Medical Thoracoscopy: Experiences in Siriraj Hospital

Jamsak Tscheikuna MD*

* *Division of Respiratory Disease and Tuberculosis, Department of Medicine, Faculty of Medicine, Siriraj Hospital, Mahidol University*

Objective: *Medical thoracosopy is the investigational and therapeutic procedure for many kinds of pleural diseases. One of its indications is for the diagnosis of undetermined pleural effusion. We report our experience in using medical thoracoscopy in investigating undiagnosed pleural effusion.*
Material and Method: *Thirty four consecutive patients had thoracoscopy done for this indication from 1999 to 2005.*
Result: *Malignancy was diagnosed in 21 patients. Pleural biopsies showed chronic pleuritis in 7 patients. Normal thoracoscopy was found in 2 cases and the procedures were unsuccessful in 4 cases because of extensive pleural adhesion. In patients with malignancy, pleural nodules had a tendency to be localized in the lower part of the pleural cavity. Better selection of the patient should lower the unsuccessful procedure.*
Conclusion: *The review of the indication for thoracoscopy will increase the use of this procedure in respiratory medicine practice and shorten the investigation time.*

Keywords: *Medical thoracoscopy*

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The diagnosis of pleural effusion is mostly carried out after a careful history taking and physical examination of the patient with the confirmation of pleural fluid examination done by thoracentesis and histology of the pleura obtained from percutaneous pleural biopsy. Despite this, the remaining undiagnosed pleural effusion patients are around 21% to 27%[1-4] who are then qualified for diagnostic medical thoracoscopy.

Thoracoscopy was introduced by Jacobaeus[5], an internist in Stockholm in 1910, primarily as a diagnostic procedure in two cases of exudative (tuberculous) pleuritis. It was widely used in North America until the late 1940s in collapse therapy for the lysis of adhesion in patients with tuberculosis. With the advent of antibiotic therapy, the collapse therapy fell out of use, and together with it, thoracoscopy. In the last 10 to 15 years, however, thoracoscopy has been re-introduced by chest physicians in many European centres for the diagnosis of pleural diseases. The popularity of this procedure is much less in North America and the rest of the world with few centres performing it and including it in the training of chest physicians.

In Thailand, Puspakom et al[6] reported the use of pleuroscopy with a flexible bronchoscope and needle biopsy of the pleura in the diagnosis of pleural effusion in 1980. Basically, the word pleuroscopy has the same meaning as thoracoscopy; and, this procedure is not popular in this country. This study aims to report the experience in performing medical thoracoscopy in patients with undiagnosed pleural effusion from one centre in Thailand.

Correspondence to : Tscheikuna J, Division of Respiratory Medicine and Tuberculosis, Department of Medicine, Faculty of Medicine, Siriraj Hospital, Mahidol University, Prannok Rd, Bangkok 10700, Thailand. Phone: 0-2419-7757: Fax: 0-2419-7760, E-mail: sijtk@mahidol.ac.th

Material and Method

Patients

The inclusion criteria were patients with undiagnosed exudative lymphocytic predominated pleural effusion after routine evaluation and at least 2 pleural tapping for pleural fluid examination and repeated percutaneous needle biopsies (Abrams needle, Downs Surgical, London, England) which did not yield diagnostic results. Thoracoscopy was not done if the patients were considered unable to tolerate a 20% to 30% pneumothorax, were confused or otherwise unable to cooperate, or had a $PaCO_2$ of more than 50 mmHg.

Thoracoscopy

Thoracoscopy was done with the patient lying in a lateral decubitus position with the affected side upward. Before thoracoscopy, all patients were administered midazolam 2 mg and pethidine 25 mg intravenously. During the procedure, local anaesthesia was used and additional uses of intravenous 1-2 mg midazolam or 25 mg pethidine were also administered if necessary. Two metallic trochas with an external diameter of 5 mm were used. The point of first entry was usually at the 5th or 6th intercostal space, at the mid or anterior axillary line. Rigid endoscopes (Karl Storz Endoscope, Tuttlinggen, Federal Republic of Germany) with a viewing angle of 0 degrees were used. After removal of an adequate amount of pleural fluid which was replaced with air, the second port of entry site was determined by the appearance of pleural finding and controlled under direct vision by an endoscope. Biopsy specimens of parietal, mediastinal or diaphragmatic pleura were obtained under direct vision and were sent for routine histologic examination and other examinations if indicated. At the end of thoracoscopy, an intercostal drain was inserted to evacuate any remaining air and fluid and to ensure that there was no bleeding or air leak. The intercostal drainage tube was removed when there was no air leak and fluid drained was less than 100 ml per day.

