



# Video-assisted thoracoscopic surgery for spontaneous hemothorax caused by rib metastases from multiple myeloma



Ann Ital Chir, 2022; 11 - Oct. 20  
pii: S2239253X22037574  
Online Epub

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## Video-assisted thoracoscopic surgery for spontaneous hemothorax caused by rib metastases from multiple myelomas

**AIM:** The aim of this study was to analyze the clinical characteristics and the treatment of a rare case of rib metastases from multiple myeloma (mm) complicated by hemothorax.

**METHODS:** We present a case of coagulated hemothorax in a 60-year-old woman with rib metastases from MM. Clot removal was performed via videothoracoscopy. The secondary lesion was treated with radiofrequency energy ablation. Hemostasis was achieved with bipolar current and local hemostatic agents.

**RESULTS:** An effective re-expansion of the lung was achieved. There were no complications. The patient immediately began respiratory rehabilitation and she was discharged after 2 weeks.

**CONCLUSION:** Video-assisted thoracoscopic surgery is advantageous for the management of coagulated hemothorax. In this way it is possible to restore lung function and avoid complications such as empyema.

**KEY WORDS:** Emergency thoracoscopy, Hemothorax, Multiple myeloma, Rib metastasis

## Introduction

Multiple myeloma (MM) is a malignant proliferation of plasma cells that primarily affects the bone marrow, but can also involve other organs. Various cases of pleural involvement in MM with the development of massive myelomatous or non-myelomatous pleural effusion have been described in the literature<sup>1</sup>. Spontaneous hemothorax is an unusual manifestation of MM and published cases are scarce<sup>2</sup>. True hemothorax is defined as pleural fluid with a hematocrit >50% of the peripheral blood hematocrit.

We report a rare case of coagulated spontaneous hemothorax in a patient with MM.

## Case Report

The patient was a 60-year-old woman diagnosed with MM with metastases to the spine consisting of vertebral lesions in the somas of C2, D7, D8, L1, L3 and L4. The patient, who had no history of cough, fever, other symptoms of chest involvement or use of anticoagulants or aspirin, developed dyspnea, chest pain and cough, during an interval between chemotherapy treatments. In a hematological Day-Hospital regime, ultrasound of the abdomen and non-enhanced computed tomography (CT) scan of the chest were performed. The findings were morphostructural alteration of the posterior arch of the right 10th rib, with irregular margins of about 40x30mm. CT scan showed homolateral pleural effusion (maximum thickness of 115 mm) with collapse of about two-thirds of the right lung due to filling of the pleural cavity (Fig. 1). After 5 days, in the Surgery Unit, contrast enhanced CT scan showed an increase of the pleural effusion with inhomogeneous fluid collection and complete atelectasis of the lower and middle lobes of the right lung. The definitive diagnosis was hemothorax,

Pervenuto in Redazione Dicembre 2021. Accettato per la pubblicazione Maggio 2022

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mostly coagulated, and right pulmonary atelectasis caused by rib metastasis from MM. The patient was transferred to the Emergency Surgery Unit. The patient was in fair clinical condition with moderate physical discomfort from chest pain and dyspnea. Her heart rate was 84 bpm, her blood pressure was 140/80 mmHg and her temperature was 37.3 C°. On physical examination, pain was not aggravated by palpation of the spine and chest wall; there was dullness on percussion and diminished vesicular breath sounds on auscultation over the lower two-thirds of the right hemithorax. There was no cervical, axillary or supraclavicular adenopathy. Blood test results were as follows: hemoglobin 9.6 g/dL, hematocrit of 28.4% with mean corpuscular volume of 95.7fL, partial thromboplastin time 0.95 seconds and prothrombin time 12.6 seconds. Repeat CT scan before surgery confirmed a right-sided pleural effusion with partial atelectasis of chest segments 4b, 5b, 7, 8, 9, 10. In these segments air-bronchograms were not visible. The blood collection in the anterior part of the middle-lower third of the right hemithorax was significantly increased with total atelectasis of segment 6. Video-assisted thorascopic

