A Case of Cryptogenic Hemoptysis after General Anesthesia

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Hemoptysis after general anesthesia is common, and is believed to be a consequence of surgical error or the anesthesia itself. Despite complete evaluation, 20-30% of cases of hemoptysis remain without an identified etiology and are considered cryptogenic hemoptysis. Perioperative cryptogenic hemoptysis has rarely been reported in the literature. Herein, we report the case of a patient who expectorated fresh blood intermittently, and a large blood clot after an uneventful cervical spine surgery under general anesthesia. Extensive evaluation including chest X-ray, computed tomography (CT), and bronchoscope identified active oozing from the left lingual segmental bronchus only. The differential diagnosis of perioperative hemoptysis and its management are discussed. The prognosis of cryptogenic hemoptysis is favorable, but hemoptysis may recur. Complete prompt evaluation is important, especially for patients with a risk of malignancy. ***(Thorac Med 2016; 31: 305-310)***

Key words: cryptogenic hemoptysis, general anesthesia

Introduction

Hemoptysis after surgery is common, and is believed to be due to damage from endotracheal intubation, the surgical procedure, or vigorous negative pressure after extubation. In 20-30% of hemoptysis patients the cause cannot be determined; these cases are therefore considered to be cryptogenic hemoptysis [1-6]. However, cryptogenic hemoptysis is rarely reported in patients who receive general anesthesia. Thus, the true incidence of cryptogenic hemoptysis may be underestimated. We herein report a case of cryptogenic hemoptysis in a female who received cervical spine surgery under general anesthesia.

Case Description

A 64-year-old female presented with aggravated neck soreness and weakness in all 4 limbs after a traffic accident. She denied any dyspnea or other discomforts. She had a history of cervical spine stenosis from C4-7, and no history of

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systemic disease. Magnetic resonance imaging (MRI) revealed C4-7 herniated intervertebral discs with myelopathy. Laboratory testing, including coagulation parameters, were unremarkable. She was admitted for spine surgery.

The operation was performed on the 6th day after the accident; she had worn a cervical collar prior to surgery. Induction of general anesthesia was accomplished with propofol 100 mg, fentanyl 50 μg, and succinylcholine 80 mg. Her trachea was intubated using a 7.0-mm internal diameter cuffed oral endotracheal tube with a Trachway intubating stylet (Trachway®; Biotronic Instrument Ltd; Taiwan) without difficulty. Anesthesia was maintained with desflurane in oxygen/air (1 L/1 L). Mechanical ventilation was set at a tidal volume of 450 ml and a respiratory frequency of 10 breaths/min. Her SPO_2 was 100% on 40% FiO_2 throughout the surgery. Anterior C4-7 discectomy and anterior body fusion with a polyether ether ketone (PEEK, Zimmer®) cage and trabecular metal spine (TM-S, Zimmer®) cage were performed in the supine position.

At the end of the anesthesia, endotracheal suction showed a small amount of blood-streaked secretions. The endotracheal tube was removed as soon as the patient awoke, and no more blood was seen on endotracheal suction. The patient was transferred to post-anesthesia recovery (PAR), where she expectorated small amounts of blood-tinged sputum 3 times. Once no active hemoptysis was noted, she was transferred to the ward. One hour later she began to intermittently expectorate fresh blood accompanied with a large blood clot. Approximately 100 ml of fresh blood mixed with saliva was found by oral suction. Her SPO_2 was 99% under nasal cannula (2 L O_2/min). Her consciousness was clear and she was sent to PAR for further treatment, at which time her blood pressure, heart rate, and SPO_2 were 171/81 mmHg, 66 beats/min, and 100% under nasal cannula (2 L O_2/min), respectively.

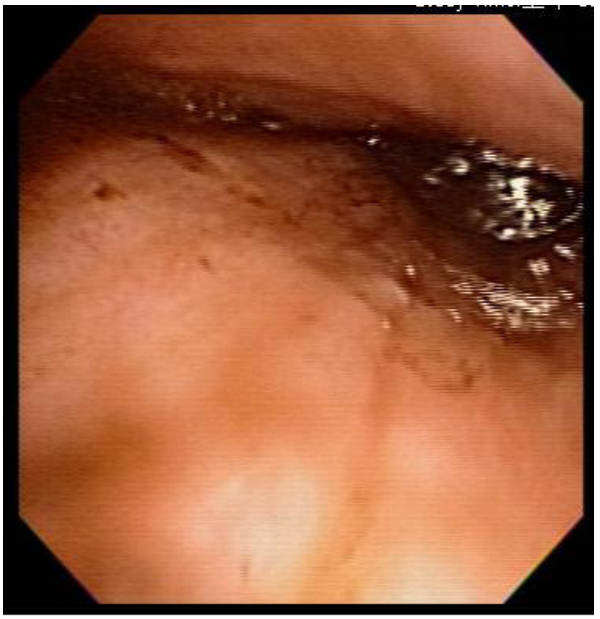

Fig. 1. Bronchoscopy showed active oozing from the left lingual segmental bronchus spilling out to the left lingual lobe and trachea. No injury to the esophagus, pharynx, larynx, trachea, and main bronchus was noted.

