CHEST

Feasibility and Safety of Outpatient Medical Thoracoscopy at a Large Tertiary Medical Center

A Collaborative Medical-Surgical Initiative

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BACKGROUND: Medical thoracoscopy (MT) is performed by relatively few pulmonologists in the United States. Recognizing that an outpatient minimally invasive procedure such as MT could provide a suitable alternative to hospitalization and surgery in patients with undiagnosed exudative pleural effusions, we initiated the Mayo Clinic outpatient MT program and herein report preliminary data on safety, feasibility, and outcomes.

METHODS: All consecutive patients referred for outpatient MT from October 2011 to August 2013 were included in this study. Demographic, radiographic, procedural, and histologic data were recorded prospectively and subsequently analyzed.

RESULTS: Outpatient MT was performed on 51 patients, with the most common indication being an undiagnosed lymphocytic exudative effusion in 86.3% of the cohort. Endoscopic findings included diffuse parietal pleural inflammation in 26 patients (51%), parietal pleural studding in 19 patients (37.3%), a normal examination in three patients (5.9%), diffuse parietal pleural thickening in two patients (3.9%), and a diaphragmatic defect in one patient (2%). Pleural malignancy was the most common histologic diagnosis in 24 patients (47.1%) and composed predominantly of mesothelioma in 14 (27.5%). Nonspecific pleuritis was the second most frequent diagnosis in 23 patients (45.1%). There were very few complications, with no significant cases of hemodynamic or respiratory compromise and no deaths.

CONCLUSIONS: Outpatient MT can be integrated successfully into a busy tertiary referral medical center through the combined efforts of interventional pulmonologists and thoracic surgeons. Outpatient MT may provide patients with a more convenient alternative to an inpatient surgical approach in the diagnosis of undiagnosed exudative pleural effusions while maintaining a high diagnostic yield and excellent safety. CHEST 2014; 146(2):398-405

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ABBREVIATIONS: MT = medical thoracoscopy; NSP = nonspecific pleuritis; TIPC = tunneled indwelling pleural catheter; VATS = video-assisted thoracoscopic surgery

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Approximately 1.5 million pleural effusions are identified yearly in the United States, an estimated 200,000 of which are malignant.[1] Thoracentesis is the most commonly performed procedure by pulmonologists, with approximately 180,000 thoracenteses performed yearly.[2] However, pleural fluid analysis can establish the cause of the effusion in only approximately 75% of cases, which means that additional investigations must be routinely performed.[3] Other options include closed pleural biopsies, image-guided pleural biopsies (by ultrasound or CT scan), and medical or surgical thoracoscopy. Closed pleural biopsies are less sensitive than medical thoracoscopy (MT) for the diagnosis of pleural malignancy, and image-guided biopsies generally require that focal pleural abnormalities are identified, which is not always possible.[4] MT training is available in only a small minority of postgraduate training programs in the United States, and as such, it is not a commonly performed procedure.[5] Therefore, the course of action after negative pleural fluid analysis generally consists of either clinical observation or video-assisted thoracoscopic surgery (VATS). This contrasts with other countries in which MT is recommended and increasingly performed.[6] Recognizing that an outpatient minimally invasive procedure such as MT could provide a suitable alternative to surgery in patients with undiagnosed exudative pleural effusions, we initiated the Mayo Clinic outpatient MT program in October 2011 and herein report preliminary data on the safety, feasibility, and outcomes of our program.

Materials and Methods

Study Design

We aimed to present safety, feasibility, and outcome data from our recently established outpatient MT program. This is a retrospective review of prospectively collected data, conducted in the Division of Pulmonary and Critical Care Medicine and the Division of Thoracic Surgery at Mayo Clinic, Rochester, Minnesota, from October 2011 to August 2013. This study was approved by the Mayo Clinic institutional review board (IRB 13-003772).