Results

From December 1999 to December 2005, there were 1,989 patients referred for pleural tapping and percutaneous needle biopsies of the pleura at the Special Respiratory Procedure Unit, Department of Internal Medicine, Faculty of Medicine Siriraj Hospital. Dependent on the referring physician, the patients who met the criteria for thoracoscopy were consulted and included in the study. Thoracoscopy was done in 34 patients with undiagnosed pleural effusion. In 4 patients, the procedure was unsuccessful because of extensive pleural adhesion. All these 4 patients had intercostal drainage tubes placed before thoracoscopy. Only 30 patients received complete thoracoscopic procedure.

The pathological diagnoses of the 30 patients were malignancy (21 cases), chronic pleuritis (7 cases), and normal thoracoscopic findings (2 patients). The details of the malignancies are shown in Table 1. The thoracoscopic findings in 21 malignancy patients were multiple nodules distributed in all areas of pleura in 6 patients; and in 13 the nodules were located only in the lower part of the pleural cavity. The rest were plaque lesion (1 patient) and fibrinous lesion (1 patient). In pathological diagnosed chronic pleuritis, the thoracoscopic findings showed nodules in 2 patients and fibrin in 5 patients. The pleural fluid colour could not differentiate in favour of any pathological diagnosis as shown in Table 3. The follow-up of 7 pathological diagnoses of chronic pleuritis patients is shown in Table 3. The underlying diseases of the patients who had normal thoracoscopy were chronic renal failure with congestive heart failure in one case and breast cancer in another which are explainable causes for their pleural effusion.

When compared to previous reports with the same inclusion criteria in Table 4, the incidence of malignancy in this study was 70% which was comparable with Boutin et al in 1981[4] and higher than Menzies et al's report in 1991[7]. There was no complication from

Table 1. Details of malignancy diagnosed by thoracoscopy

Type of malignancy	Number of patients
Adenocarcinoma	11
Undifferentiated carcinoma	4
Squamous cell carcinoma	2
Small cell carcinoma	1
Adenoid cystic carcinoma	1
Large cell carcinoma	1
Lymphocytic lymphoma	1
Total	21

Table 2. Pleural fluid color

	Serosanguinous	Straw color	Total
Malignancy	12	9	21
Chronic pleuritis	3	4	7
Normal	0	2	2
Total	15	15	30

Table 3. Follow-up of 7 patients with pathological diagnosis of chronic pleuritis

Underlying disease may explain pleural effusion	Number of patients	Duration of follow up (months)
Chronic renal failure	1	12
Neuroendocrine tumor	1	12
Acute myeloid leukemia	1	<1
Tuberculous pleuritis (AFB positive)	1	<1
Cirrhosis	1	3
No other causes	2	1-3

Table 4. Comparison of incidence of malignancy with other series

	Tscheikuna*	Menzies[7]	Boutin[4]
Pleural effusion	1989	-	1000
Thoracoscopy	34	102	215
Previous pleural tapping, biopsies	2	1-3	2
Malignancy diagnosed by thoracoscopy	21 (70%)	42 (44%)	150 (69%)

* The present article

this study. The oxygen saturation of the patients as measured by pulse oxymeter was over 90% in all patients during the procedure with 2-5 litres per minute of oxygen supplementation by nasal canula.

Discussion

With the usual diagnostic methods available such as careful history taking, physical examination, thoracentesis and pleural biopsy, significant numbers of pleural effusion patients are still undiagnosed. Of these, approximately 50% will ultimately be diagnosed with malignancy and a few may prove to have tuberculosis, fungal disease, or pulmonary emboli, but 20% to 45% of patients will continue to be classified as having idiopathic disease. Medical thoracoscopy is the procedure of choice in this situation and is the only indication in this study. The other indications of thoracoscopy were to lysis the adhesion in loculated pleural effusion, for minor surgery in pleural cavities such as biopsy of the lung, diaphragm and mediastinum, for talc pleurodesis, and being the gold standard in pleural research.

