated necrotic tracheal epithelium (Figure 2). Cultures of the pseudo-membrane showed no bacterial or fungal growth. The patient was discharged 23 days after admission.

Discussion

The OFTP is a rare and poorly understood, potentially fatal

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Figure 1. Pathological examination of the lesion showed a pseudo-membrane molding the tracheal wall.

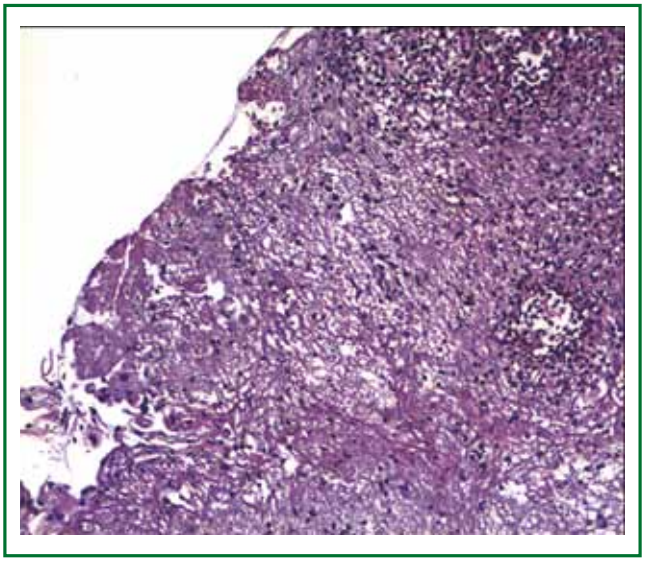

Figure 2. Histological examination showed fibrinous material with polymorphonuclear infiltration and patchy areas of desquamated necrotic tracheal epithelium.

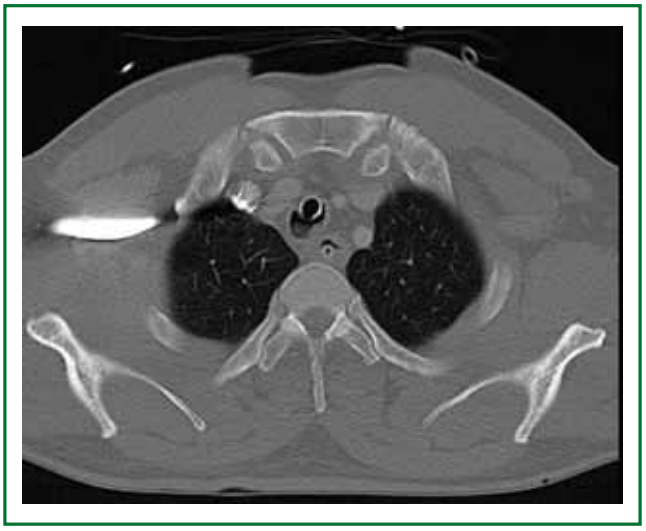

Figure 3. CT-scan of the chest performed 3 hours after intubation, revealed a contact on the tip's tube to the anterior endo-tracheal wall just below cuff, and the presence of a luminal narrowing close the posterior endo-tracheal wall and the lumen surface of the tube.

