Outcome of Medical Thoracoscopy

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Background: *Medical thoracoscopy is a common procedure for pulmonologists working in Europe but is still unpopular in South East Asia with few medical centers in Thailand performing this procedure. We report our outcome of medical thoracoscopy based upon 10 years experience.*
MAterial and Method: *Medical thoracoscopy was first performed in our unit in 1998. The early indication was undiagnosed pleural effusion. Other indications which were empyema, pneumothorax and talc pleudrage were carried on for the last 3 years. The patients' demographic data, indication for medical thoracoscopy, procedures, complication and outcome were recorded and analyzed separately.*
Results: *During 1998 to 2007, there were142 procedures of medical pleuroscopy performed. There were 86 procedures for the indication of undiagnosed pleural effusion. The diagnostic yield was 95.2%. The malignancy was recovered by thoracoscopy in 45.35% of procedure. For indication of talc pleurodesis, there were 22 patients with 3 who had early failure of pleurodesis because of trapped lung. After mean follow up of 124 days,17 patients did not have recurrence of pleural effusion. 15 patients who had loculated pleural effusion were done medical thoracoscopy. Operations were successful in only 6 patients. For indication of pneumothorax 5 out of 6 procedures were successful after mean follow up of 167 days. In 12 empyema patients, mean hospital admission was 9.1 days after thoracoscopy. There was no serious complication from the procedure.*
Discussion: *There are many indications for medical thoracoscopy and the experience of the performer is the important factor determining success of the procedure. In undiagnosed pleural effusion, our result was comparable to other studies in the past in which the rate of malignancy was around 40-60%. The result of talc pleudrage was also comparable with the need to improve the diagnosis of trapped lung to prevent the unnecessary medical thoracoscopy. The result was excellent in patients who came for pleurodesis indicated in pneumothorax also in empyema but number of patient was still low. The problem was in loculated pleural effusion from malignancy which showed high failure rate. The early pleurodesis in malignant pleural effusion before it became loculated should be considered.*
Conclusion: *Outcome of medical thoracoscopy varies from various indications. The success rate was high and decreasing in undiagnosed pleural effusion, pneumothorax, empyema and talc pleurodesis in malignant effusion. Great skill was needed to perform medical thoracoscopy in loculated malignant pleural effusion*

Keywords: *Empyema, Empyema pleural, Pleural effusion, Thoracoscopy*

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Since Hans Christian Jacobaeus described thoracoscopic procedure in 1910[1], the procedure which was originally used to divide pleural adhesions during procedure of artificial pneumothorax induced as collapse therapy for tuberculosis was enhanced in its capacity to diagnose pleural tumor[2]. The indications for medical thoracoscopy are increasing primarily as a diagnostic procedure, such as for the evaluation of exudative effusions of unknown cause, confirming stages of malignant mesothelioma or lung cancer and treatment of malignant or other recurrent effusions with talc pleurodesis. Early empyema, pneumothorax, biopsies of diaphragm, the lung, the mediastinum and the pericardium are also the evolving indications of medical thoracoscopy.

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Medical thoracoscopy is a common procedure for pulmonologist working in Europe but is still unpopular in South East Asia with few medical centers in Thailand performing this procedure. There are many reasons for hospitals and physician to adopt the new procedure for their clinical practice. Few of them are the simplicity and yields of the procedure. The cost effectiveness, steps to perform this procedure and how to set up this procedure in a new unit, are known. We report our outcomes of medical thoracoscopy based upon 10 years experience.

Material and Method

Medical thoracoscopy was first performed in our unit in 1998. With this introduction, the rate of performing medical thoracoscopy was slowly increased together with the introduction of new indications. Early indication for performing medical thoracoscopy was only undiagnosed pleural effusion which defined as after at least two thoracentesis and pleural biopsies, the cause of pleural effusion could not been made. Other indications were empyema, pneumothorax and talc pleudrage for medical pleurodesis and these were carried on for the last 3 years. The details of how to perform medical thoracoscopy in our unit had been reported earlier and are the same as the standard procedure in Europe[3].

