



Video-Assisted Thoracoscopic Surgery for Several Diseases of Thoracic Surgery in 1412 Patients

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Abstract: *Background:* Video-Assisted Thoracoscopic Surgery (VATS) is applied in the almost diseases of Thoracic Surgery in the world, and became a standard approach that the patients enthusiastically hope, because VATS can reduce the invasion of operation, the duration of hospitalization and aesthetically satisfy in all patients. We retrospectively reviewed our recent experience with VATS to define its role in the context of current surgical practice. *Method:* Between January 1999 and December 2015, 1209 patients at Pyongyang medical college hospital, Kim Il Sung university with Hyperhidrosis, kakisidrosis, Raynaud's disease, pleurisy in 1st stage and pneumothorax were treated with the use of VATS. 203 patients with pleurisy in 2nd, 3rd stage and pneumothorax, empyema, haemothorax, lung cancer, mediastinal tumor, lung tuberculoma, lung cystoma and esophageal cancer were treated with MITS (Mini-Invasion Thoracoscopic Surgery). *Result:* VATS was successful in achieving satisfied effects in the patients with hyperhidrosis, empyema, pneumothorax, mediastinal tumor, lung tuberculoma, lung cystoma and esophageal cancer. In 42 patients with kakisidrosis VATS failed to treat and symptom recurred. In one patient with pleurisy died postoperatively, two patient experienced empyema. *Conclusions:* In our experience the operation approach with the use of VATS was safe and effective in the surgical treatment of several thoracic diseases. The rate of complication is low and the level of pain is acceptable without long-term sequelae.

Keywords: Video-Assisted Thoracoscopic Surgery, VATS, Thoracic Sugery

1. Introduction

Thoracoscopy was first performed by Sir Francis Cruise of the Mater Misericordiae Hospital in Dublin in conjunction with Dr Samuel Gordon in 1865. [1] It was further developed by Hans Christian Jacobaeus, a Swedish internist in 1910 for the treatment of tuberculous intra-thoracic adhesions. Although thoracoscopy was initially performed for diagnostic purposes, it later evolved into a therapeutic procedure. [2, 14] The development of endoscopic instruments, particularly endoscopic staplers, enabled surgeons to perform major operations using minimally invasive techniques. [3]

Video-assisted thoracoscopic surgery (VATS) became a normal surgical management of a wide variety of chest conditions, since presented a new approach in 1990s. Because VATS can reduce the invasion of operation, the

duration of hospitalization and aesthetically satisfy in all patients, Video-assisted Thoracoscopic Surgery (VATS) is applied in the almost diseases of Thoracic Surgery in the world, and became a normal operation approach that the patients enthusiastically wish to do. Some published literature shows discrepant findings regarding VATS histologic results, with some cohorts dominated by pleural malignancy and others showing a near even divide. [5, 6, 7] Complicated situations could alter the definite diagnosis in the diseases affecting thoracic cavity. [8, 9] The VATS procedure differs from medical thoracoscopy in the access to the chest cavity and the ability to perform such surgical interventions as bullectomy, lobectomy, and pneumonectomy. [13].

We retrospectively reviewed our recent experience with VATS to define its role in the context of current surgical practices of operating in some diseases such as

Hyperhidrosis, kakidrosis, Raynaud's disease, pleurisy, pneumothorax, empyema, haemothorax, lung cancer, Mediastinal tumor, lung tuberculoma, lung cystoma, esophageal cancer and etc.

2. Patients and Methods

2.1. Patients

Between January 1999 and December 2015, a total of 1412 patients at Pyongyang medical college hospital, Kim Il Sung university with thoracic diseases underwent VATS of whom 1209 patients had the operations of VATS, and 203 patients of MITS (mini invasion thoracoscopic surgery).

2.2. Operative Technique

With general anesthesia and selective one-lung ventilation, patients were positioned in the suitable position with the operating table flexed to open up the upper intercostal space. The thoracoscope was placed according to the usual intercostal approach strategy for the procedure.