complication associate with the endotracheal intubation. Neither the real incidence nor the common definition of this complication is known. Sigrist and colleagues first reported a description of an OFTP in 1981 (1); the lemma OFTP was proposed by Deslee (2). A review by Lins and Dobbeleir (3) include, until April 2010, 23 adult cases. The OFTP is usually located at the site of the cuff where are removed by bronchoscopy. Clinical presentation evidence a stridor occurred shortly after extubation due to partial detachment of proximal part of pseudo-membrane producing intermittent respiratory failure caused by a valve-like tracheal obstruction. The spontaneous emission of OFTP has been described only once previously (4). The mechanism of development of pseudo-membranous material is nowadays not completely known. Several risk factors have been proposed as tracheal injury after intubation (5,6), illness (7), infections, caustic lesions of gastric reflux (8), hyper-pressure of endotracheal cuff, wrongly use of large tracheal tubes, length of intubation period. Since the patient described hereby had a difficult intubation inside his car on the trauma scene, the previous evidences described in literature suggest that a traumatic and a forceful intubation may have damaged the tracheal mucosa, triggering the OFTP formation. The tip's tube shearing on the tracheal mucosa due to an excessive head hyperextension, the repeated micro-movements of the tube due to transport and the swallow might have sustained the development of the pseudo-membrane. The chest CT-scan performed 3 hours after the intubation, showed the contact of the tip's tube (last 3 cm) to the anterior tracheal wall just below the cuff (about 8 cm from cricoid cartilage), and the existence of a luminal tighten close to the posterior tracheal wall and the surface of the tube (Figure 3). It bordered about one third of the posterior tracheal wall. We became aware of this tighten only after the OFTP expulsion when we re-evaluated the CT-scan images: The luminal lesion was the first step of pseudo-membrane developing. The characteristics of OFTP and the histological findings (superficial scratch of the mucosa,

thick fibrinous material with polymorphonuclear infiltration and desquamated necrotic tracheal epithelium) were similar to others report in literature and suggest that OFTP represents an early stage of tracheal ischemic damage. As in other reports, the presence of OFTP can be silent, if the membrane adheres to tracheal wall. Consequently, our patient remained asymptomatic for 4 days after extubation; cough reflex caused by nose-gastric tube insertion developed the respiratory distress. We speculated that the patient might have tolerated the OFTP since the analgo-sedation with morphine concurred to diminish trachea-coughing reflex. The pseudo-membrane was spontaneously expectorated few minutes after detach and this is the second report in literature.

In conclusion, the inexplicable occurrence of upper way obstruction with development of respiratory failure in recent intubation or extubation should lead to contemplate the presence of OFTP. Our report demonstrates that OFTP can early develop after intubation and remain silent if there were no tracheal lumen obstruction. OFTP is certainly underdiagnosed, as stridor and respiratory failure after extubation are common. Moreover, reintubation or tracheal suction can remove pseudo membranous lesions that will remain unknown. Although these lesions may be life threatening, a careful management results in favorable outcomes. OFTP requires an immediate diagnosis by bronchoscopy. OFTP removal through rigid bronchoscopy remains the gold standard, since the spontaneous expectoration of OFTP is an outstanding event.

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References

1. Sigrist T, Dirnhofer R, Patscheider H. [Rare complications following tracheotomy and intubation (author's transl)]. Anaesthesist 1981;30:523-7.
2. Deslée G, Brichet A, Lebuffe G, et al. Obstructive fibrinous tracheal pseudomembrane. A potentially fatal complication of tracheal intubation. Am J Respir Crit Care Med 2000;162:1169-71.
3. Lins M, Dobbeleir I, Germonpré P, et al. Postextubation obstructive pseudomembranes: a case series and review of a rare complication after endotracheal intubation. Lung 2011;189:81-6.
4. Fiorelli A, Vicidomini G, Messina G, et al. Spontaneous expectoration of an obstructive fibrinous tracheal pseudomembrane after tracheal intubation. Eur J Cardiothorac Surg 2011;40:261-3.
5. Takanami I. Life-threatening stridor due to membranous tracheitis as a rare complication of endotracheal intubation: report of a case. Surg Today 2003;33:285-6.
6. Farr MJ, Cyna AM. Subacute airway obstruction from a tracheal mucosal flap. Anaesthesia 2006;61:285-90.
7. Harbison J, Collins D, Lynch V, et al. Acute stridor due to an upper tracheal membrane following endotracheal intubation. Eur Respir J 1999;14:1238.
8. Kang HH, Kim JW, Kang JY, et al. Obstructive fibrinous tracheal pseudomembrane after tracheal intubation: a case report. J Korean Med Sci 2010;25:1384-6.