Feasibility Of Video Assisted Thoracoscopic Surgery In Early Result

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Abstract: Video Assisted thoracoscopic surgery (VATS) is mini-invasive thoracic procedure, mainly refers to a technique involving significant reduction of the chest wall access-related trauma. Present study was conducted to determine efficacy, safety and postoperative morbidity of VATS as compared to open thoracotomy.

Aims: To determine the efficacy, safety and postoperative morbidity of VATS as compared to open thoracotomy.

Materials and methods: 70 patients included in study were divided in two groups Group A (VATS) and Group B (Open) as per patients’ choice. All patients were evaluated by Chest X-ray, HRCT Thorax and pulmonary function test. Patients with malignant pleural effusion, spontaneous pneumothorax, small peripherally located hydatid cyst were included in study. Patients with pleural symphysis, prior pleurodesis, thoracotomy, inability to tolerate single lung ventilation, extensive pleural diseases, coagulopathy and prior radiation treatment for thoracic malignancy were excluded.

Results: Patients included in present study with lung pathologies were of 40-50 years age group. Males were affected more than females with ratio 2.18:1. Most common pathologies were found to be pulmonary hydatid cyst and pleural effusion with 25% each. 91.4% patients were successfully operated with 3 trocar method. 4th port was required in lobectomy. VATS found to be superior than open in view of lesser postoperative morbidity, pain, shorter intercostal drainage (ICD) duration and hospital stay.

Conclusion: Video assisted thoracoscopic surgery should be preferred as postoperative morbidity, mortality postoperative pain, narcotic requirement and hospital stay associated with VATS is less as compared to thoracotomy.

Keywords: Thoracotomy, VATS, Public Hospital

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INTRODUCTION:
Video assisted thoracoscopic surgery (VATS) is minimally invasive thoracic procedure, mainly refers to a technique involving significant reduction of the chest wall access-related trauma. It is ‘keyhole surgery’ carried out in the thorax. It is a procedure which can be performed to identify, diagnose and treat different types of intrathoracic conditions. Minimally invasive thoracic surgery refers to surgical incision which is relatively smaller than that of conventional thoracic surgery. This surgery is technically performed by using reusable long slender tools or disposable tools. The affection of functions of heart, lung, liver and kidney, nervous system and locomotor system caused by minimally invasive thoracic surgery are very few statistically.

MATERIAL AND METHODS
This was a prospective randomized study comprising of 70 patients divided into 2 groups. Group A (VATS) and Group B (Open Thoracotomy). Randomization was done as per patients choice. Those patients who were not consenting to VATS and not fit for VATS were put in Group B. Patients in VATS group were explained the need of conversion to open if required. With history and thorough clinical examination, all patients were evaluated by Chest X-ray, computed tomogram (CT) of thorax and pulmonary function test (PFT). All patients were operated by a team of General Surgeons with Cardio-thoracic surgeons.

RESULTS
In present study, carried out over a period of 2 years from June 2012 to June 2014, we included 70 patients with various diseases like lung hydatid cyst, spontaneous pneumothorax, pleural effusion (tuberculous and malignant), lung empyema, lung mass and Upper limb peripheral vascular diseases. The age of patients ranging from 15 years to 61 years, with peak incidence being in 5th decade with Male to Female ratio being 2.18:1. Amongst these diseases, maximum patients had pulmonary hydatid cyst (25%) and pleural effusion(25%) which account for almost 50%. 91.4% patients were operated by using 3 trocar method. 4th port was inserted for patients operated for Lobectomy. 3 patients (Hydatid cyst -2, Lobectomy -1) were converted to open thoracotomy due to intraoperative bleeding and extensive intrapleural adhesions. 25% patients were operated for cyst excision and 20% patients were operated for pleurodesis and biopsy of lung mass each(Figure No.1).

Figure No. 1
We compared ICD removal day, Visual anologue scale and mean hospital stay of procedures included in study amongst two groups. Our results are as follow:

**Table No. 1**

<table>
<thead>
<tr>
<th>Procedure</th>
<th>VATS</th>
<th>Open</th>
<th>VATS</th>
<th>Open</th>
<th>VATS</th>
<th>Open</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lung hydatid cyst excision</td>
<td>5.4</td>
<td>7.3</td>
<td>4.5</td>
<td>7.2</td>
<td>7.2</td>
<td>9.7</td>
</tr>
<tr>
<td>Decortication</td>
<td>4.1</td>
<td>10.2</td>
<td>3.5</td>
<td>5.5</td>
<td>9.5</td>
<td>15.7</td>
</tr>
<tr>
<td>Pleurodesis</td>
<td>2</td>
<td>2</td>
<td>3.7</td>
<td>6</td>
<td>3.2</td>
<td>3.7</td>
</tr>
<tr>
<td>Blebectomy</td>
<td>5.5</td>
<td>7.5</td>
<td>4</td>
<td>5.5</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>Biopsy of lung mass</td>
<td>2</td>
<td>2</td>
<td>2.2</td>
<td>2</td>
<td>3.1</td>
<td>3.2</td>
</tr>
<tr>
<td>Lobectomy</td>
<td>5.5</td>
<td>6.6</td>
<td>6.5</td>
<td>8.6</td>
<td>13</td>
<td>13.6</td>
</tr>
<tr>
<td>Cervical sympathectomy</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>6.5</td>
<td>3</td>
<td>3.5</td>
</tr>
</tbody>
</table>

