



THE ROLE OF EARLY VIDEO-ASSISTED THORACOSCOPIC SURGERY IN PATIENTS WITH EMPYEMA THORACIS

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ABSTRACT

Empyema thoracis management is a challenge and an inappropriate diagnostic-therapeutic work up can lead to serious short and long-term complications. VATS resulted to be safe and effective for the treatment of Empyema thoracis, and an early minimally invasive thoracoscopic intervention (early VATS) correlates with better outcomes. It emerged that the elapsed period between the onset of symptoms and surgery correlates in a statistically significant way with the post-operative stay in intensive care and the analysis between early VATS(Stage I & II), late VATS (Stage III) and postoperative hospitalization showed a statistically significant reduction of the post-operative hospitalization in the early VATS group. **Aim And Objectives:** 1. To evaluate the role of VATS in management of early and late stage of Empyema thoracis. 2. To study the efficacy of VATS as a therapeutic tool in Empyema Thoracis. **Methodology:** A retrospective study was carried out in 40 Empyema thoracis patients admitted to surgery ward, to assess the role of the early video-assisted thoracoscopic surgery in them at a tertiary care hospital. **Results:** Total 40 patients were studied. Stage 1 and 2 were combined as early Empyema cases and stage 3 as late Empyema cases. Patients in late stage required more time to operate, longer duration of oxygen therapy and intercostal drainage, prolonged hospital stay as compared to early stage significantly. **Conclusion:** Video-assisted thoracoscopic surgery in patients with early stage of empyema thoracis reduces post op complications, post op hospital stay, operative time, oxygen therapy and ICD duration.

KEYWORDS : video-assisted thoracoscopic surgery, Empyema thoracis, Mann-Whitney U test

INTRODUCTION

Empyema thoracis defined as pus in the pleural cavity is often associated with poor lung function. Empyema thoracis management is a challenge and an inappropriate diagnostic-therapeutic work up can lead to serious short and long-term complications. The management of empyema thoracis would include evacuation of the pus and antibiotic cover, Video assisted thoracoscopic surgery (VATS), chest drain with fibrinolysis (CDF) or by an open thoracotomy. The ideal surgical approach for empyema remains controversial. Video assisted Thoracoscopic Surgery in the management of Empyema Thoracis has now begun to be widely used as a first line treatment bypassing a trial with percutaneous drainage or with an intercostal drainage tube. Patients treated with VATS also had a comparatively lesser hospital stay. Patients treated with VATS had potentially lesser surgical site infections and improved tolerance for exercise, lesser paraesthesia and required lesser analgesia. Also, VATS worked best in early stage of empyema with a significantly decreased conversion rate to open surgery, reduced operative time, fewer days of intercostal drainage, fewer days of post operative air leak, lesser rate of surgical site infection and lesser hospital stay than late stage.

AIM AND OBJECTIVES

1. To evaluate and access the role of VATS in early stage of Empyema thoracis.
2. To study the efficacy of VATS as a therapeutic tool in Empyema Thoracis.

MATERIAL AND METHODS

Study design- Retrospective observational study.

Study Setting- Tertiary care hospital.

Period Of Study- May 2022 to May 2024

Sample Size- 40,

Sampling Technique: Convenience sampling

Statistical Analysis: data was analyzed by using SPSS

software version 20.0

Inclusion Criteria:

1. Patients diagnosed to have empyema thoracis.
2. Patients with loculated pleural effusion.
3. Patients with unresponsive empyema.
4. Patients treated with intercostal drains without benefit.

Exclusion Criteria:

1. Patients unfit for surgery due to co morbidity, coagulopathies.
2. Patients with poor lung function or those on ventilatory support.

Methodology –

The study was conducted in the Department of General Surgery, at a tertiary care hospital from May 2022 to May 2024. 40 patients diagnosed to have empyema thoracis admitted to surgery ward and who gave consent for the study were included in this study.

A detailed questionnaire was used as a data collection tool. Following tests were done for all enrolled patients: Complete blood count, Coagulation profile, Serological examination, Chest X-ray, Ultrasonography of thorax, High resolution computerized tomography of thorax.

All the data was collected and entered in MS office xl. Statistical data analysis was done by using SPSS software version 20.0. Descriptive statistics are presented as percentage and proportions. As the data is not normally distributed, Mann-Whitney U test was used to compare parameters between early and late-stage cases.

Data was assessed on basis of: Cases requiring conversion to open thoracotomy in early and late empyema ,Number of days of hospital stay, Number of days of intercostal drainage., Post operative complications in the form of air leak, subcutaneous emphysema, pneumonia, pneumothorax, hemothorax, ventilator support, re exploration for bleeding, Post operative 6 months follow up to assess: perceived improvement in exercise tolerance compared with

immediately before and after the surgery, any residual pain or paraesthesia, average duration of analgesic use, resolution of any associated consolidation.

RESULTS:

Table 1 : Age And Gender Distribution Of Patients

age	Male	female	total
<10	8	7	15
11-20	3	6	9
21-30	1	3	4
31-40	2	4	6
41-50	1	1	2
>=51	1	3	4
Total	16	24	40

Total 40 patients were studied, out of which maximum were less than 40 years of age. (85%) 60% of the study population were females where 40% were males.