The defined outcomes of medical thoracoscopy were different, depending on the indication. Diagnostic yield was the endpoint of undiagnosed pleural effusion. For empyema, decrease of fever and the length of hospital stay were to be the outcome. The improvement in chest x-ray immediately after the thoracoscopic procedure was also used and was categorized as class I when the improvement was dramatic showing complete resolution of empyema, class II when the improvement was demonstrated but some loculation still existed. Class III was in patient who showed no improvement by following chest x-ray.

In pneumothorax and malignant pleural effusion, the efficacy of talc pleurodesis was confirmed by the recurrence of their diseases during the period of follow-up. The outcome of medical thoracoscopy in loculated malignant effusion was assessed by immediate chest x-ray improvement after the procedure which was defined as good response if there was no loculated area, moderate response if there was more than fifty percent decrease in size of loculation and poor response in other of whom chest x-ray did not show significant change from the one before the procedure. The subsequent follow-up chest x-rays were also used to evaluate for their response. The patients' demographic data, indication for medical thoracoscopy, procedures, complication of the procedure and outcome were recorded and analyzed separately.

Statistical analysis

The demographic data were presented as the mean $\pm$ SD or mean with range. The categorical data were compared using the x^2 test with and of 0.05. The non-categorical data are compared by ANOVA test. If statistical significant different was found, we used LSD for Post Hoc multiple comparisons. Statistical software (SPSS, version 11.01; SPSS: Chicago, IL) was used for all analyses. Statistical significance was established at the $p < 0.05$ level, and all analyses were two-sided.

Results

Between 1998 and 2007, 142 procedures of medical thoracoscopy were performed at the Respiratory procedure unit, Division of Respiratory disease and Tuberculosis, Department of Medicine, Siriraj Hospital. The details of their demographic data are in the Table 1. Mean age was 57 $\pm$ 15.6 years. The ratio of male to female and right side to left side procedure were 0.97. The mean operating time was 47.7 $\pm$ 18.8 minutes. The amount of pleural fluid being removed during the medical thoracoscopy was 1,000 ml with range from o to 3,600 ml.

There were 86 procedures for the indication of undiagnosed pleural effusion. The mean operating time was 46.8 $\pm$ 18 minutes. There were 44 males and 42 females. The diagnostic yield was 95.2%. The malignancy was diagnosed by thoracoscopy in 45.35%. The median of the total fluid which was removed during medical thoracoscopy was 1,000 ml (range 20 to 3,000 ml).

In 12 patient with empyema, the male sex was predominate (9 male and 3 female) when compared to other indications. The operating time was also statistically different, being longer than for other indications. The amount of drainage fluid was less than other indications, except pneumothorax. The average length of hospital stay was 16.2 days with standard deviation of 8.64 days. After the medical thoracoscopic procedure, the patients had to stay in the hospital for the average of 9.1 days with standard deviation of 7.64 days. The delay time before the procedure was 6.9 days with standard deviation of 7.79 days. All patients responded with decreased fever.

Table 1. Demographic data

Indication	Number	Age (year) Mean (SD)	Operative time in minute Mean (SD)	Sex Male/Female	Site Right/Left	Amount of drained fluid in ml Median (range)
Empyema	12	48.8(16.2)	62.9 (20.4)*	9/3*	6/6	175 (50-800)*
Loculated effusion	15	58.1(12.1)	54.2 (17.4)	8/7	7/8	725 (300-2,100)
Talc pleurodesis	22	56.8(14.5)	40.8 (15.6)	6/16	14/8	1,400 (50-3,600)
Pneumothorax	7	41.6(21.7)	37.0 (17.9)	3/4	2/5	(0-20)
Undiagnosed pleural effusion	86	60.3(14.9)	46.2 (18.0)	44/42	41/45	1,000 (20-3,000)
Total	142	57.5(15.6)	47.7 (18.8)	70/72	70/72	1,000 (0-3,600)

$p < 0.05$, SD = standard deviation

There were 15 patients who had loculated pleural effusion in the study, and included 8 male and 7 female. In 13 evaluated patients, 6 showed good respond another 6 showed poor response with one having a moderate response. Extensive adhesion was found under thoracoscopy in all. Mean duration of follow-up time was 111.92 days with a minimum of 4 days and maximum of 370 days.