As per above figures, ICD removal day was comparatively earlier in patients of group A i.e. patients operated with VATS for different pathologies. As per visual anologue scale, pain was found to be lesser in patients with VATS than open. Hospital stay was also found to be lesser in VATS patients. Results showing procedures done with VATS in view of age, sex ratio, VAS and hospital stay are as follows:

**Table No. 2**

<table>
<thead>
<tr>
<th>Procedures with VATS</th>
<th>No of patients</th>
<th>Mean age in years</th>
<th>M:F</th>
<th>Operated with VATS</th>
<th>Conversion to open</th>
<th>VAS</th>
<th>Hospital stay in days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulmonary hydatid cyst</td>
<td>9</td>
<td>35.52</td>
<td>2:1</td>
<td>7</td>
<td>2</td>
<td>5.2</td>
<td>7</td>
</tr>
<tr>
<td>Pleurodesis</td>
<td>7</td>
<td>42.75</td>
<td>2:5:1</td>
<td>7</td>
<td>0</td>
<td>3.7</td>
<td>3</td>
</tr>
<tr>
<td>Decortication</td>
<td>4</td>
<td>34.75</td>
<td>3:1</td>
<td>4</td>
<td>0</td>
<td>3.3</td>
<td>3</td>
</tr>
<tr>
<td>Blebectomy</td>
<td>3</td>
<td>34</td>
<td>2:1</td>
<td>3</td>
<td>0</td>
<td>3.6</td>
<td>2</td>
</tr>
<tr>
<td>Lung mass biopsy</td>
<td>7</td>
<td>56.7</td>
<td>2:5:1</td>
<td>7</td>
<td>0</td>
<td>2.2</td>
<td>2</td>
</tr>
<tr>
<td>Lobectomy</td>
<td>3</td>
<td>51.6</td>
<td>2:1</td>
<td>2</td>
<td>1</td>
<td>7.3</td>
<td>16</td>
</tr>
<tr>
<td>Cervical sympathectomy</td>
<td>2</td>
<td>55.1</td>
<td>1:1</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

**DISCUSSION**

Results of the present study were compared with the available previous similar studies.

**Pulmonary hydatid cyst with VATS:**

In our experience, the cysts most suitable to VATS are peripheral cysts. It is supported by the opinion of Becmeur and colleagues^3^ that cysts deep into lung parenchyma are unsuitable for VATS treatment. In such cases, the bronchial fistulas are small and can be easily closed with tissue glue (Tissucol). In present study, out of 35 patients, 9 patients were operated for Hydatid cyst excision. Mean age of patients operated for cyst excision was 35.52. 6 patients were female and 3 were male with male to female ratio of 2:1. All cysts were diagnosed by computerized tomography, and no patient had a history of hydatid disease in the
liver or lung. No serious postoperative complications were observed. Patients were operated as Hydatid cyst excision by 3 trocar technique. Patients with thoracoscopic excision were discharged after 7 days. Out of 9 patients 2 patients were converted to open thoracotomy. Average visual analogue scale was 5.2, Isitmangil T et al studied 207 patients. Hundred and ninety three patients were male and 14 female. They ranged in age from 19 to 72 years (mean 25.3 years). The most common presenting symptoms were cough, expectoration and chest pain. The surgical approach was thoracotomy in 198 patients, bilateral staged thoracotomies in 5 patients, median sternotomy in one patient and video-assisted thoracic surgery in 3 patients. Postoperative hospital stay for VATS was 6 days.

**Pleurodesis and Decortication**

Out of 35 patients included in present study, 7 and 4 patients were operated for pleurodesis and decortication respectively. Mean age of patients operated for pleurodesis was 42.57 years and for decortication was 34.75 years. Mean age of patients included in our study was 56.7 years. The most common presenting symptoms were cough, expectoration and chest pain. The surgical approach was thoracotomy in 198 patients, bilateral staged thoracotomies in 5 patients, median sternotomy in one patient and video-assisted thoracic surgery in 3 patients. Postoperative hospital stay for VATS was 6 days.