Table 2: Presenting Symptoms Of Patients

symptoms	present	Percentage of cases
cough	29	72.5
fever	23	57.5
expectoration	13	32.5
breathlessness	3	7.5

most common Presenting symptom was cough reported in 72.5% patients followed by fever reported in 57.5% patients. 32.5% patients complained of expectoration and 7.5% were having breathlessness.

Table 3: Distribution Of Patients According To Stages Of Empyema

STAGE OF EMPYEMA	No. Of cases	Percentage of cases
I	6	15
II	21	52.5
III	13	32.5
Total	40	100

Maximum patients i.e. 52.5% were in stage 2 of Empyema followed by 32.5% in stage 3 and 15% in stage 1.

Table 4: Empyema Stage

	Frequency	Percent
early	27	67.5
late	13	32.5
Total	40	100

Table 5: Various Parameters In Patients In Early And Late Empyema

OPERATIVE TIME			
	Early Empyema	Late Empyema	total
<= 30 mins	1	0	1
31 to 60 mins	12	0	12
61 to 90 mins	11	7	18
>=91 mins	3	6	9
Total	27	13	40
OXYGEN THERAPY (DAYS)			
	Early Empyema	Late Empyema	total
1 to 5 days	26	11	37
6 to 10 days	1	1	2
> 10 days	0	1	1
Total	27	13	40
DURATION OF INTERCOSTAL DRAINAGE (DAYS)			
	Early Empyema	Late Empyema	total
1 to 10 days	22	3	25
11 to 20 days	5	7	12
21 to 30 days	0	2	2
>=to 31	0	1	1

Total	27	13	40
POST OPERATIVE HOSPITAL STAY (DAYS)			
	Early Empyema	Late Empyema	total
1 to 10 days	17	1	18
11 to 20 days	8	7	15
>= 21 days	2	5	7
Total	27	13	40

In 45% cases, operative time was 61 to 90 minutes. In 30% patients operative time was 31 to 60 minutes. In 22.5% cases, it was >= 91 minutes. In only 1 patient, operative time was < 30 minutes. Maximum patients i.e 92.5% required oxygen therapy for 1 to 5 days.

5% patients required oxygen for 6 to 10 days and only 1 patient needed oxygen for > 10 days.

In 25 patients (62.5%) Intercostal drainage was kept for 1 to 10 days, In 12 patients i.e.30%, it was kept for 11 to 20 days and in 3 patients. Intercostal drainage was kept for more than 21 days.

Table 6: Vats Converted To Open Thoracotomy

STAGE	I	II	III
Primary VATS	6	18	4
Open thoracotomy	0	3	9
Total	6	21	13

18(45%) patients were hospitalized for 1 to 10 days, followed by 15(37.5%) patients for 11 to 20 days and 7(17.5%) for >= 21 days

Table 7: Association Of Any Complications With Stage:

ANY COMPLICATION (Postoperative Pneumonia /air leak/ pneumothorax/ hemothorax)					
	PRESENT	ABSENT	TOTAL	Chi square	P value
Early	5	22	27	19.551	<0.001
Late	12	1	13		
	17	23	40		

Presence of Complications were more associated with late stage as compared to early stage (chi square= 19.551, p value is <0.001)

Table 8: Comparison Of Parameters In Early And Late Stage

	stage	n	Mean Rank	Sum of Ranks	Mann-Whitney U value	p value
operati ve time	early	27	15.89	429	51	0.000
	late	13	30.08	391		
oxygen therap y	early	27	17.81	481	103	0.036
	late	13	26.08	339		
ICD duratio n	early	27	15.81	427	49	0.000
	late	13	30.23	393		
Post-op hospita l stay	early	27	15.81	427	49	0.000
	late	13	30.23	393		

Patients were divided into early and late category of Empyema. Stage 1 and 2 were combined as early Empyema cases and stage 3 as Late Empyema cases.

The Mann Whitney U test was used to find out the difference between the two rank totals.

The Mann Whitney U test showed that there is a significant difference in operative time in early and late-stage categories U = 50, p value <0.05 for late stage patients, much more operative time was required.

There was statistically significant difference in the two groups with a greater number of oxygen therapy days required in late stage. $U = 103, P < 0.05$

Similarly, ICD duration was more in late stage as compared to early. $U = 40, P < 0.05$

Hospital stay in late cases for prolonged as compared to the early-stage case.

$U = 40, P < 0.05.$

DISCUSSION:

The overall reduction in hospitalization time in VATS compared with thoracotomy treated patients has been demonstrated for both pleural infection stages II and III (3,4) as seen in our study. Similar to this study, The postoperative ICD was significantly higher with thoracotomy in three studies (4,5,6) and postoperative hospital stay was significantly higher with thoracotomy in five such studies (3,6,7,8,9). Few studies reported reduced postoperative complications like this study. (4,10)

CONCLUSION:

Early video-assisted thoracoscopic surgery in patients with empyema thoracis reduces post op complications, post op hospital stay, operative time, oxygen therapy and ICD duration.

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