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Evaluation of Video Assisted Thoracoscopic Surgery in Thoracic Pathology

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Abstract: ***The introduction of video-assisted imaging system amplifies the function of thoracoscopy. It cannot only magnify the image with the aid of better instruments, but also share the images with all people performing this procedure. The term video-assisted thoracic surgery is used to describe these minimally invasive surgical techniques that nowadays represent a valid alternative to open procedures for many chest diseases. It should be regarded as a part of the basic armamentarium of the new generations of thoracic surgeons. VATS has multiple advantages over traditional thoracotomy including less postoperative pain, shorter hospital lengths of stay, earlier recovery of respiratory function especially in patients with chronic obstructive pulmonary disease (COPD) and the elderly and overall reduced cost. Video-assisted techniques have proven useful for the performance of a broad spectrum of thoracic surgical procedures.***

Keywords: Video assisted thoracoscopic surgery, minimally invasive surgery, single lung ventilation, early recovery

1. Introduction

The introduction of video-assisted imaging system amplifies the function of thoracoscopy. It cannot only magnify the image with the aid of better instruments, but also share the images with all people performing this procedure .[1] The minimal requirements of VATS include a zero-and/or 30 degree rigid telescope(s), a light source and cable, a camera and an image processor. The optional devices include a slave monitor, a semi-flexible telescope and a video-recorder .[2] The choice of the telescope diameter can range from 3 mm to 10 mm, depending the type of procedure. The 30 degree angled viewing scope can help us check the pleural cavity with broader visual field.[3,4] The recommended light source and the output power for the video-assisted thoracic surgery are inert gas (eg. Xenon) mediated “cold light” at 300 W, higher than that used in other endoscopes .[5] The reason why VATS needs higher light output power is that the blood in the operation field will absorb up to 50% of the light .[6] Regarding the light transmission, thinner light fibers lead to better light transmission. The most commonly used camera in the VATS is the CCD (charged-coupled device) type, 2 which can convert the light signals to digital ones .[6] The number of prisms used in the camera can be one (one chip) or three (three chips), and the latter is usually selected for VATS because it can correct the chromographic phase differences (especially from the red light).[6] The term video-assisted thoracic surgery is used to describe these minimally invasive surgical techniques that nowadays represent a valid alternative to open procedures for many chest diseases. It should be regarded as a part of the basic armamentarium of the new generations of thoracic surgeons. Video-assisted thoracic surgery (VATS) has developed very rapidly in these two decades, and has replaced conventional open thoracotomy as a standard procedure for some simple thoracic operations as well as an option or a complementary procedure for some other more complex operations VATS has multiple advantages over traditional thoracotomy including less postoperative pain, shorter hospital lengths of stay, earlier recovery of respiratory function especially in patients with chronic obstructive pulmonary disease (COPD) and the elderly and overall reduced cost. In this thesis we will review its development history, the present status and the future perspectives.

2. Aims and Objectives

The aim of my study is to evaluate the scope of video assisted thoracoscopic surgery for thoracic pathologies. Objectives are to assess:

1) Duration of surgery
2) Intraoperative Complications
   - Bleeding
   - Adjacent organ injury
3) Post operative pain assessment
4) Early and late postoperative complications
   - Anastomotic site leakage
   - Recurrent laryngeal nerve injury
   - Pneumonia (d) Chylothorax
5) Duration of chest tube drainage
6) Duration of hospital stay
7) Resumption of normal routine activit

3. Materials and Method

Study Site: Department of General surgery, Northern Railway Central Hospital, New Delhi.

Study Population: Patients visiting in Northern Railway Central Hospital, New Delhi with various intra thoracic pathologies for surgical intervention.

Study Design: Prospective outcome study.

Sample Size with Justification: 25 cases of intra thoracic pathology with their inclusion and exclusion criteria. All cases are reported to Northern Railway Central Hospital New Delhi during the period of my study.

Study Period: January 2018 to December 2018

Inclusion Criteria

Patient of all age group with:- Intra thoracic pathology like:

1) Carcinoma lung
2) Loculated empyema
3) Pleural effusion
4) Hydropneumothorax
5) Esophageal carcinoma,
6) Leiomyoma of esophagus

7) Patient with mediastinal space occupying lesions 36

Exclusion Criteria:
1) If a patient withdraws his/her inclusion consent.
2) Inability to tolerate one lung ventilation
3) Inability to tolerate lateral decubitus position
4) Hemodynamic instability
5) Tumor>6cm
6) Chest wall or medistinal involvement
7) Coagulopathy
8) T3 tumor or N2 disease
9) Involvement of hilar structure
10)Extensive intrapleural adhesion

Methodology
Information imparted: Eligible participants were told about the study and the goals.
Informed consent: This was taken as per standard protocol before starting evaluation. x Patients admitted in our hospital and fulfilling the inclusion criteria were included in the study.

