



Case report

Sudden death during medical thoracoscopy



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ABSTRACT

Medical thoracoscopy (or pleuroscopy) is a valuable diagnostic tool in patients with pleural pathology, being minimally invasive, inexpensive and relatively easy to learn. Complications may occur, depending on the complexity of the case, and mainly include broncho-pleural fistulas, chest infections, arrhythmia, severe hemorrhage due to blood vessel injury, and air or gas embolism. Death is very rare.

The present report describes the peculiar case of a 72-year-old woman affected by a pleural empyema who suddenly and unexpectedly died during medical thoracoscopy.

On autopsy, three small perforations of the right lung were found, without involvement of major vessels or bronchial ramifications.

After a brief overview of medical thoracoscopy and its complications, the fatality and its possible pathophysiological mechanisms are analyzed through a review of the literature.

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1. Introduction

Performed for the first time by Sir Francis Richard Cruise in 1866 on an 11-year-old girl with a history of cough and pain in the left side of the chest¹ and introduced into the treatment of tuberculosis by Jacobaeus in 1910,² thoracoscopy is a method whereby an optical system is used to examine the pleural cavity, to perform biopsies of visceral and parietal pleural surfaces of the lung parenchyma and to carry out other minimally invasive procedures within the chest cavity.

Medical thoracoscopy is now less frequently undertaken to treat tuberculosis because of the reduced incidence of this disease in Western countries. However, it has become the gold standard in the diagnosis and treatment of pleural pathologies, especially pleural effusions.³ Specifically, it is mainly used for diagnostic purposes, especially when other procedures have not been diagnostic, and as a therapeutic mean in talc pleurodesis ('poudrage') to prevent recurrence of persistent pleural effusions or pneumothorax.⁴ To

date, it is the gold standard in the diagnosis and management of malignancy.⁵

It is usually performed under local anesthesia and some conscious sedation. It is less invasive, less expensive and easier to learn than more invasive procedures which require general anesthesia.⁶

While it is considered a safe procedure and has a low complication rate in expert hands, sometimes complications may occur. These are mainly constituted by broncho-pleural fistulas, chest infections, arrhythmia, severe hemorrhage due to blood vessel injury, and air or gas embolism; death is very rare.⁷

We present the case of a 72-years-old woman who suddenly and unexpectedly died during the execution of a medical thoracoscopy performed because of pleural empyema, and discuss this fatality and its pathophysiological mechanisms through a review of the literature.

2. Case report

2.1. Case history

A non-smoking 72-year-old woman was referred to hospital because of right thoracic pain. Her medical history revealed only obesity and high blood pressure. Apart from anti-hypertensive therapy, she was not on any medication.

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She presented severe thoracic pain, dyspnea and fatigue. An ECG was performed, which did not reveal any pathological features, and also myocardial enzymes were negative. The following day, she developed a non-productive cough and fever (38 °C) and right-inferior hypophonesis was found. Arterial blood gas test resulted in pH 7.43, P_aCO₂ 37.1 mm Hg, P_aO₂ 68.6 mm Hg, Sat. O₂ 93.9%. A chest radiograph revealed right pleural effusion, confirmed by computed tomography, and right thoracentesis showed the presence of muddy yellowish liquid (ph 6.73). An empyema was suspected.

In the light of this finding, physicians decided to perform a medical thoracoscopy. The patient was under cardiac and blood pressure monitoring through all the process.

According to the medical record, the procedure was performed by means of a rigid thoracoscope through a direct access on the posterior axillary line, after local anesthesia with 2% lidocaine (20 ml). The right pleural cavity was first explored with a thoracentesis needle, and several centiliters of purulent liquid were withdrawn; the skin was then incised and the trocar was inserted. The exploration was immediately interrupted because of the onset of coughing and hemoptysis. After a few minutes, the patient died of cardiac arrest (asystolia), despite 20 min of attempts at cardio-pulmonary resuscitation (both drugs and cardioversion).

As this death was totally unexpected, the coroner decided to carry out an autopsy, which was performed 48 h later.

2.2. Autopsy findings

External inspection of the corpse revealed a skin incision on the right side of the thorax immediately under the axilla and on the right axillary line. The incision had neat, infiltrated edges of nearly 2 cm in length and its longer axis was perpendicular to the body.

Before section, pneumothorax was investigated in both pleural spaces by inserting a wide-bore needle attached to a water-filled syringe into the subcutaneous tissue above an intercostal space and then into the pleural space and it was evident on the right side.