**Blebectomy with VATS**

Out of 35 patients studied, 3 patients were operated for blebectomy with indications being Spontaneous pneumothorax and Lung emphysema with recurrent pneumothorax. Casadio C et al. One hundred and thirty-three patients who underwent VATS management of primary spontaneous pneumothorax, were retrospectively reviewed. They were 113 males and 20 females with a mean age of 26 (range 12-37). Among these patients, 114 underwent VATS for recurrent pneumothorax and 19 for persistent air-leakage at the first episode. During surgical procedure, in 78% of cases, parenchymal blebs were identified and resected by stapler resection. All patients were submitted to pleural abrasion. Hospital stay was 3 (range 3-12) days. Connolly SS et al. performed a retrospective study on 113 consecutive cases carried out in one unit. VATS procedures were performed on 108 patients. The mean age was 23 years (range 14-45). The male to female ratio was 82:26. Recurrent pneumothorax was the indication for surgery in 80%. Conversion to an open procedure was required in 10 cases (9%), most commonly due to severe adhesions. Successful endoscopic blebectomy was performed in 98 cases (87%), 48 of which had an additional chemical pleurodesis. Follow-up is currently to a mean of 28 months. Recurrence has occurred in eight cases, including only three in the group managed with additional chemical pleurodesis (6.25%).

**VATS guided biopsy of lung mass**

VATS in lung masses help for proper preoperative staging and for obtaining tissue sample for histopathological examination to decide further plan of management. We studied 7 patients for the same. Mean age of patients included in our study was 56.7 with average visual analogue scale was 2.2 and hospital stay was 2 days. Out of 9 patients 3 patients were excluded from definitive surgery in view of inoperability. Bagheri R et al. performed study on 40 patients with NSCLC who had undergone preoperative staging and were candidate for curative surgery between 2008-2010. Diagnostic
accuracy of VATS for confirmation or modification of preoperative staging was evaluated. M/F ratio was 21/19. Mean age of the patients was 57.2 ± 16.64 yrs. The most common symptom was coughing in 90% of patients. 72.5% of the patients had endobronchial mass and only for 27.5% tissue sample was obtained by transthoracic needle biopsy (TTNB) method. After performing VATS, 6 patients were excluded from surgery (3 cases (7.5%) due to seeding plural metastasis, 2 cases (5%) due to N2 involvement and one case (2.5%) due to satellite lesion in other lobes). Other 34 patients underwent surgery.

**VATS guided lobectomy:**

We operated 3 patients out of 35 patients included in present study operated for lobectomy. Mean age of patients was 51.6 years with male to female ratio being 2:1. Average visual analogue scale was 7.3 and average hospital stay was around 16 days. Lobectomy was done by using 4 ports. Out of 3 patients operated for lobectomy, in 1 patients VATS was converted to open thoracotomy. Hwanq Y et al performed 100 thoracoscopic segmentectomies and 1049 thoracoscopic lobectomies on patients with lung cancer between January 2005 and December 2013. Preoperative clinical parameters including gender, age, tumour size, pathological stage, histology were used for propensity score matching. 94 thoracoscopic segmentectomies and 94 lobectomies were selected. Thoracoscopic segmentectomies were performed on patients with small-sized tumour (mean diameter 1.7 ± 1.0 cm), early-stage cancer (Stage I 93.7%) and predominant adenocarcinoma (81.9%). Hospital stay was (7.1 ± 7.1 days).

**Cervical sympathectomy with VATS:**

We operated 2 patients with Upper limb PVD for Cervical Sympathectomy. Mean age of patients was 55.1 years. Patients were evaluated by CT angiography of Upper limb and operated by using 3 ports. Visual analogue scale was 2 and average hospital stay was 3.5 days. Alric P et al performed a study which included a total of 67 patients between January 1996 and December 2000 who underwent 102 sympathectomy procedures with excision of the sympathetic chain between the second and fourth sympathetic ganglion. The mean duration of hospitalization was 1.7 +/- 0.6 days. Long-term patient satisfaction was excellent. Ursche1HC Jr et al studied 326 patients. Major indications for performing cervical sympathectomy include (1) hyperhidrosis, (2) Raynaud's phenomenon, (3) Raynaud's disease, (4) causalgia, (5) reflex sympathetic dystrophy, and (6) vascular insufficiency of the upper extremity. Except for hyperhidrosis, all of the other indications require the usual diagnostic techniques, including cervical sympathetic blockade to assess whether the symptoms are relieved by temporary blockade of the sympathetic ganglia. In 326 patients, sympathectomy, performed either alone or in conjunction with first-rib removal for relief of the thoracic outlet syndrome, has been successful. In only 6 patients has sympathetic activity recurred in less than 6 months. Initially all of them were treated conservatively.

**CONCLUSION**

Present study shows that VATS should be preferred modality of treatment for various thoracic diseases like Pulmonary hydatid cyst for cyst excision, malignant pleural effusion for pleurodesis, for blebectomy, decortication, lobectomy, biopsy of mediastinal mass, Hyperhydrosis. It features less morbidity than classical procedures, with better aesthetic consequences and a lower risk of postoperative complications. Considering the conversion and complication rates in present study, VATS should be the primary therapeutic choice for adults. However further studies are required with the advent of new energy sources and equipment to broaden the spectrum of conditions which can be dealt with VATS.

**REFERENCES**


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Conflict of Interest: None declared

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