

Persistent Air Leak after Medical Thoracoscopic Talc Poudrage Pleurodesis Successfully Managed with Povidone-Iodine Chemical Pleurodesis

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Abstract

Medical thoracoscopic (MT) talc poudrage pleurodesis is a safe procedure for the management of malignant pleural effusion (MPE). Lung laceration and persistent air leak (PAL) after MT are uncommon complications. We report a unique complication of MT talc poudrage pleurodesis for the management of MPE in a 49-year-old patient with metastatic non-small cell lung cancer. Lung laceration from the rigid insufflations' catheter caused PAL and was successfully managed with povidone-iodine (PI) chemical pleurodesis. To the best of our knowledge, this is the first reported case of PI chemical pleurodesis for the management of PAL. Extreme precautions, use of the self-contained system with the plastic cannula, effective local and systemic analgesia are mandatory. PAL following lung laceration can be safely managed with PI chemical pleurodesis.

Keywords: Medical Thoracoscopic (MT); Malignant Pleural Effusion (MPE); Persistent Air Leak (PAL); Povidone-Iodine (PI)

Introduction

Persistent air leak (PAL) is a common postoperative complication after thoracic surgery or spontaneous pneumothorax. PALs prolong chest tube drainage, postoperative pain, restrict ventilation and increase the risk of pneumonia, decrease mobility and increase the risk of thromboembolism, prolong hospital stay and are related with higher overall costs [1,2]. Several methods have been used to manage PAL, namely prolonged chest tube drainage, surgical re-interventions, chemical pleurodesis (with sclerosing agents, like doxycycline, bleomycin, talc, and minocycline), autologous blood patch pleurodesis, intrapleural infusion of fresh frozen plasma and endobronchial valves [1,3-7]. Povidone-iodine (PI) is considered as an alternative sclerosing agent for chemical pleurodesis of malignant pleural effusion (MPE). However, PI has never been used for the management of PAL.

Medical thoracoscopy is a safe procedure performed by interventional pulmonologists for the diagnosis and management of pleural effusion and spontaneous pneumothorax [8]. Major complications are rare. Pleurodesis with talc poudrage can be undertaken during MT for the management of MPE with high success rates [8]. Studies have shown that the use of graded talc for pleurodesis reduces the complication rates [8,9]. Lung laceration and PAL after MT are uncommon [10]. Lung laceration can complicate the insertion of the trocar in the thoracic cavity and is usually small [10].

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Herein we report a unique complication of MT talc poudrage for the management of MPE, namely PAL, due to lung laceration from the rigid insufflations' catheter, successfully managed with PI chemical pleurodesis.

Case Report

A 49-year-old man, recently diagnosed with non-small cell lung cancer stage IV (T2bN3M1a) managed with chemotherapy (cisplatin 75 mg/m², pemetrexate 500 mg/m²) and recurrent malignant right-sided pleural effusion complained of shortness of breathing and was referred to our department for further management with pleurodesis. During admission, the patient was pale, with tachypnoea (24 breaths per minute), hypoxia (SatO₂: 83%, FiO₂: 21%) normal vital signs and afebrile. Routine laboratory workup showed normal full blood count, renal function and liver function tests. Electrocardiography was unremarkable, while breath sounds and vocal percussion were decreased at the right hemithorax. Chest X-ray (CXR) followed by computed tomography (CT) revealed a lung mass and atelectasis at the right upper lobe, mediastinal lymphadenopathy, and a free-floating, right medium-sized pleural effusion (Figure 1). Thoracentesis yielded an odorless, hemorrhagic lymphocyte predominant pleural exudate. Cytology was positive for malignancy. MT talc poudrage pleurodesis was scheduled. MT was performed under local anaesthesia and conscious sedation, using the rigid pleuroscope (KARL STORZ®, Germany) from a single port of entry, according to current recommendations [8,11]. Main thoracoscopic findings were a lung mass at the right upper lobe, multiple parietal and visceral pleural nodules and large parietal pleura mass at the lower third of the parietal pleura. Biopsies were obtained and talc poudrage pleurodesis with 4gr of graded talc (Steritalc®, Novatech) through the rigid insufflations' catheter was performed. However, during the procedure the patient experienced pain, coughed and the lung expanded spontaneously. A large lung laceration (3 - 4 cm length) from the rigid insufflations' catheter at the right upper lobe occurred (Figure 2). There was no major bleeding or air-leak from the lung laceration and an 18F chest drain was placed after the procedure through the same entry port as the thoracoscopy. The intercostal drain was connected to an underwater seal and low negative suction (-10 cm/H₂O) was used. Post MT CXR revealed a large pneumothorax (PTX) and an air-leak was present while observing the water column and the water-seal. The appearance of bubbles remained in the same intensity at repeated coughs during the first 5 days. The intensity was gradually reduced with each cough the next days; chest tube clamping however, resulted in a PTX relapse (Figure 3). The minor air-leak persisted for 10 days post-operatively and chemical pleurodesis with PI solution was scheduled. Other alternative sclerosing agents, like tetracycline, bleomycin, repeat talc pleurodesis, or autologous blood patch and fresh frozen plasma pleurodesis were considered high risk for infectious complications, specifically empyema since the patient was immunocompromised from previous chemotherapy and had a 10-day chest-tube drain. A mixture of 20 mL of 10% solution of povidone-iodine and 80 mL of normal saline was instilled into the pleural cavity through the chest-tube and then, the tube was clamped for 2 hours. After declamping, the patient was placed in a lateral decubitus position and remained there for 12hours. Negative pressure was not applied. The next day there was no air-leak present, the chest tube was clamped, without any evidence of PTX at the CXR performed (Figure 4). There were no complications. The chest-tube was removed and the patient was discharged at home. During the follow-up after 1 week and 1 month, the patient was clinically stable without any evidence of recurrent PTX or MPE at the CXR performed.