In the patients group (Hyperhidrosis, Kakidrosis, Raynaud's disease with their hands), the patients were placed in the dorsal position, we made two ports: a 10-mm trocar was introduced through the second intercostal space on the anterior axillary line or on lateral 1Cm from midclavicular line

for the insertion of a 0-degree endoscope, another port then were inserted a 5-mm trocar through the second intercostal space in midclavicle line for operating instruments. We found out the 2nd, 3rd and 4th thoracic sympathetic chains and branches, then cauterized them.

In other patients group with pleurisy, the patients were placed in a lateral position, a 10-mm trocar was introduced through the sixth intercostal space in the midaxillary line just anterior to the latissimus dorsi for the insertion of thoracoscope, two additional ports then were inserted under direct vision: a 12-mm trocar through the fifth intercostal space on the mammary line and a 5-mm trocar posteriorly through the fifth or sixth intercostal. The pleural cavity were examined, performed irrigation in 1st stage-exudative according to our classification, debridement in 2nd stage-fibroexudative, decortication in 3rd stage-organization.

The other operations for Lung tumor, Mediastinal tumor, Esophageal cancer was going with MITS (mini-invasion thoracoscopic surgery).

Results were estimated hospitalization date, complications and effects more than 6 months after surgical approach.

3. Results

Postoperative results are as follows (Table 1):

Table 1. Postoperative results in patients treated by VATS.

Disease	case	operations	Male/female	Average age	Operation methods	Treatment date	outcome
Hyperhidrosis	944	1888	485/459	24.5	VTS	3	100%
Kakidrosis	105	210	38/67	20.3	VTS	3	60%
Pleurisy	156	156	70/86	30.8	VTS/MITS	10	98%
Empyema	25	25	14/11	35.5	MITS	14	1.2% Pyothorax 0.6% died 100%
Spontaneous Pneumothorax	70	70	66/14	40.2	VTS/MITS	12	100%
Traumatic Haemothorax	21	21	15/6	28.3	MITS	12	100%
Lung Cancer	3	3	3/0	52	MITS	15	100%
Mediastinal Tumor	15	15	11/4	34.5	MITS	14	100%
Lung Tuberculoma	12	12	9/3	40.6	MITS	14	100%
Raynaud's disease	38	76	31/7	35.5	VTS	5	100%
Mesothelioma	2	2	0/2	56	VTS	15	100%
Lung Cystoma	1	1	0/1	34	MITS	13	100%
Esophageal foreign body	1	1	1/0	43	MITS	17	100%
Esophageal Cancer	2	2	2/0	42	MITS	15	100%
Achalasia	16	16	6/10	35.6	LS	12	85%
Chylothorax	1	1	0/1	24	MITS	8	100%
Total	1412	2499	832/580				

(*VTS-Video Thoracoscopic Surgery, MITS-Mini Invasion Thoracoscopic Surgery, LS-Laparoscopic Surgery. VATS=VTS+MITS)

VATS were very successful therapy for several diseases such as Hyperhidrosis, Empyema, Spontaneous Pneumothorax, Traumatic Haemothorax, Mediastinal tumor, Lung Tuberculoma, Mesothelioma, Lung Cystoma, Esophageal Foreign Body, Esophageal Cancer and Chylothorax (Table 1).

The operation approaches are as follows (Table 2):

Complications were defined and recorded as described

previously by Colt. [4] In start stage of beginning thoracic sympathectomy, it was happened unexpected complication (4.58%) as intercostal vein's injury, Horner's syndrome, pneumothorax, chylothorax, suppuration and etc, because ours operation skills weren't proper enough to meet requirements. Complication after operation of Kakidrosis were Lung injury (0.95%), but they were healed naturally (Table 3).

Table 2. The operation approaches (n=2499).

Operation	case
Thoracic symphathectomy (2nd)	178 (7.12)
Thoracic symphathectomy (2nd, 3rd)	1318 (52.74)
Thoracic symphathectomy (2nd, 3rd, 4th)	678 (27.13)
Irrigation of Pleural Cavity	131 (5.24)
Decortication	25 (1.0)
Debridement and Decortication	25 (1.0)
Bullectomy	18 (0.72)
Pneumonorrhaphy	52 (2.08)
Irrigation and Pneumonorrhaphy	21 (0.84)

Operation	case
Lobectomy	17 (0.68)
Mediastinal tumorectomy	2 (0.08)
Irrigation and Carcinostatic Injection	1 (0.05)
Ligation of Thoracic Duct	1 (0.05)
Esophagectomy	2 (0.08)
Remove of esophageal foreign body	1 (0.05)
Dehydrated Alcohol into lesion of lung cancer	1 (0.05)
Laparoscopic Heller's myotomy	16 (0.64)

Thoracic symphathectomy (n=2174) was the largest operation approach, Irrigation of Pleural cavity (n=131), Pneumonorrhaphy (n=52) and others.