Patients and Selection Criteria

All consecutive patients referred to the pulmonary medicine clinic for outpatient MT, and for whom the decision to proceed with MT was made, were included in this study. All patients were evaluated by an interventional pulmonologist (F. M.) in the outpatient clinic. Each case was discussed preoperatively with a thoracic surgeon (D. W. or C. D.), and an agreement to proceed was reached prior to proceeding with MT. Procedural informed consent was obtained from all patients. Contraindications to MT included absence of a pleural space, chronic hypoxemic (need for >2 L/min supplemental oxygen by nasal cannula) and/or hypercapnic ($Paco_2 > 50$ mm Hg) respiratory failure, bleeding diathesis or anticoagulation, Eastern Cooperative Oncology Group performance status >2, refractory cough, and obesity.

Collected data included age, sex, performance status, number of previous thoracenteses, pleural fluid analysis results, prior chest imaging results, procedure duration, drugs used for anesthesia and conscious sedation, pleural fluid volume removed, thoracostomy tube used for lung re-expansion, endoscopic pleural space findings, histologic diagnoses, and complications. Complications were defined and recorded as described previously by Colt.[7]

Procedure

All procedures were performed in the pulmonary outpatient procedural suite. After a standard procedural pause, the patient was positioned with the affected side up in the lateral decubitus position as described previously. Ultrasound (Micromaxx Ultrasound System with P17/5-1 MHz 17 mm phased array probe; Sono Site, Inc) was used to identify the trocar entry site, generally located at the mid- to anterior axillary line, between the fifth and seventh intercostal space. The patient was connected to cardiac, BP, and pulse oximetry monitors. The patient continued breathing spontaneously with supplemental oxygen via nasal cannula as needed. Fentanyl and midazolam were used for moderate sedation. The skin was prepared and draped in sterile fashion. The skin, subcutaneous tissue, adjacent ribs, and parietal pleura were anesthetized with 1% lidocaine (15-30 mL), and a small incision was made at the planned site of entry. If minimal or no fluid was seen by ultrasound (because of lateral decubitus positioning with pooling of pleural fluid against the gravity-dependent medial parietal pleura), a Boutin blunt-tip trocar was used to access the pleural space and create a pneumothorax. Large-volume effusions did not require use of the Boutin trocar. Kelly forceps were then used to bluntly dissect the subcutaneous tissues and intercostal muscles until the pleural space was accessed through the parietal pleura. The 8-mm disposable trocar was then inserted, and the flex-rigid pleuroscope (Olympus LTF 160) was introduced into the pleural space with immediate aspiration of all pleural fluid. A detailed examination of the pleural cavity was then performed, with documentation of any abnormalities by photographic and/or video recordings. Parietal pleural abnormalities were biopsied with flexible forceps. Six to eight biopsy specimens were generally obtained. Random biopsy specimens were obtained from the posterior parietal pleura in the absence of visible abnormalities.

At the end of the procedure, either a small bore (10-14F) pigtail thoracostomy tube or a tunneled indwelling pleural catheter (TIPC) was placed and was connected to a water seal suction device at -20 cm H_2O pressure for lung re-expansion. The criteria for insertion of a TIPC included the presence of a recurrent symptomatic effusion with prior evidence of symptomatic improvement following thoracentesis and completion of mandatory preoperative education with informed consent. Patients not meeting these criteria for any reason had a temporary thoracostomy tube inserted. A chest radiograph was obtained prior to transferring the patient to the recovery room. After confirmation of lung re-expansion, the pigtail thoracostomy tube was removed at the bedside in the recovery room, or the TIPC was disconnected from suction and the site dressed appropriately.[8] The patient was dismissed on the day of the procedure once outpatient discharge criteria were met. Patients had to satisfy the requirements of the Mayo Modified Post-Anesthesia Care Unit Discharge Scoring System prior to discharge (e-Appendix 1). Several other criteria were also required, including pain rated at <4 on a 10-point scale, hemostasis at the operative site(s), adequate control of nausea/vomiting, and return to preoperative functional status. All procedures were carried out by one interventional pulmonologist (F. M.). Surgical backup was provided by two thoracic surgeons (C. D. and D. W.), one of whom had previously discussed the case with the interventional pulmonologist and was readily available for emergent operative intervention if necessary.

Data

Qualitative data are presented as percentages. Quantitative data are presented as mean $\pm$ SD.