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Removal of a mediastinal osteosynthesis screw by rigid bronchoscopy

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Introduction

To remove a foreign body from the tracheobronchial tree is a common job for bronchoscopists. Yet, to extract an extra-tracheal foreign body by bronchoscopy is exceptional and, to the best of our knowledge, never reported. We herein report a case of a patient who after vertebral surgical fixation presented with acute cough revealing a screw migrated to the mediastinum, touching the posterior tracheal wall.

Case Report

A 43 year-old male patient, suffered from a diffuse myeloma with complete osteolysis of the 7th cervical vertebra, underwent an autogenic bone graft coupled with an osteosynthesis, considering the high risk of spinal cord injury. The osteosynthesis anterior plate was fixed between the 6th cervical vertebra (C6) and the first thoracic vertebra (T1), using 6 screws. T1 was however invaded also by the myeloma and the fixation of one screw could not be secure enough in T1. Due to anatomical limitation of the exposure, this lower screw was fixed mostly in the disc T1/T2 and consequently, prone to migration. After fixation, the patient underwent chemotherapy, external irradiation on lytic lesions with bone marrow transplantation.

One year later, the disease was controlled and the bone graft was consolidated. However, the patient presented with chronic cough and a slight dysphagia. A radiography followed by a computed tomography showed a screw dislodgment, migrated just behind the pars flaccida of the trachea (Figure 1a,b) neighboring the esophagus. The esophagus endoscopy was unremarkable, but bronchoscopy showed a bulging of the pars flaccida, without any ulceration, due to the screw (figure 2). Due to the position of the screw, close to the posterior membrane, a bronchoscopic extraction was judged less aggressive than an open

surgical procedure, more complex in that location, behind the trachea and in the cervical/thoracic junction, at the upper part of the mediastinum. Therefore a decision of an endotracheal attempt was retained, and the patient underwent a rigid bronchoscopy procedure under general anesthesia.

During the procedure, the intact pars flaccida was first cut with scissors, then, the head of the screw was progressively extracted using a forceps and a lasso (Figure 3). Finally, the 1.5cm long screw was extracted in totality through the tracheal wall (figure 4a). After the screw removal, the posterior tracheal wall appears irregular and lacerated but without opened fistula (Figure 4b). A large antibiotic prophylaxis with Rifampicine 600 mg and Levofloxacin 500 mg was given for 2 weeks, starting first intravenously during the rigid bronchoscopy. Patients' symptoms have dramatically improved after the screw extraction and a bronchoscopy performed one month later showed no laceration of the pars flaccida (Figure 4c). Two years after the procedure the patient was still asymptomatic.

Discussion

To the best of our knowledge, this procedure of extra-tracheal foreign body removal has been never published. To extract this screw through the tracheal posterior wall requires performing an intentional tracheal injury. Tracheal membrane rupture is well known after aggressive intubation, often with very large dehiscence. A spontaneous healing is often observed¹ and we have expected and observed the same evolution.

Anterior cervical spine fixation is an effective procedure but some complications can occur such as migration of plates or screws. Lowery and McDonough² reported a 35% incidence of hardware failure but only 5% of these patients required hardware removal, and no esophageal complications were noted in these series. Most cases of migration have a rather

benign clinical course. Yet, several cases of esophageal or pharyngeal perforations have been reported from few days to 11 years after cervical spine plating ^{3,4}.

In general, the airways are less affected by these migrations, due to the bigger distance from the spine. In 2005, Wong ⁵ reported the first case of acute airway obstruction due to the migration of a screw causing a cervical abscess with airway compression. Only 5 authors report cases with screw migration in the trachea. In the first case of screw endotracheal migration 10 years after an osteosynthesis, fistula was surgically treated ⁶.

In the second case ⁷, ten months after cervical spine plating, a screw was found in the right lower lobe and extracted bronchoscopically but no fistula or perforation was seen. In the third case ⁸, an ulceration of the trachea was observed by a migrating plate, few weeks after surgery. This tracheal fistula was closed also surgically. In the same observation, one screw found in the right lower lobe was removed by flexible bronchoscopy.

In the forth observation ⁹, a screw was found in the right lower lobe, 5 years after an anterior plate fixation for retrolisthesis; the screw was extracted by wedge resection. The migration through the tracheal wall was never been confirmed and the authors postulate that the screw could be inhaled after pharyngo-esophageal migration. The last case¹⁰ concerned a screw found in the intermediate bronchus, extracted with a rigid bronchoscope. This screw came from an anterior cervical plate fixed 10 years ago, eroding the trachea.

To conclude, our case is the first case of extraction through the tracheal wall with a rigid bronchoscope of a screw migrated in the mediastinum, in close relation with the posterior wall of the trachea, after a surgical procedure of vertebral fixation.

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Comments of figures

Figure 1 a,b : migration of one screw, discovered one year after the plating. The screw is located between the posterior wall of the trachea (pars flaccida) and the esophagus

Figure 2 : The bulging pars flaccida , intact ,without any fistula, prior to the incision.

Figure 3 : the different phases of the extraction with first incision of the bulging pars flaccida, then progressive extraction of the screw using forceps and lasso wire.

Figure 4 a,b,c: The extracted screw of 15 mm in length (a) , the final aspect of the pars flaccida just at the end of the extraction showing an irregular and lacerated membrane without open fistula (b) and the complete healing, seen here with a flexible bronchoscope, one month after the extraction (c).

Figure 1

Figure 2

Figure 3

Figure 4