

Frequency of Failed Decortications in Post Tuberculous Empyema

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Abstract

Objectives: Treatment of post-Tuberculous empyema remains challenge to clinicians. The objective of this study was to report frequency of failed decortications in post-tuberculous empyema.

Methodology: A cross-sectional observational study was carried out at Thoracoscopic Surgery Department of Lady Reading Hospital Peshawar. Medical records of hospital were reviewed retrospectively from last 5 years (from 2016-2021). Patients with post-tuberculous empyema that underwent decortication were included. Definition of empyema was taken as loculation or septations in pleural space identified on computed tomography. Patients without any decortications were excluded. SPSS was used for data analysis.

Results: From 110 patients, mean age 59.2 ± 19.4 years and 71 (65%) males and 39 (35%) females, mean BMI was 22.3 ± 2.9 kg/m². All patients had history of pulmonary tuberculosis. Mean duration of symptoms before surgical treatment was 12.7 ± 9.8 days. 34 (31%) were successful while 76 (69%) decortications failed. Decortication as first line of treatment was used in 04 (12%) with successful decortications, while in 47 (62 %) with failed decortications ($p < 0.001$). Mean duration of symptoms to treatment among successful decortications was 12.2 ± 9.5 days while in failed decortications 14.1 ± 10.2 days ($p = 0.06$). Mean duration of hospital stay in successful decortications was 12.3 ± 7.7 days while in failed decortications 13.2 ± 8.1 days ($p = 0.08$). Frequency of drainage fluid > 1000 ml in successful decortications was 10 (29 %) while in failed decortications 52 (68 %). 11 (15 %) of patients died among failed decortications.

Conclusion: High frequencies of failed decortications due to post-tuberculous empyema were reported in this study.

Keywords: Post-Tuberculous empyema, Decortications, Pulmonary Tuberculosis

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Introduction

Post Tuberculous Empyema is defined as presence of purulent fluid within the pleural space and is a complication of pulmonary tuberculosis.¹ Majority of the empyema tends to occur with associated pneumonia, even though empyema itself is reported to have no relation to pneumonia in around 33 % of the patients.² Post-Tuberculous Empyema is rising day by rising, mostly in Tuberculosis (TB) endemic populations.³ A significant contribution to mortality and morbidity is linked with empyema. American Thoracic Society (ATS) has labeled empyema in 3 phases such as stage I- exudative, stage II- fibrino-purulent and stage III-

organizing.⁴

During the initial stages of exudation, drainage of chest (closed) along with appropriate administration of antibiotics may lead to compromised treatment effectiveness.⁵ Literature shows that empyema which is small and uni- loculated tends to resolve using anti-microbial therapy in around 80 % of the cases.⁶

Nonetheless, afterwards in fibrino-purulent and in organizing stage/s, the use of antibiotics has been reported to be non-effective due to peeling of the pleura and loculation of fluid.⁷ Initially, non-invasive treatments tend to fail in stages II and III which leads to surgical interventions that involve decortication and

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thoracotomy.⁸

The type of surgical intervention carried out is dependent upon the experience of the surgeon, the intervention being minimally invasive techniques like open thoracotomy or decortication using video-assisted thoracoscopic surgery (VATS).⁹ Even though optimal therapeutic approaches for empyema, to date has remained un-determined wherein surgical intervention is reported to have effective option for treatment, especially in multi-loculated empyema.¹⁰ Contrastingly, surgical risks are required to have a balance alongside the expected advantages.¹¹

The evolutionary stages of post-tuberculous empyema have not been completely defined, but rather tend to represent continuous spectrum of events.¹² A number of empyema patients have enough time for undergoing surgical therapies alternatively, since disease progression can be rapid, concurrently with deterioration of health, wherein surgery remains the only option.¹³ Therefore, first and initial choice of therapy in empyema ought to be made in deliberation.¹⁴ Traditionally, management of empyema is observed to be carried out empirically; however until recently, published data has shown to be in favor of establishment of more specific guidelines for management.¹⁵⁻¹⁷

The objectives of this study were to report the frequency of failed decortications in post-tuberculous empyema.

Material and Methods

This cross-sectional observational study was carried out using non-probability convenient sampling technique at the Thoracoscopic Surgery Department of Lady Reading Hospital Peshawar for a period of 6 months from November 2021 to April 2022. Medical records of the hospital were reviewed retrospectively from last 5 years (from 2016-2021). Patients with post-tuberculous empyema were included in the study which was all above 18 year olds. Definition of empyema was taken as loculation or septations in pleural space identified on computed tomography. All patients that had undergone decortications were included. Patients without any decortications were excluded from the study.

The pleural fluid which was collected from the patients was investigated for bacterial cultures along with gram staining, smears of acid-fast bacilli and cultures of Mycobacterium Tuberculosis were noted from the records.

Successful treatment was defined as complete resolution or evacuation of infected pleural fluid along with restoration of complete lung expansion, with follow up radiological examinations showing that no further treatment was required. Failure of treatment was indicated by the need for any additional intervention or mortality associated to empyema.

For data analysis, SPSS version 25.0 was used. For reporting of data, mean and standard deviation were reported for quantitative variable while for qualitative variables, frequency and percentage were recorded. For testing of association between failed decortications and successful ones, chi-square test was applied keeping p-value of <0.05 was taken as statistically significant.

