

FAILED DECORTICATION, AETIOLOGY, TREATMENT OPTIONS AND OUTCOME

M.Muslim Aamir Bilal Viqar Aslam Abdul Baseer Farhan Majeed

ABSTRACT

OBJECTIVE: To find out different factors which lead to failed decortication and to evaluate their management and outcome.

STUDY DESIGN: Retrospective observational descriptive study.

PLACE AND DURATION: Department of Cardiothoracic Surgery, Postgraduate Medical Institute, Lady Reading Hospital Peshawar from January 2003 to June 2006.

SUBJECTS AND METHODS: Clinical record of 260 patients who underwent decortication for chronic empyema during the last 3.5 years was retrospectively analyzed and their results evaluated. Detailed scrutiny of the computerized clinical record was carried out to analyze the aetiology of failure of the operation. The variables studied were persistent broncho-pleural fistula, poor postoperative efforts by the patients, wound infection, old chest drain site infection, technical failure and nutritional state of the patient.

RESULTS: Of the 260 decortications performed over the period of 3.5 years, 230 patients had a successful outcome in terms of lung expansion and improved pulmonary functions. In thirty patients (19 males, 11 females with age range of 12 to 70 years) decortication failed to achieve the desired results. These patients had to undergo space obliterating procedures for persistent infected space. Twenty three patients had history of tuberculosis and seven patients had non-tuberculous empyema. All patients had chronic empyema with duration of more than 12 weeks before the first operation. All patients were nutritionally compromised. Thoracoplasty (complete or partial) was performed in 25 patients to obliterate the persistent infected space. Five patients with recurrent broncho-pleural fistula had an additional procedure of intercostal muscle re-inforcement over the fistulae, in addition to thoracoplasty. All patients had successful obliteration of the persistent space with no mortality and minor wound infection in only three patients.

CONCLUSION: Thoracoplasty is a useful procedure following failed decortication as a space obliteration procedure in patients with nutritional impairment and poor respiratory efforts.

INTRODUCTION

Empyema thoracis is the collection of pus in the pleural cavity. It has been recognized as a diseased entity since ancient times.¹ Although, with the invention of efficient antibiotics, its incidence has decreased dramatically,² but in a country like ours, where tuberculosis is major a problem, empyema patients still form a significant number of our daily out patients.

Decortication, performed early in the course of the disease has a high cure rate.³ The success of operation also depends upon the

course of the disease, meticulous surgical technique used to close the broncho-pleural fistula, postoperative chest physiotherapy by the patient, nutritional state of the patient, postoperative wound infection and wound dehiscence as well as infectious old chest drain site. All these factors when not addressed properly, will result in collapse of the lung and re-appearance of infected pleural space.

Treatment of patient with failed decortication is a difficult job because of difficulty encountered in re-do surgery plus poor nutritional state of these patients.

Thoracoplasty with or without intercostal muscle flap over the broncho-pleural fistula is a treatment option by which the infected

* Address for correspondence:
Department of Cardiothoracic Surgery
Postgraduate Medical Institute
Lady Reading Hospital
Peshawar-Pakistan

TABLE 1
DEMOGRAPHIC FEATURES

S.No.	DEMOGRAPHS	NO. OF PATIENTS
1.	Failed Decorts	30
2.	Males	19 (63.33%)
3.	Females	11 (36.66%)
4.	Post TB	23 (76.66%)
5.	Non TB	07 (23.33%)

persistent space can be obliterated with good results. Other treatment options are muscle transposition into the persistent space and open window drainage. All these patients are so malnourished that there is hardly any muscle to fill the space.

This study aimed to observe different aetiologies which led to failed decortication and to analyze the best surgical option for their management.

MATERIALS & METHODS

This is a retrospective analysis of patients who underwent thoracoplasty alone or in combination with intercostal muscle flap over the broncho-pleural fistula for obliteration of persistent infected pleural space after the first operation. The study was carried out in the Department of Cardiothoracic Surgery, Postgraduate Medical Institute, Lady Reading Hospital, Peshawar, Pakistan from January 2003 to June 2006. Patients of both sexes and all ages who had undergone decortication for chronic empyema and who had developed infected pleural space afterwards were included in the study. Patients with thoracoplasty after pulmonary resection surgery and those having thoracoplasty in the first instance for destroyed lung were excluded from the study.

Computerized data of patients were analyzed for demographic features, surgical procedure performed, postoperative course and postoperative outcome of the disease. Nutritional assessment was done by measuring weight and height of the patients and by calculating body mass index (BMI). Patients were labeled as malnourished who had a body mass index of less than 19. These patients on an average had weight less than 45 Kgs. Failure of

surgical technique was assessed by re-appearance of persistent air leak after closure of broncho-pleural fistula during the first operation. Postoperative poor ventilatory effort was assessed by the three ball device (TRIFLO) of incentive spirometry. Patients were labeled as having poor respiratory effort who were unable to elevate a single ball upto the top of the device. Patients were diagnosed as having failed decortication, when inspite of virgorous chest physiotherapy, continuous low pressure suction and nutritional support, their lungs did not come up or went down again after expansion or developed massive air leak during the second and third week postoperatively. All patients underwent complete or partial thoracoplasty through postero-lateral thoracotomy incision under general anesthesia. Thoracoplasty was considered complete when 7-8 complete ribs were removed. In partial or tailoring thoracoplasty limited number of ribs were removed to obliterate a localized infected space.