Medical thoracoscopy can be done safely with consciously sedated patients under local anaesthesia as reported by many centres making it cost-effective[8-11]. The different techniques of diagnostic and therapeutic thoracoscopy are described in detail elsewhere[12]. Some centres prefer a single entry with a 9 mm thoracoscope with a working channel for accessory instruments and optical biopsy forceps. In this study, two entry methods with both 5 mm trocars were used: one for the examination telescope, and the other for accessory instruments including biopsy forceps. Flexible bronchoscopes have also been used in the past. In comparison with rigid thoracoscopes in particular, they have several disadvantages, i.e., less adequate orientation with the pleural cavity and smaller biopsies[13]. An absolute prerequisite for thoracoscopy is the presence of an adequate pleural space which should be at least 6-10 cm in diameter. Adequate timing of state of the disease so that the pleural cavity can be easily assessed for thoracoscopy is very important and this was the reason for all the four failed cases in this study. If extensive pleuropulmonary adhesions were present, it would require special skills and expertise to create an "extended" thoracoscopy[14]. The number of cases in this study was relatively low, as estimated from the number of thoracentesis cases, because there was no rational for the physicians who handled undiagnosed pleural effusion to consult for medical thoracoscopy.

Thoracoscopy could diagnose malignancy in 70% of the cases which was comparable with Boutin's report[4], but more than Menzies'[7]. The most common malignancy was adenocarcinoma, primary and metastasis; the second was undifferentiated carcinoma.

There was one case of primary pleural lymphocytic lymphoma in a lady who presented with bilateral pleural and pericardial effusion. Neither pleural fluid colour nor thoracoscopic findings of nodules and fibrin could be used to predict the pathological diagnosis of malignancy and chronic pleuritis. In the case of malignancy, the nodules were likely to locate in the lower part of the pleural cavity. The non-malignancy cases which had chronic pleuritis from pleural biopsies and normal thoracoscopic finding were followed up for a short period between 1 month to 12 months and their likely explanations for pleural effusion were recorded in Table 3. Another mechanism which could be the cause of pleural effusion in malignancy patients with negative thoracoscopic finding is lymphatic obstruction in breast cancer. There was only one case of tuberculous pleuritis in this study, in spite of the high prevalence of tuberculosis in Thailand. Probably the reason was that the diagnosis could be easily made by thoracentesis, pleural biopsy and measurement of the adenosine deaminase (ADA) level in the pleural fluid.

Ryan et al[1] reported patients with pleural effusion of indeterminate cause after thoracotomy to have satisfactory outcome. In his series of 51 patients 31(60.8%) had no recurrence of effusion, and no cause became apparent during a follow-up period of from 1.5 to 15 years. Two patients (3.9%) died relatively soon after thoracotomy, but their deaths were not clearly related to the pleural effusion. In 18 patients (35.3%), the cause of the effusion became apparent from 12 days to 6 years after thoracotomy. These findings were encouraging for medical thoracoscopy in these patients for early diagnosis and decision for their prognosis.

There is growing evidence for indications of medical thoracoscopy that make us speculate that an increasing number of cases will be referred for the procedure. The increased awareness of physicians of the right timing of each indication for medical thoracoscopy and this increasing number of centres for this procedure are encouraging.