For 22 (16 male and 6 female) patients who were scheduled for medical thoracoscopy and talc pleurodesis, 18 were diagnosed with malignant pleural effusion, pleural effusion in two patients was caused by retractable pleuritis from systemic lupus erythematosus and the other two patients had chronic pleuritis of unknown cause. Pleurodesis was successful in 17 patients with reasons of failure being trapped lung in 3 patients, there was such extensive pleural adhesion that the pleural space could not be created in two patients. After mean follow-up of 124 days (range 4 to 376 days), there was only one case with increased malignant effusion.

There were 6 patients (3 male and 3 female) who had pneumothorax who came for talc pleurodesis. The procedure was not successful in one case because of trapped lung. There was no recurrence of pneumothorax after mean follow up of 167 days (range 14 to 696 days).

There was no serious complication from the procedure.

Discussion

Medical thoracoscopy is one of the underused procedure in pulmonary medicine. It is only in Europe that this procedure is widely accepted as a common practice of pulmonologists. In North America, East Asia and Australia, medical thoracoscopy is only at the beginning of an era of being used[4]. In South East Asia, after pressure from lack of thoracic surgeon who could do thoracotomy or video assisted thoracoscopy, a few medical centers started to perform medical thoracoscopy.

There are many indications for medical thoracoscopy which range from diagnostic to therapeutic purposes. The experience of the performer is the important factor which determines success of the procedure. We started our program on medical thoracoscopy in 1998 only on undiagnosed pleural effusion patients. After gaining some experience, more indications were applied and we reported our results have for each indication.

In undiagnosed pleural effusion, our results were comparable to other studies in the past in which the rate of malignancy was around 40-70%[5-7].

There is controversy about whether thoracoscopy is indicated in pleural infection, but many reports showed successfully treated cases by medical or surgical thoracoscopy[8,9]. In our study, the length of hospital stay was 16.2 days and the mean time for thoracic drainage was 9.1 days which were comparable to the study of Kang in pediatric patients[10]. The main problem was the unacceptable delay time of 6.9 days before performing medical thoracosopy procedure. Early thoracoscopy would shorten the length of hospital stay in complicated pneumonia[11].

There was a tendency for loculation of pleural fluid in malignant pleural effusion being done by repeated thoracentesis resulting in multiple loculation with compromising of normal respiration. For this indication, medical thoracoscopy did not result in a high success rate because of the extensive adhesion found in the pleural space. The decision to perform early pleurodesis is therefore recommended.

Thoracoscopic talc pleurodesis is a safe and effective method to prevent the recurrent of malignant pleural effusion[12]. There was only one case of recurrent malignant pleural effusion during the follow-up period and the result of talc pleurodesis was excellent also in non-malignant effusion. There were, however, unsuccessful attempts to do medical thoracoscopy for talc pleurodesis because of trapped lung and extensive pleural adhesion.

The indications for medical thoracoscopy in primary spontaneous pneumothorax are recurrent case and in cases with bronchopleural fistula in which medical pleurodesis with talc can be done[13]. The result of talc pleurodesis was also excellent in our experience with no recurrent of pneumothorax in all patients during the mean follow up of almost six months.

The improvement of techniques and instruments in medical thoracoscopy make this procedure useful in many indications but experience of the performer is still the barrier to developing this procedure in many medical centers. Adherence to the step by step procedure in terms of the indications in performing medical thoracoscopy is recommended for medical centers that want to set up this procedure.

Conclusion

Outcome of medical thoracoscopy varies from various indications. The success rate was high and decreasing for undiagnosed pleural effusion, pneumothorax, empyema and talc pleurodesis in malignant effusion. High skill was needed to perform medical thoracoscopy in loculated malignant pleural effusion.