The patients with recurrence of broncho-pleural fistulae had closure of the fistula with monofilament suture with an additional procedure of intercostal muscle flap put over the fistula and stitched in place to further re-enforce it.

Postoperatively, a single chest drain was put in the chest and kept on continuous low pressure suction for seven days. All patients were given 3rd generation cephalosporin postoperatively and ATT to tuberculous patients. The patients were kept hospitalized for 7-10 days.

RESULTS

A total of 260 decortications were done during the last 3.5 years. 230 cases were successful and went home as cured. In 30 patients decortication failed to achieve the desired results. These patients who developed infected space problem were included in the study. Nineteen were males, 11 were females. Their age ranged from 12 years to 70 years with mean age of 32.6 years. The mean duration of the illness before the first operation was > 12 weeks in all patients. All the patients had failed decortication diagnosed during 2nd - 3rd week postoperatively on chest x-ray and clinical examination or having massive air leak. Twenty three out of 30 patients were post tuberculous while 7 had non-tuberculous empyema. All patients were nutritionally compromised with average weight of less

than 45 Kgs and the body mass index of less than 19. Twenty six patients were unable to perform incentive spirometry properly to help expand their lungs postoperatively. Sixteen out of 30 patients had wound infection and 3 had wound dehiscence. These patients had also infection of the old chest drain site. Five patients who had repair of broncho-pleural fistula during the first operation developed recurrence of massive air leak and hence, broncho-pleural fistula during the first week. This was either due to pulmonary infection or due to poor surgical technique to close the broncho-pleural fistula during the first operation.

Twenty five patients underwent thoracoplasty alone as a space obliteration procedure. Of these, 20 had complete thoracoplasty and five had tailoring thoracoplasty for apical spaces. Five patients who had developed recurrence of broncho-pleural fistula had repair of the fistula with a non-absorbable monofilament suture superimposed by patch of intercostal muscle flap stitched over it to re-enforce the closure, in addition to complete thoracoplasty. All patients improved symptomatically and functionally. There was minor wound infection in three patients which responded to conservative management. There was no mortality in our series.

DISCUSSION

The third stage of empyema thoracis is characterized by fibrosis and organization of peel over the parietal and visceral pleurae. The peel is very thick and inelastic. The underlying lung become fibrotic and non compliant.^{4,5} If the disease process continues, it further make the lung diseased and stiff which is very difficult to expand.

Tuberculosis is now emerging as a global emergency and it has a high incidence in 3rd world countries. Pakistan is one of those countries where the Tuberculosis burden is very high, especially due to its high incidence in Afghan refugees. Tuberculosis is one of the commonest causes of empyema thoracis.^{6,7} Other causes can be spontaneous pneumothorax, chest trauma, subphrenic abscess, oesophageal perforation and operation involving lung and mediastinum.⁸ Of these, the tuberculous empyema is notorious in the sense that the underlying lung fail to expand postoperatively.⁹ There are also more chances of developing broncho-pleural fistula

TABLE 2
PROCEDURES PERFORMED (n=30)

S.No.	PROCEDURE	NO. OF PATIENTS
1.	Complete Thoracoplasty	20 (66.66%)
2.	Partial Thoracoplasty	05 (16.66%)
3.	Thoracoplasty & Muscle flap over the Broncho pleural fistula	05 (16.66%)

in tuberculous lungs.¹⁰

In our series too, most of the patients whose lungs did not expand postoperatively were tuberculous. Another reason for non-expanding of the lung is a late referral of empyema cases for surgery. The early decortication done to clear the empyema cavity, the better the results would be.^{3,11,12} Of the 260 decortications, 230 were successful mostly because of their timely referral for surgery. The remaining 30 were mostly late referrals which resulted in operation failure. By the time the patient is referred for surgery, the empyema has progressed into fibrothorax and the underlying lung become stiff and fibrotic. Thus the chances of failure of operation increase. This require further surgical procedure in the form of thoracoplasty.^{10,13,14} In our series all patients requiring thoracoplasty had history of the disease for more then 3 months.

Nutritional state of the patient plays a vital role in the postoperative recovery.¹⁵ Well nourished patients will recover earlier with good healing of the wounds and less postoperative complications. Malnourished patients have poor wound healing and are unable to do vigorous chest physiotherapy. In addition, their immunity is also compromised and are liable to infections. As a result, these patients are more likely to have failed decortication.