surgery (VATS) was performed. The patient was placed on the operating table in left lateral decubitus, right arm elevated above the head and fixed to a support. A 12mm trocar was inserted in the 5th intercostal space on the rear axillary line. A 5 mm trocar was inserted posteriorly to the first trocar in the 8th intercostal space and another 12 mm trocar was inserted in the 4th intercostal space on the hemiclavicular line. The anesthesiologist carried out the selective exclusion of the right lung and collapse was also facilitated by the insufflation of CO<sub>2</sub> into the pleural cavity. The exploration of the pleural cavity showed the presence of numerous clots, adhesions between the visceral and parietal pleura, and fibrinous and fibrotic tissue at times with real rinds (Fig. 2). Slowly and meticulously we proceeded to free all the parenchyma of the three right lung lobes from adhesions with the parietal, mediastinal pleura and the costophrenic sinus. The pleural cavity was washed thoroughly. Once the tumor lesion was identified, radiofrequency ablation was carried out and Floseal® was applied. Then the pleural cavity was again washed and other fibro-fibrinoid residues were removed (Fig. 3). Two 30 Fr. drainage

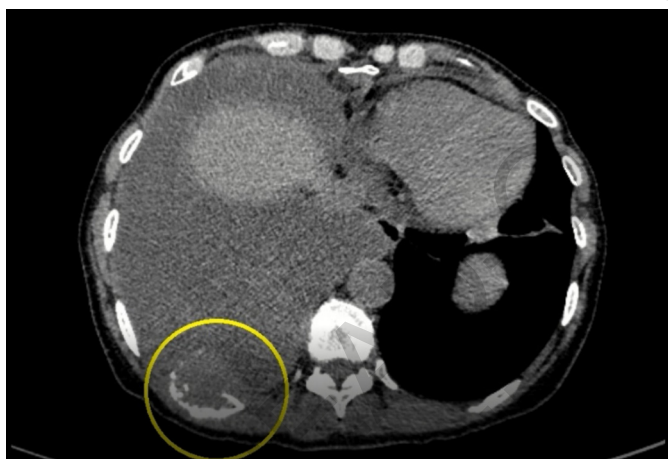


Fig. 1

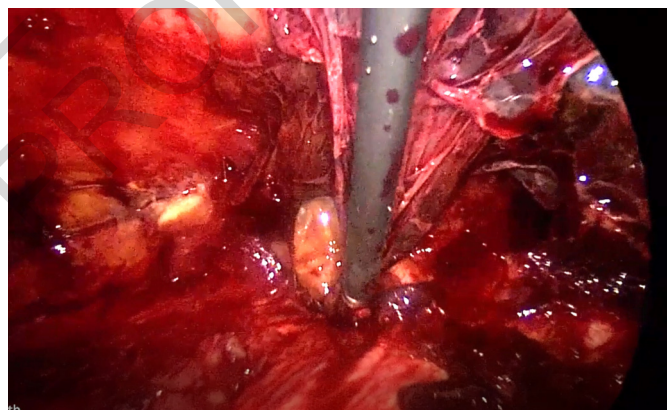


Fig. 3

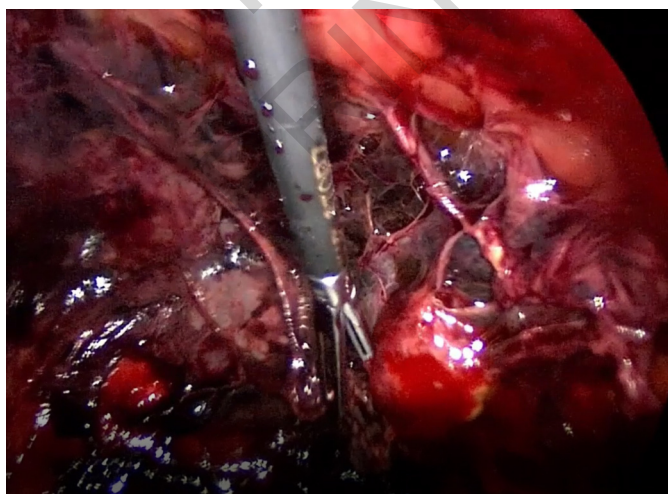


Fig. 2

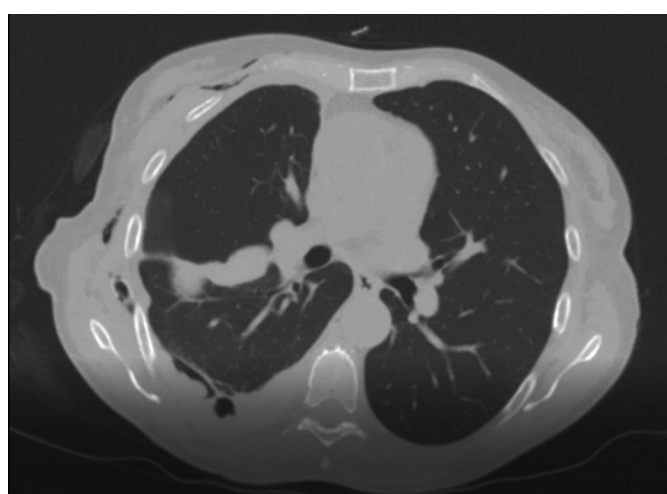


Fig. 4

tubes were placed, one in the costophrenic sinus and the other towards the apex of the cavity. There were no major complications during or after the procedure. The patient's postoperative stay was uneventful except for the development of subcutaneous emphysema which did not require treatment. The pleural drains were removed seven days after surgery with complete resolution of the hemothorax and a reduction in the amount of fluid effusion. The culture tests carried out on the pleural fluid were negative. The cytological study was non-diagnostic. A CT-scan, on postoperative day 10, showed good right lung expansion (Fig. 4) The patient was discharged on postoperative day 15.