Transamin 500 mg was given intravenously, and steam inhalation of epinephrine 1 mg was administered. Chest X-ray showed increased bilateral lung marking and no localized infiltration. Fiberoscopy done by an anesthesiologist and otolaryngologist revealed no mucosal trauma to the nose, pharynx, larynx, and trachea. However, blood was noted coming from the left bronchus orifice. During a 2-hour observation, no more fresh blood was coughed out and the patient was transferred to the ward again. A recurrent episode of fresh blood expectoration occurred 3 hours later, and her vital signs were stable. Bronchoscopy was then performed by a thoracic surgeon under general anesthesia. No injury to the esophagus, pharynx, larynx,

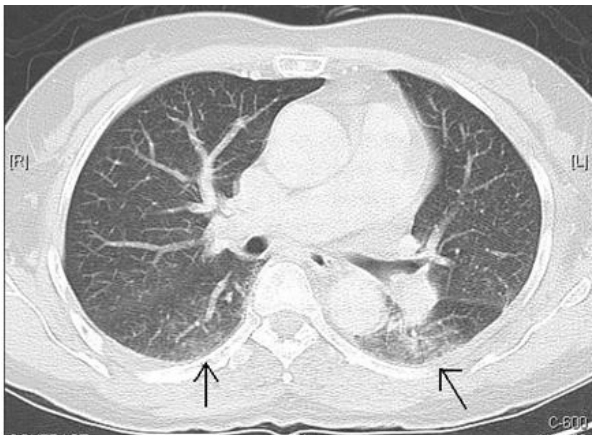

Fig. 2. Chest computed tomography revealed ground-glass opacities in the dependent areas of both lower lobes of the lungs (arrows). No other pathological abnormalities were identified.

trachea, and main bronchus was noted. Active oozing was noted from the left lingual segmental bronchus spilling out to the left lingual lobe and trachea (Figure 1). The bleeding stopped after use of an epinephrine spray.

Chest computed tomography (CT) revealed ground-glass opacities in the dependent areas of the right upper lobe and both lower lobes of the lungs, and no other pathological abnormalities (Figure 2). Steam inhalation of epinephrine 1 mg and intravenous transamin 500 mg were given every 8 hours. Small amounts of blood-tinged sputum were observed several times, but this resolved within 2 days. The patient was discharged without further complications on the 5th day after surgery.

Discussion

Hemoptysis after surgery is not uncommon, and most cases are considered to be due to tracheal intubation, the surgical intervention, or negative pressure pulmonary edema (NPPE). Cryptogenic hemoptysis after surgery has rarely been reported. Factors related to the anesthesiologist and surgeon are commonly thought to be responsible for postoperative hemoptysis, though adequate proof is generally not found. In the case presented here, bleeding from the lingual bronchus, with no upper airway damage or bleeding, was noted during fiberscopic examinations by 3 doctors from different departments. In addition, no pathological lesion was noted in the lingual lobe on chest CT. Thus, this was considered to be a case of perioperative cryptogenic hemoptysis, since no pathological findings were identified after an extensive evaluation.

The etiology of hemoptysis may be infectious, neoplastic, immunologic, vasculitis, cardiovascular, or traumatic [5-7]. Hemoptysis can also be due to rare conditions such as pulmonary endometriosis, pulmonary sequestration, and lymphangioleiomyomatosis. Even after performing a complete clinical evaluation with chest X-ray, fiberoptic bronchoscopy and CT, no cause could be established in 20-30% of patients, no matter the severity of bleeding [1-6]. In 1985, Adelman *et al* [1] defined cryptogenic hemoptysis as bleeding with no clear cause despite a thorough evaluation.

The patient reported herein had no history of hemoptysis, and no symptoms of respiratory infection such as cough and fever. There was no localized infiltration of a mass lesion identified on chest X-rays before or after surgery. No signs of bronchiectasis (e.g., bronchial dilatation with an increased bronchoarterial ratio and lack of bronchial tapering), tumor, or vascular malformation were noted on chest CT. Bronchoscopy revealed no injury to the esophagus, pharynx, larynx, and main bronchus, and no mass lesion. Thus, infection, bronchiectasis, neoplasm, and surgical trauma were excluded as the possible etiologies of the hemoptysis.