Table 3. Complications in patients treated by VATS (n=2499).

Disease	Case	Complications (%)	treatment
Hyperhidrosis	1888	Injury of intercostal vein	8 (0.42) Ligature, cauterization
		Horner's syndrome	3 (0.15) Natural healing
		pneumothorax	35 (1.85) Needle evacuation
		Chylothorax	1 (0.05) Ligation of Ductus Thoracicus
		Suppuration of wound	40 (2.11) Exposure
Kakidrosis	210	Injury of lung	2 (0.95) Natural healing
		Fistula after decortication (empyema)	2 (1.28) Tube Drainage
		Suppuration of wound	6 (3.84) Exposure
Pleurisy	156	Bleeding after TB's cave laceration (died)	1 (0.64)
		Fluid in Pleural cavity	3 (4.28) Tube Drainage
Spontaneous pneumothorax	70	Mucosal Lesion	1 (6.25) Laparotomy
Achalasia	16		
Total	2324		101 (4.34)

After operations of Pleurisy happened pyothorax in 2 patients (1.28%), ports suppuration in 6 patients (3.84%), one patient was died for bleeding of TB's cave laceration (0.64%).

3 patients with spontaneous pneumothorax (4.28%) had any fluids in pleural cavity, were recovered after proper managements.

One patient with Achalasia (6.25%) was happened esophageal fenestration at 10th day after cardiomyotomy under laparoscopy and immediately recovered with laparotomy.

4. Discussion

Video assisted rigid thoracoscopy is a minimally invasive procedure with a minor morbidity and mortality risk for the evaluation of the pleural space by direct vision through small incisions. [10] Minimal access techniques allow extensive operations to be performed with little trauma, leading to faster recovery times and shorter hospital stays. There are many reports which have so far described thoracoscopy performed by pulmonologists to be a safe and effective modality for the diagnosis of pleural diseases. [11, 12] VATS can be useful for the diagnosis and treatment of undefined interstitial lung diseases. [13]

In this article, 1412 patients were underwent thoracoscopic surgery operations (n=2499), and discussed operations' results. By using thoracoscopy into diseases of thoracic surgery, treatment's effects were highly changed.

From our experiences, firstly, the patients who knew

hyperhidrosis was one of skin diseases were pleased to choose the operation method in medical managements for mental hyperhidrosis. Mental hyperhidrosis were treated with Koryo traditional therapy or painting several oil-drugs at local skin area before performing VATS, but could see temporal effects and recurrence. Since thoracic Symphathectomy was underwent, it was successful effect with hyperhidrosis, and vessel diseases as Raynaud's disease were also improved its therapy effect.

Second, we had directly seen the pathological situation of pleural by thoracoscopy, could classify pleurisy, made surgical management according to stages so that reduced the patients' hospitalization date, established therapy method for pleurisy and defended tuberculosis pleurisy or atrophy of chest wall. For the therapy of exudative pleurisy was limited into the needle's method and anti-TB before, elimination of effusion fluids in thoracic cavity wouldn't entirely cleaned in time and may be happened severe pleural pachysis and encysted pleurisy so that it couldn't avoid happening any complications such as chronic pyothorax and pericostal TB. From our experiences, such as early therapy with pleurisy were unfortunately failed it will be caused more than 75% happening of chronic pyothorax and pericostal TB.

Third, we had some experiences how to perform difficult operations such as Heller's myotomy, esophagectomy, lobectomy and so on.

5. Conclusion

VATS can reduce the invasion of operation, the duration of

hospitalization, bloods and some drugs. In our experience the operation approach with the use of VATS was safe and effective in the surgical treatment of several thoracic diseases.

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