## Discussion

Known causes of spontaneous hemothorax include coagulopathy, vascular malformations, neoplasia and pleural metastases<sup>3</sup>. Pleural metastases are the most common malignant lesions causing spontaneous hemothorax<sup>4</sup>. Our patient developed a spontaneous hemothorax as a result of the invasion of the adjacent intercostal vessels. Bone metastases are the most frequent cause of morbidity in MM, occurring in about 80% of patients, with the appearance of osteolytic lesions, pathological fractures, root compression and severe pain symptoms in about 60% of patients<sup>5</sup>. The resulting manifestations significantly reduce overall survival and increase the risk of death by 20%<sup>6</sup>. Until the 1990s, thoracotomy was always the standard approach. In early trials, VATS was associated with less morbidity, better visualization with less postoperative pain and with a shorter hospital stay<sup>7</sup>. In patients who are hemodynamically stable, VATS has become the preferred procedure, when surgery is indicated, both in case of empyema<sup>8</sup> and especially in the first seven days after hemothorax formation although it is most effective within 48-72 hours<sup>9</sup>. The literature supports the validity and safety of the technique for evacuating hemothorax and obtaining early re-expansion of the lung<sup>10,11</sup>.

## Conclusions

This clinical case demonstrates that VATS can be preferable to thoracotomy. It is minimally invasive and it is important for the management of clotted hemothorax even when hemothorax is a complication of a systemic disease. With VATS it is possible to effectively clean the pleural cavity and allow for early re-expansion of the lung avoiding complications associated with thoracotomy.

## Riassunto

Donna di 60 aa, affetta da Mieloma Multiplo (MM), in una pausa fra cicli di Ch-T, manifesta una dispnea che risulta dovuta, alla TAC-torace con m.d.c., ad una vasta atelettasia di circa due terzi del polmone destro per occupazione del cavo pleurico da materiale misto in buona parte composto da sangue e coaguli. La fonte emorragica attiva è una localizzazione sulla X costa di una metastasi da MM. Il trattamento in video-toroscopia permette la rimozione dei coaguli, delle aderenze fibrinoidi e delle cottenne fibrose. Si ottiene un ripristino dell'espansione polmonare con recupero funzionale ventilatorio. Inoltre, è stata effettuata una termoablazione della lesione metastatica, soprattutto a scopo emostatico, ed applicato su essa un emostatico topico. Dimessa in 15° giorno post-op.

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