References

1. Ryan CJ, Rodgers RF, Unni KK, Hepper NG. The outcome of patients with pleural effusion of indeterminate cause at thoracotomy. Mayo Clin Proc 1981; 56: 145-9.
2. Gunnels JJ. Perplexing pleural effusion. Chest 1978; 74: 390-3.
3. Poe RH, Israel RH, Utell MJ, Hall WJ, Greenblatt DW, Kallay MC. Sensitivity, specificity, and predictive values of closed pleural biopsy. Arch Intern Med 1984; 144: 325-8.
4. Boutin C, Viallat JR, Cargnino P, Farisse P. Thoracoscopy in malignant pleural effusions. Am Rev Respir Dis 1981; 124: 588-92.
5. Jacobaeus HC. Uber die Moglichkei, die Zystoskopie bei Untersuchung seroser Hohlen anzuwenden. Munch Med Wschr 1910; 40: 2090-2.
6. Puspakom R, Maranetra N. Needle biopsy of the pleura and pleuroscopy with flexible fiberoptic bronchoscope in the diagnosis of pleural effusion. Thai J Tuberc Chest Dis 1980; 1: 87-94.
7. Menzies R, Charbonneau M. Thoracoscopy for the diagnosis of pleural disease. Ann Intern Med 1991; 114: 271-6.
8. Canto A, Blasco E, Casillas M, Zarza AG, Padilla J, Pastor J, et al. Thoracoscopy in the diagnosis of pleural effusion. Thorax 1977; 32: 550-4.
9. Oldenburg FA Jr, Newhouse MT. Thoracoscopy. A safe, accurate diagnostic procedure using the rigid thoracoscope and local anesthesia. Chest 1979; 75: 45-50.
10. Loddenkemper R, Boutin C. Thoracoscopy: present diagnostic and therapeutic indications. Eur Respir J 1993; 6: 1544-55.
11. Loddenkemper R. Thoracoscopy - state of the art. Eur Respir J 1998; 11: 213-21.
12. Brandt HJ, Loddenkemper R, Mai J. Atlas of diagnostic thoracoscopy. New York: Thieme; 1985.
13. Davidson AC, George RJ, Sheldon CD, Sinha G, Corrin B, Geddes DM. Thoracoscopy: assessment of a physician service and comparison of a flexible bronchoscope used as a thoracoscope with a rigid thoracoscope. Thorax 1988; 43: 327-32.
14. Janssen JP, Boutin C. Extended thoracoscopy: a biopsy method to be used in case of pleural adhesions. Eur Respir J 1992; 5: 763-6.

การส่องกล้องช่องเยื่อหุ้มปอด: ประสบการณ์ในโรงพยาบาลศิริราช

แจ่มศักดิ์ ไชยคุนา

การส่องกล้องช่องเยื่อหุ้มปอด เป็นหัตถการที่ใช้ในการให้การวินิจฉัยและรักษาโรคของเยื่อหุ้มปอดหลายโรค ข้อบ่งชี้ประการหนึ่งคือมีสารน้ำที่ไม่ทราบสาเหตุในช่องเยื่อหุ้มปอด รายงานนี้ได้เสนอประสบการณ์การส่องกล้องเยื่อหุ้มปอดในผู้ป่วย 34 รายที่มีสารน้ำที่ไม่ทราบสาเหตุในช่องเยื่อหุ้มปอด ระหว่างปี พ.ศ. 2542 ถึง พ.ศ. 2548 พบว่ามีสาเหตุของสารน้ำจากมะเร็ง 21 ราย เยื่อหุ้มปอดที่ตัดส่งตรวจทางพยาธิวิทยาเป็นการอักเสบเรื้อรัง 7 ราย ผลการส่องกล้องเยื่อหุ้มปอดพบปกติ 2 ราย มีผู้ป่วย 4 รายที่ไม่สามารถตรวจด้วยวิธีนี้ได้เนื่องจากช่องเยื่อหุ้มปอดติดกันแน่น ในกลุ่มที่สารน้ำเกิดจากมะเร็ง ลักษณะตุ่มเล็ก ๆ ที่พบที่เยื่อหุ้มปอดมักอยู่ในส่วนล่างของช่องเยื่อหุ้มปอด

เมื่อประสบการณ์ในการทำการส่องกล้องเยื่อหุ้มปอดมีมากขึ้นจะสามารถเลือกผู้ป่วยที่เหมาะสมมากขึ้น ประกอบกับข้อบ่งชี้ที่เพิ่มขึ้นในปัจจุบันของการทำหัตถการนี้จะทำให้การตรวจนี้และจำนวนผู้ป่วยที่ได้รับการทำหัตถการนี้เพิ่มขึ้น