

Quadrangular Eloesser Flap Technique an Innovative Controlled Open Thoracoplasty for Chronic Organised Empyema and its Outcome

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Abstract: *Empyema thoracis is a purulent pleural effusion. The rib resection and open drainage is an option for the treatment of chronic empyema thoracis in late stage, particularly in tubercular empyema where mediastinum fixed and underlying lung fibrosed. From first principles, pus anywhere requires drainage and this applies equally to pleural space pus. Since these patients are often unfit for procedures like decortication or the underlying lung is often unhealthy and will fail to expand, open drainage provides a safe and suitable option for the treatment of this pathology. We present the successful management of patients by this approach as well as the review of literature in this respect.*

Keywords: Chronic empyema, open drainage, pneumothorax, Eloesser flap

1. Introduction

Chronic empyema is commonest disease, which pulmonologist and thoracic surgeon come across in developing countries. Empyema thoracis is defined as pus in the pleural space or a [1] purulent pleural effusion. Empyema is divided into three stages (phases), Stage I (acute exudative phase), Stage II (subacute fibrinopurulent phase), and Stage III (chronic organizing [2, 3] phase). Chronic empyema is caused by pyogenic infection or tuberculosis. Rarely post [4] traumatic chest infection and malignant pleural effusion can progress in to empyema. The empyema requires multi-modality treatment, promptly at appropriate time to reduce [5] morbidity and mortality. The goal of empyema treatment is remains standard, control the [6, 7] infection, drain the pus and assist for the lung expansion. Chronic empyema does not respond to monotherapy. Type of treatment depends on status of underlying lung and stage of [8] empyema. Majority of pyogenic organised chronic empyema with matured cortex on visceral pleura can be treated successfully by Decortication. It is the primary modality of management. Earlier is [9] the intervention better the outcome and lung expansion. The Anti-tuberculosis drug alone never extenuates the complications of pulmonary tuberculosis, more so in tubercular organised empyema. It requires the multi-modality therapy in organised tubercular empyema but [11, 12] more complex and controversy exist regarding timing and technique of treatment. Tubercular organised empyema is associated with non elastic and sometimes calcified cortex and underlying lung plastered to mediastinum. Chronic empyema associated with fibrosis or multiple fibrocavitary lesions in the lung, huge and multiple bronchopleural fistula lead to unsuccessful treatment with intercostal drainage tube insertion and decortication. In the Preantibiotic and pre antitubercular drugs era, empyema was debilitating disease with an immense morbidity and mortality. The surgery was in front role to alleviate symptoms. It was usual to do open drainage or thoracoplasty

in early 19th century. It was Dr Leo Eloesser popularised technique of open drainage, with unique tongue like unidirectional flap, now known as Eloesser flap technique. The Eloesser flap, modified later by number of surgeons to simplify the technique to use it in all spectrums of empyema patients. The commonest indication of

Eloesser Flap and its modification were, Para pneumonic and post lung [13]resection empyema. The improved clinical and investigative knowledge lead to early diagnosis of empyema. An antibiotic, anti tubercular drugs reduced morbidity and mortality due to empyema. In developing world, there is high prevalence of pulmonary tuberculosis and its complications. Chronic tubercular empyema is common to see and most difficult to treat. In such cases regularly, rib resection and open drainage, modified Eloesser flap surgeries done. Both techniques have great role in alleviating morbidity and mortality due to organised chronic empyema particularly in tubercular empyema.

2. Case Study

A 40 year young hindu male patient was asymptomatic before 8 months than he develops pulmonary tuberculosis for which he was started AKT. he presented with left sided pleuritic chest pain which increase on deep breathing or coughing and breathlessness. The chest x-ray findings showed left sided hydropneumothorax for which ICD tube was inserted, Since than continuous seropurulent discharge present in ICD bag. When he presented to us, he already was on antituberculosis chemotherapy for 8 months with some improvement in his clinical symptoms. Examination revealed a young man chronically ill looking afebrile, anicteric, acyanosed and vitally stable. The left anterior chest wall was depressed at the apex and there was significantly reduced excursion on the left chest. The percussion note was dull and the breath sound was minimal. The right chest was essentially normal as well as other systemic examinations. A diagnosis of left chronic empyema thoracic secondary to