4. Observation and Results

Table 1: No. of cases

Diagnosis	No. of cases
Thymoma	02
Leiomyoma of oesophagus	02
Empyema and hydropneumothorax	07
Carcinoma lung	03
Carcinoma oesophagus	11

Table 2: Procedures

Diagnosis	Procedure	No. of cases
Thymoma	VATS Thymectomy	2
Leiomyoma of esophagus	VATS enucleation	2
Empyema and hydropneumothorax	VATS decortication	7
Carcinoma lung	VATS lobetomy	3
Carcinoma esophagus	VATS oesophagectomy	11

Table 3: Duration of surgery

Diagnosis	Mean duration of surgery (in hours)
VATS thyectomy	2.75
VATS enucleation	2.75
VATS decortication	2
VATS esophagectomy	3.5
VATS lobectomy	2

Table 4: Complications of the procedure

Complications	Number of cases
Recurrent laryngeal nerve injury	2
Chylothorax	0
Adjacent organ injury	2
Anastomotic leak	1
Significant bleeding (>800 ml)	1
Pneumonia	1

Table 5: Mean duration of hospital stay

Diagnosis	Mean duration of hospital stay (in days)
VATS Thymectomy	5
VATS Enucleation	6
VATS Decortication	4.5
VATS Lobectomy	8.5
VATS Esophagectomy	12

5. Discussion

The study was a prospective outcome study, conducted on 25 patients who underwent VATS in our hospital over a period of 1 year.

In our study we found that out of 25 patients, 11 were cases of carcinoma esophagus, 7 were empyema and hydropneumothorax, 3 were carcinoma lung, 2 were thymoma and remaining 2 were leiomyoma of esophagus. The respective VATS procedures done were VATS esophagectomy with gastric pull up in 11 patients, VATS decortication in 7, VATS lobectomy in 3, VATS thymectomy in 2 and VATS enucleation in 2 patients.Mean Duration of surgery was 2.75 hours in case of VATS Thymectomy, 2.75 hours in case of VATS Enucleation , 2 hours in case of VATS Decortication 2 hours in case of VATS Lobectomy and 3.5 hours in case of VATS EsophagectomyMean Duration of hospital stay was 5 days in case of Thymectomy , 6 days in case of Enucleation, 4.5 days in case of Decortication , 8.5 days in case Lobectomy and 12 days in case of Esophagectomy. Maximum hospital stay was 18 days in VATS Esophagectomy and minimum hospital stay was 4.5 days in case of VATS decortication. Our results were in accordance to the studies conducted by Shi-Ping Luh et al, B. H. A. von Rahden, H. J. Stein et al, G. Zaninotto,G. Portale et al. Petrakis IE et al, Hany Hasan Elsayed et al, Rodriguez JA et al. Jones R.O et al, Arvind Kumar, Belal Bin Asaf et al, ws. Walker et al. Orringer MB, Sloan H et al, James D. Luketich, Ninh T. Nguyen et al, Chinnusamy Palanivelu, Anand Prakash et al Wright GM et al, Bo Ye, MD,a Ji-Cheng Tantai, et al, Julissa Jurado MDet al.

6. Conclusion

On the basis of my study, I conclude that VATS (minimally invasive procedure) is a less moribund procedure with some major advantages as compare to open procedure like open thoracotomy. Advantages like less intra-operative and post operative complications, early recovery, better accessibility during surgery, less post operative pain and less hospital stay are the major benefits which make VATS a standard procedure of care for the patients with intra-thoracic pathology in experienced hands.

So, for better care of patient and better quality of life after surgery we need to expand our vision to treat intra-thoracic pathology by minimally invasive procedures. I will continue my study in future, to have more data regarding benefits and complication of VATS so that we can work on intra-thoracic disease and treat them in a better way. Surgeons have learned these techniques and have kept morbidity to acceptance levels during the learning phase. Where these techniques ultimately fit into the overall practice remains to be determined as more experience is gained.

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