Results

From the total of 110 patients included in the study, the mean age was 59.2 ± 19.4 with 71 (65 %) males and 39 (35 %) females. The mean BMI of patients was 22.3 ± 2.9 kg/m². 32 (29 %) of patients were reported to have hypertension while 27 (24.5 %) diabetes. All the patients had a history of pulmonary tuberculosis. The mean duration of symptoms prior to admission to hospital was 9.5 ± 15.2 days while duration of symptoms before surgical treatment was 12.7 ± 9.8 days (Table I).

Variables	Mean + SD / N(%)	
Age (years)	59.2 ± 19.4	
Gender	Male	71 (64.54)
	Female	39 (35.45)
BMI (kg/m ²)	22.3 ± 2.9	
Hypertension	32 (29.1)	
Diabetes	27 (24.5)	
History of Pulmonary Tuberculosis	110 (100)	
Duration of symptoms before admission (days)	9.5 ± 15.2	
Duration of symptoms before treatment (days)	12.7 ± 9.8	

From all the decortications that took place, 34 (31 %) were successful while 76 (69 %) o decortications failed (Figure I).

Table II shows the association of different variables between successful and failed decortications. In 04 (12 %) of patients with successful decortications, it was used as first line of treatment while in 47 (62 %) of patients with failed decortications, it was used as first line of treatment, with a significant p-value of <0.001. the mean duration of symptoms to treatment among successful decortications was 12.2 ± 9.5 days while in

failed decortications was 14.1 ± 10.2 days with an insignificant difference of $p=0.06$. The mean duration of hospital stay in successful decortications was 12.3 ± 7.7 days while in failed decortications was 13.2 ± 8.1 days with an insignificant difference of $p=0.08$. The frequency of drainage fluid >1000 ml in successful decortications was 10 (29%) while in failed decortications was 52 (68%). 11 (15%) of patients died among the failed decortications.

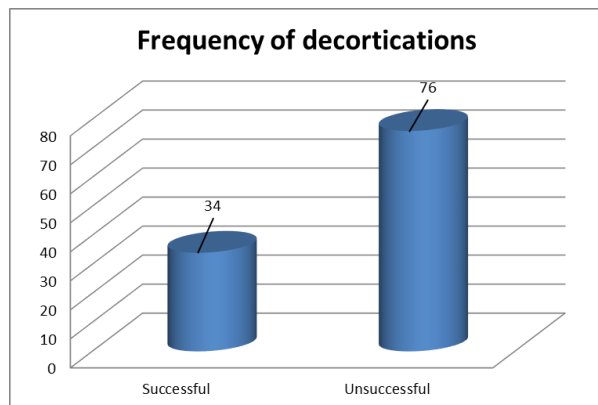


Figure I: Frequency of successful and failed decortications (n=110)

Variables	Decortications		p-value
	Successful (n=34)	Failed (n=76)	
Decortication as first line of treatment (%)	04 (12)	47 (62)	<0.001
Duration of symptoms to treatment (days)	12.2 ± 9.5	14.1 ± 10.2	0.06
Duration of hospital stay (days)	12.3 ± 7.7	13.2 ± 8.1	0.08
Drainage fluid (>1000 ml)	10 (29.4)	52 (68.4)	<0.001
Mortality	0	11 (14.5)	-

Discussion

This study showed that post-tuberculous empyema was treated using decortication as both first line of treatment in some patients while as second line of treatment in other patients. It was observed that patients with decortication as second line of treatment showed better outcomes. In addition patients with lesser duration of symptoms to treatment and with lesser hospital stay also showed better outcomes in terms of successful decortications, although with an insignificant difference. Likely patients with less drainage fluid were reported to have better outcomes. Among successful decortications, no mortality was observed while in about 15% of patients with failed decortications, mortality was reported.

The disparity between findings of our research with other researches such as Massard et al, demonstrated the use of decortication as second line of treatment and in patients with less severe disease (less duration of treatment to symptoms and hospital stay).¹⁸ Although surgical decortication is termed as successful treatment option for empyema and published literature shows that decortication has a tendency to decrease treatment to discharge time in comparison to other treatment options such as tubal drainage.¹⁹ Studies have compared the use of decortications with tubal drainage, reporting decortications to be much more successful than tubal drainage of empyema.²⁰ It was reported that decortications reduced duration of stay in intensive care units etc.²¹ However, since our study showed that majority of patients had failed decortications; other reasons for failure should also be anticipated.

Such reasons include surgical expertise, experience of the attending surgeon, duration of surgery, pre-operative hematological factors, blood loss, post-surgical drainage, co-morbidities etc. Since surgical decortication is a major thoracic surgery which requires an incision, seldom being a challenge to be performed among debilitating patients.²²

There were several limitations to this study. Firstly the nature of study design was retrospective in nature with limited sample size even after searching hospital records of previous five years. Secondly only the hospital record of one hospital was included in the study. Surgical expertise of experience of surgeon was not reported in the study. Neither were decortications compared with other treatment options nor with different types of decortications as well (such as open and VATS). Furthermore only patients with post-tuberculous empyema were included but were in line with the research topic and objectives.

However with that said, this study was done on an area of research on which scanty data is available especially in Pakistan. Since it is a specialized surgical intervention, it doesn't take place commonly in this part of the world. Therefore, further multi-centered studies with greater sample size and comparing different decortication types or with different treatment options for empyema would be enlightening to the findings reported in this study.

Conclusion

According to the results of the study, high frequencies of failed decortications due to post-tuberculous empyema were reported in this study.

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