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ประสิทธิผลของการส่องกล้องโพรงช่องปอด

แจ่มศักดิ์ ไชยคุนา, สันติ สิลัยรัตน์, สุธีร์ แสงแก้ว, อรรถ นานา

ภูมิหลัง: *การตรวจและรักษาด้วยการส่องกล้องโพรงช่องปอดเป็นที่นิยมในประเทศแถบทวีปยุโรป ในแถบอาเซียตะวันออกเฉียงใต้มีโรงพยาบาลไม่มากที่มีการตรวจด้วยวิธีนี้ รายงานนี้นำเสนอประสิทธิผลของการส่องกล้องโพรงช่องปอดในช่วงระยะเวลา 10 ปี*

วัสดุและวิธีการ: *ผู้วิจัยได้รวบรวมรายงานผู้ป่วยที่มารับการตรวจการส่องกล้องโพรงช่องปอดที่สาขาวิชาโรคระบบการหายใจและวัณโรค ภาควิชาอายุรศาสตร์ คณะแพทยศาสตร์ศิริราชพยาบาลตั้งแต่ปี พ.ศ.2541 โดยข้อบ่งชี้ในการตรวจในระยะแรกคือการที่มีน้ำในช่องปอดโดยไม่ทราบสาเหตุหลังจากที่ทำการสืบค้นโดยการเจาะตรวจน้ำและเยื่อหุ้มปอดแล้ว ต่อมามีข้อบ่งชี้ที่เพิ่มขึ้นได้แก่การที่มีหนองในช่องเยื่อหุ้มปอด การเกิดลมรั่วเข้าไปในช่องเยื่อหุ้มปอดและการผนึกช่องปอดด้วยแป้งฝุ่น*

ผลการศึกษา: *ในช่วงระยะเวลา 10 ปีมีผู้ป่วยมารับการตรวจส่องกล้องเยื่อหุ้มปอดจำนวน 142 ราย มีข้อบ่งชี้เพื่อหาสาเหตุของการเกิดน้ำในช่องปอดจำนวน 86 รายในจำนวนนี้สามารถหาคำตอบได้ร้อยละ 95.2 มีสาเหตุที่เกิดจากโรคมะเร็งร้อยละ45.35 ในการทำการผนึกช่องปอดด้วยแป้งฝุ่นในผู้ป่วย 22 ราย ผู้ป่วย 3 รายไม่สามารถทำได้ เพราะปอดไม่ขยายหลังจากติดตามผู้ป่วยไปเฉลี่ย 123 วัน ไม่พบการเกิดของน้ำขึ้นมาอีกในผู้ป่วย 17 ราย ผู้ป่วย 13 รายที่มีการรวมตัวของน้ำในช่องปอดเป็นก้อนมีเพียง 6 รายที่สามารถกำจัดก้อนน้ำได้ ผู้ป่วย 12 ราย ที่มี หนองในช่องปอดการส่องกล้องโพรงช่องปอดสามารถกำจัดหนองออกได้โดยผู้ป่วยต้องพักอยู่ในโรงพยาบาลโดยเฉลี่ย 16.2 วัน ผู้ป่วยที่มีลมรั่วเข้าช่องปอดก็ได้ผลดีต่อการส่องกล้องเช่นกัน*

วิจารณ์: *ข้อบ่งชี้ในการทำการส่องกล้องโพรงช่องปอดมีเพิ่มมากขึ้นในปัจจุบัน ประสิทธิผลของการทำการส่องกล้องโพรงช่องปอดขึ้นกับข้อบ่งชี้แต่ละอย่างและความสามารถของผู้ทำ ในกรณีของการหาสาเหตุของน้ำในช่องปอด การเกิดลมรั่วเข้าช่องปอด การเกิดหนองในโพรงช่องปอดและการผนึกช่องปอดด้วยแป้งฝุ่นนั้น ประสิทธิผลที่ได้เท่าเทียมกับต่างประเทศ ในกรณีของการเกิดก้อนน้ำในโพรงช่องปอดประสิทธิผลของการส่องกล้องโพรงช่องปอดไม่ได้ผลดี*

สรุป: *การตรวจการส่องกล้องโพรงช่องปอดสามารถพัฒนาให้ทำได้ในโรงพยาบาล โดยมีประสิทธิผลใกล้เคียงกับต่างประเทศโดยแนะนำให้เริ่มทำในข้อบ่งชี้ที่ค่อนข้างง่ายก่อน*