Good surgical technique and proper selection of suture material also play a part in better surgical out come. After complete removal of the peel, always look for any broncho-pleural fistula. If found, each one has to be individually identified, edges freshened and repaired with monofilament suture and then re enforced with intercostals muscle flap. If the

TABLE 3

AETIOLOGICAL FACTORS CONTRIBUTING TO
FAILED DECORTICATION

(More than one factor was found in one patient)

S. No.	AETIOLOGICAL FACTOR	NO. OF PATIENTS
1.	Poor Nutritional State	30 (100%)
2.	Poor Postoperative Respiratory Effort	26 (86.66%)
3.	Wound infections & infected old drain site	16 (53.33%)
4.	Poor Surgical technique for closure of Bronchopleural Fistula	05 (16.66%)

broncho pleural fistula is not properly closed or an improper early absorbable suture material is used, then there are more chances that the suture will give way and the fistula will recur during the postoperative period.

Different space obliteration procedures are used to obliterate the persistent infected pleural space¹⁶. All the potential space has to be obliterated to achieve satisfactory results. If there is still a space even after release of inferior pulmonary ligament then decision

should be made on table for space obliteration. If sufficient muscle is available then muscle flap is the best option. If not, then full or tailoring thoracoplasty is the best choice. If any residual space is left the problem will recur. Our patients were also so malnourished that myoplasty was not possible. We performed thoracoplasty to let the chest wall sink into the space and obliterate it.

All of our patients improved very well both symptomatically and functionally. Thoracoplasty with or without muscle reinforcement over the broncho-pleural fistulae has also been used by others with good results.^{10,17,18,19}

CONCLUSION

We conclude that treatment delayed is treatment denied. While operating on chronic empyema, when it is noted that the lung is diseased and would not expand, on table decision should be made to do thoracoplasty to avoid the horrible situation of failed decortication. We also recommend that early referral should be made of these patients for surgery to avoid the development of stiff, fibrotic and non-compliant lung and fibrothorax.

REFERENCES

1. Angehillo Mackinlay TA et al. "VATs debroidement versus thoracotomy in the treatment of loculated post-pneumonia empyema". *Ann Thorac Surg* 61: 1996: 1626.
2. Rzyman W, Shokowski J, Romanowicz G, Leso P, Murawski M et al. "Lung function in patients operated for pleural empyema". *Thorac Cardiovasc Surg* 53(4): 2006: 245 - 9.
3. Thomas W Shields, Joseph Locicero, Ronald B, Ponn (ed). *General Thoracic Surgery* 5th Ed. 2000, Lippin Cott. Williams and Wilkins.
4. Hanagiri T. Chronic expanding hematoma in the chest. *Ann Thorac Surg*. 1997, 64: 559.
5. Horowitz M D. Late complications of plombage. *Ann Thorac Surg*. 1992, 53:803.
6. Polianski VK. Tuberculous pleural empyema: surgical aspects. PMID: 12164118.
7. Bai KJ, Wu IH, Yu MC et al. Tuberculous empyema. *Respirology*. 1998; 3(4): 261-6.
8. Choi SS, Kim DJ, Kim KD, Chung KY. Change in pulmonary function following empyemectomy and decortication in tuberculosis and non-tuberculous chronic empyema thoracis. *Yonsei Med J*. 2004 Aug 31; 45(4): 643 -8.
9. Temes RT, Fallis F, Kessler RM, Pett SB et al. Intrapleural fibrolytics in the management of empyema thoracis. *Chest*. 1996 July; 110(1): 102 - 6.
10. Horrigan TP, Snow NJ. Thoracoplasty: current application to the infected pleural space. *Ann Thorac Surg* 1990 Nov; 50(5): 695 - 9.
11. Arthur E, Bave (ed.). *Glenn's Thoracic & Cardiovascular Surgery* 6th Ed. 1996, Practice - Hall International Inc.
12. Stre'tsov VP, Skorniakov VV. Pleurectomy and decortication in chronic tuberculous pleuritis and pleural empyema. PMID: 11858088.
13. Bauer HG, Probst G, Baver E, Vogt-Moykopf I. Results and complications of

- treatment of acute and chronic pleural empyema – a retrospective analysis of the last 5 years. PMID: 2577548.
14. Luchi K, Mori T, Nanjo S, Ikeda M et al. The role of surgery for chronic empyema of the advanced ages. PMID: 9038014.
 15. RCG Russell, Norman SW, Christopher JKB (ed.) – Bailey and Love's short practice of surgery. 24th Ed., 2000; Arnold, Hodder Headline Group.
 16. Stamatis G, Goebel R, Koneitzko N, Greschuchna D. The current role of thoracoplasty in treatment of chronic pleural empyema. PMID: 1475265.
 17. Dewan RK, Singh S, Kumar A. Thoracoplasty an absolute procedure? Indian J. Chest Dis Allied Sci 1990.
 18. Phillip PI Card, Jen Phillips Andrew. Thoracoplasty in post pneumonectomy empyema, experience of 23 cases. Ann Thorac Surg 1999; 68: 1159.
 19. A Jaretzki. Role of thoracoplasty on the treatment of chronic empyema. Ann Thorac Surg 1999; 52: 824.