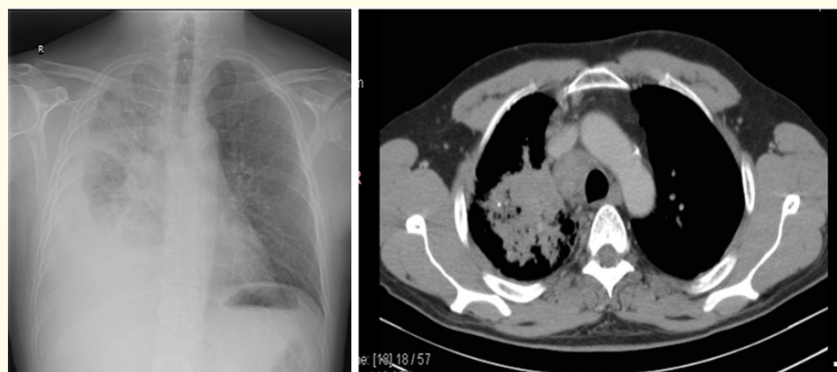


Figure 1: Chest X-ray (CXR) and computed tomography (CT): A right upper lobe lung mass, mediastinal lymphadenopathy and a free-floating, right medium-sized pleural effusion.

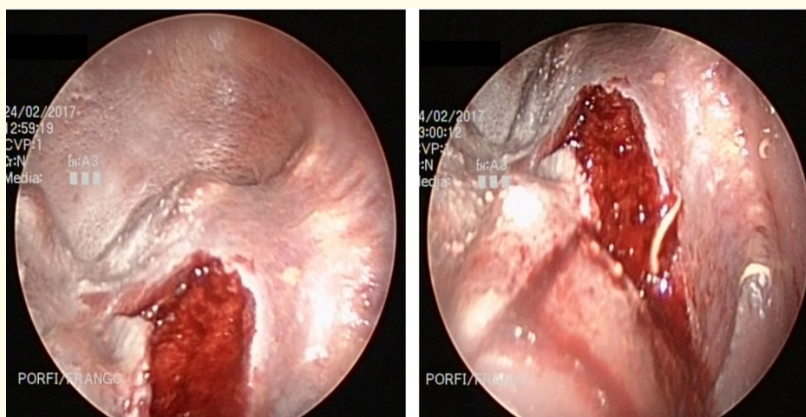


Figure 2: A large lung laceration (3 - 4 cm length) at the right upper lobe from the rigid insufflations' catheter.



Figure 3: Day 8 post-medical thoracoscopy. The chest tube was clamped for 3 hours and the CXR revealed pneumothorax relapse.



Figure 4: Day 11 post-medical thoracoscopy 12 hours after povidone-iodine pleurodesis. The chest tube was clamped for 4 hours and removed, without any evidence of PTX recurrence at the CXR performed.

Discussion

This was a unique case of lung laceration and PAL after MT talc poudrage pleurodesis successfully managed with povidone-iodine pleurodesis.

MT is considered a safe procedure for the diagnosis and management of pleural effusion [8,11]. Lung laceration and PAL after MT are uncommon. However, they are considered the most serious complications of MT [10]. Ahmed, *et al.* reported that lung laceration occurred during introducing the trocar into the thoracic cavity and did not exceed 1.5 cm length [10]. PAL is one of the most common and difficult to manage complications after thoracic surgery and spontaneous PTX [1,2]. Several surgical and conservative methods have been used for the management of PALs [1-7]. Thoracic surgeons and interventional pulmonologists prefer the conservative over surgical methods initially [3,4]. Sclerosants that are used include doxycycline, bleomycin, talc, and minocycline, whilst autologous blood patch pleurodesis, intrapleural infusion of fresh frozen plasma were also effective [3-6].

Introducing PI into the pleural space damages the mesothelial cell monolayer and triggers an inflammatory response producing pleural symphysis [12,13]. PI is considered a sclerosing agent for the management of recurrent malignant pleural effusions, with an efficacy rate around 90% and a low number of complications [14,15]. PI is easily obtained, easy to use, and inexpensive. However, PI has never been used before for the management of PAL following lung laceration. PI (in a 10% solution) has antiseptic effects and the advantage of lower risk for infectious complications and specifically empyema, following chemical pleurodesis. In our case, the patient was immunocompromised from previous chemotherapy and had a 10-day chest-tube drain and was considered high risk for infectious complications. Therefore, PI was the preferred sclerosant and proved to be effective and safe.

Conclusion

During MT talc poudrage pleurodesis with the rigid pleuroscope lung laceration from the rigid insufflations' catheter can complicate the procedure. Extreme precautions, use of the self-contained system with the plastic cannula, effective local and systemic analgesia are mandatory. PAL following lung laceration can be safely managed with PI chemical pleurodesis.

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Competing Interests

Actual or potential conflict of interest: None. All the authors, Ilias Porfyridis MD, PhD, Frangiskos Frangopoulos MD, Stella Fkiara MD, Marios Tanos MD, Flora Kyriakou MD, Tonia Adanide MD, PhD and Andreas Georgiou MD, PhD have no conflicts of interest to disclose related to this study.

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