Hemoptysis due to NPPE can occur after general anesthesia [8-11]. NPPE is associated with upper airway obstruction resulting from laryngospasm, epiglottitis, goiter, and endotracheal tube obstruction. Chest radiography typically shows bilateral patchy infiltration similar to that of pulmonary edema from other causes. Bronchoscopic findings in cases of NPPE include diffuse punctate hemorrhagic lesions in the trachea and bronchi [8,10]. Chest X-ray of our patient showed increased bilateral lung markings, and chest CT revealed ground-glass opacities in the dependent areas of the bilateral lungs, which are signs consistent with pulmonary edema. However, there was no abrupt increase in airway pressure during the period of intubation; the patient was extubated smoothly while awake, and no dyspnea was noted in PAR. No signs of airway obstruction were seen during the peri-anesthetic period. Moreover, bronchoscopy did not reveal diffuse punctuate hemorrhages. Therefore, NPPE was considered unlikely to be the cause of hemoptysis.

The initial approach to hemoptysis involves securing the airways and stabilizing the hemodynamics. Conservative treatment includes the administration of antitussives (codeine) and antifibrinolytics (aminocaproic acid). Bronchoscopy can be performed to localize the source of and control the bleeding. When the hemodynamic or respiratory status is compromised, urgent rigid bronchoscopy should be attempted by a skilled physician, as it is efficient to clear blood clots and secretions from the airways, ensure effective tamponade of the bleeding, and isolate the unaffected lung, thereby preventing further airway obstruction and sustaining adequate ventilation [7]. If the underlying lesion is endoluminal, further management would include cold saline lavage, local administration of topical vasoconstrictive agents, tranexamic acid, and fibrinogen-thrombin, local coagulation therapy, local compression, and endobronchial sealing with a biocompatible glue [7]. Bronchial artery angiography with embolization has been used recently to control massive hemoptysis. Major complications are rare and immediate clinical success is defined as an 85% to 100% cessation of hemorrhage [12].

Studies have revealed a favorable prognosis for patients with cryptogenic hemoptysis. In 1985, Adelman et al [1] reviewed the clinical outcomes of 67 patients with cryptogenic hemoptysis. During a 38±22-month period, 85% of patients remained well without evidence of active tuberculosis or malignancy; recurrent episodes of hemoptysis occurred in 8 patients (12%). One patient developed bronchogenic carcinoma 20 months after bronchoscopy. In 2001, Herth *et al* [4] reported lung cancer had developed in 6% of patients with cryptogenic hemoptysis within 3 years after the first bleeding episode; all of the patients were smokers and more than 40 years of age. In 2007, Savale *et al* [2] prospectively studied the clinical courses of 73 patients with cryptogenic hemoptysis. During a 47±35-month period, hemoptysis recurred in 10 patients (13.7%), and no cases of cancer were noted. In 2012, Lee *et al* [3] evaluated the clinical courses of 148 patients with cryptogenic hemoptysis, and during a mean follow-up of 781 days, hemoptysis recurred in 29 patients (19.6%); no patient developed malignancy. Based on these studies as a guide, we informed our patient about the possibility of recurrent hemoptysis. These data suggest that exploration of the underlying lung parenchyma at the time of hemoptysis and during follow-up to exclude lung carcinoma is warranted if the patients are smokers.

In conclusion, we reported a patient with perioperative cryptogenic hemoptysis that developed after cervical spine surgery under general anesthesia. Hemoptysis after surgery may be due not only to trauma during anesthesia or surgery, but also to unidentified causes. Complete evaluation is encouraged in order to prevent recurrence and determine the underlying cause, especially in patients at risk of malignancy.

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全身麻醉後發生隱源性咳血之病例報告

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全身麻醉後發生咳血在病例報告中是常見的，大部分被認為和手術及麻醉相關，儘管經過完整的評估，仍有 20-30% 是沒有明確的病因，被定義為隱源性咳血。手術期間發生隱源性咳血極少被報導，在此我們報告一位病例，在全身麻醉下順利完成頸椎手術後，開始出現間歇性咳出鮮血及血塊，經過胸腔 X 光、電腦斷層及支氣管鏡檢查，僅發現在左側小支氣管正在滲血。手術週期發生咳血原因及處置都在文中討論，而隱源性咳血的預後是很好的，但有復發咳血的可能，完整適當的咳血評估是很重要的，尤其是有潛在惡性腫瘤危險因子的病人。*(胸腔醫學 **2016; 31: 305-310**)*

關鍵詞：隱源性咳血，全身麻醉

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