En-bloc removal of the thoracic pluck (i.e. neck structures, heart, lungs, and mediastinum) was performed in order to preserve inter-organ relationships and effects.

The trachea and larynx were partially replete with mucus mixed with blood. In the right pleural space, muddy yellowish liquid was found (800 cc). On the anterior-lateral surface of the inferior lobe of the right lung, three small lesions of the pleura and of the lung parenchyma were found (Fig. 1); these had neat, open margins. One

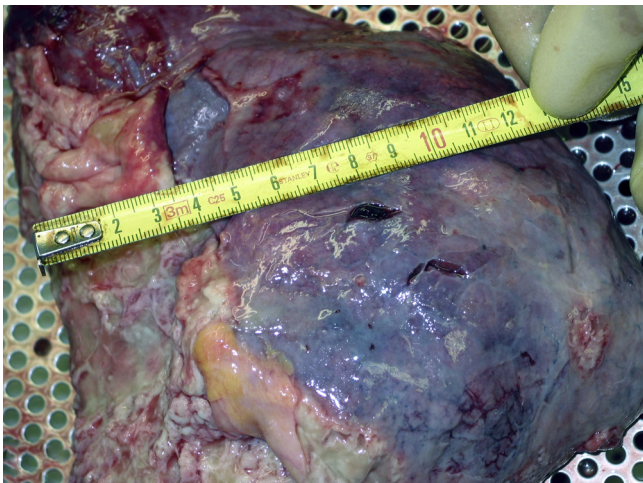


Fig. 1. Small perforation on the surface of the right lung.

lesion was 15 mm in length and its lumen was occupied by a blood clot. The other two were 10 and 6 mm in length, more superficial and less infiltrated by blood. In addition, the surface of the right lung showed a thick white fibrous layer strongly adherent to the visceral pleura. The mainstem bronchi showed no signs of lesions, but their lumina were occupied by mucus mixed with blood. The right lung was sampled *in toto* and immersed in formalin. No signs of pulmonary embolism, neither gas nor blood clot in the pulmonary circulation were found.

The heart was of normal size and weight with abundant sub-epicardial fat. Both atria and ventricles were normal. The coronary vessels were sclerotic, but their lumina were not reduced. No pathological findings were observed in the other organs.

After fixation, the right lung was examined; the traumatic lesions were superficial, penetrating 2–3 mm into the parenchyma. The largest one was occupied by a thrombus, though no vessel had been injured. This lesion was surrounded by an area of hemorrhage of approximately 1.5 cm in diameter in the parenchyma. The principal bronchus was patent, while the inferior bronchus was obstructed by clotted blood mixed with purulent material.

Histological examination was performed on the samples collected during autopsy. The heart displayed diffuse sclerosis with undulation, fragmentation and dissociation of fibers; while the lungs showed microscopic signs of emphysema and distelektasia with focal areas of pneumonia in various stages of evolution, up to fibrosis and hemorrhage.

3. Discussion

Used for decades in Europe in the diagnosis and management of pleural processes, medical thoracoscopy, a term used in order to distinguish the old conventional thoracoscopy technique from 'video-assisted thoracoscopic surgery' (VATS), is generally considered a safe procedure.⁸

Table 1
Complications of medical thoracoscopy reported in the literature.

Study	Number of cases	Complications	Incidence
Viskum and Enk ¹⁹	Revision of 2298 reported procedures in 15 series	Subcutaneous emphysema	1.3%
		Empyema	2%
		Significant bleeding	2.3%
		Air embolism	0.2%
		Death	0.09%
Viallat et al. ²⁴	360 cases	Subcutaneous emphysema	0.6%
		Empyema	2.5%
		Empyema	2.7%
de Campos et al. ²⁵	614 cases	Re-expansion pulmonary edema	2.2%
		Respiratory failure	1.3%
		Air leakage	0.5%
		Postoperative bleeding	0.4%
Rodríguez-Panadero ⁶	411 cases	Air leakage	9%
		Subcutaneous emphysema	4.9%
		Empyema	1.9%
		Postoperative bleeding	0.7%
		Pulmonary embolism	2.7%
		Death	0.2%
Boutin ²⁶	188 cases	Subcutaneous emphysema	0.5%
		Empyema	2.1%
		Postoperative bleeding	1.6%
Harris ⁷	182 cases	Air leakage	3%
		Subcutaneous emphysema	4%
		Empyema	2%
		Postoperative bleeding	4%
		Death	0.5%
Blanc ²⁷	168 cases	Subcutaneous emphysema	5.3%
		Empyema	3.6%
		Pulmonary embolism	0.6%
		Death	0.6%

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