Volume 8 Issue 12, December 2019

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pulmonary tuberculosis was made. He had a chest X-ray [Figure 1], which showed marked reduced left lung volume with trapped left lung and ICD in situ, crowded ribs on the left side and an air-liquid level suggestive of chronic empyema thoracis. His Hb was 12.0, TLC was 6800 and platelet count was 284000, the serum electrolyte and RFT was normal and he was retroviral negative. The pus microscopy and culture was sterile. The finding at surgery included a thickened parietal peel (outer empyema membrane) of 2 cm, 200 ml of offensive and very thick pus and a left lung trapped beneath a dense visceral peel (inner empyema membrane). The histology of the empyema membrane came out as chronic inflammation.



Figure 1

3. Method

Incision taken on most dependent part of empyema cavity and deepened. Underlying minimum 3 ribs, to the length of original skin incision excised, so that at least lower hilum of lung visualised without difficulty. The parietal pleura excised, beyond the cut rib edge (Figure 2,3). If hilum is not seen, upper one or more rib excised. Lung and parietal pleural surface currated, pus with muck evacuated. The Skin Bridge divided in two equal parts and made medial and lateral flaps (Figure 4,5). The superior and inferior Skin flaps elevate like tongue of classical Eloesser flap, after appropriate 3 to 4cm long skin incisions. Skin inverted and sutured to cut edges of parietal pleura using no 1 vicryl on respective side. Hinge of edge on all four sides formed exclusively by skin, which is inverted inside the cavity (Figure 6). The Cavity washed and packed with Betadine soaked roller bandage. All patients were extubated on the table. Pleura and pus sent for HPE and AFB staining, respectively. All patients put on appropriate antibiotics for 5 days. The confirmed tubercular [16] empyema patients, ATT drugs continued as per revised national TB program protocol. Day one, after the surgery, roller bandage packs removed and cavity irrigated with 500 ml saline twice a day for five days and once a day after that. Patient attenders were taught to irrigate cavity and technique of dressing under aseptic precaution. Patient were Instructed to do it regularly at their home after discharge.

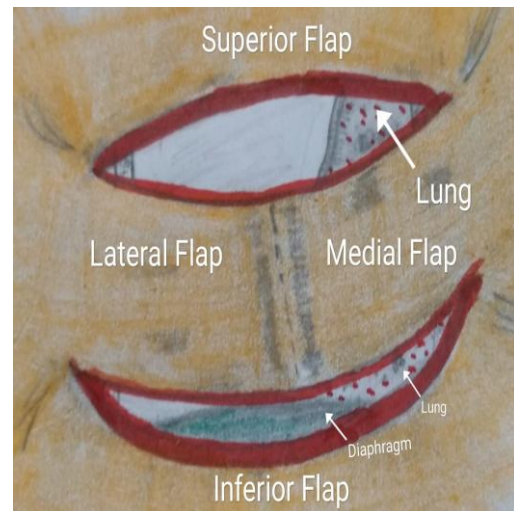


Figure 2



Figure 3

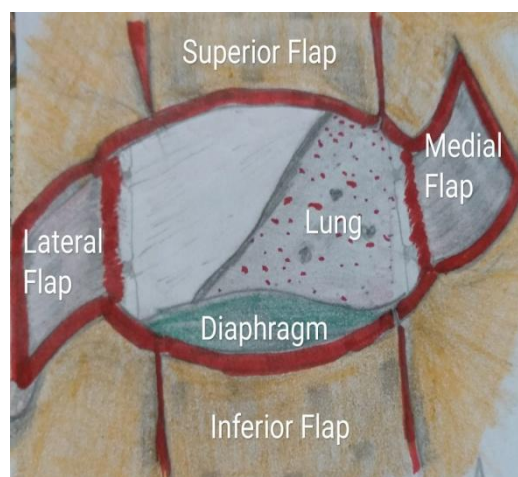


Figure 4

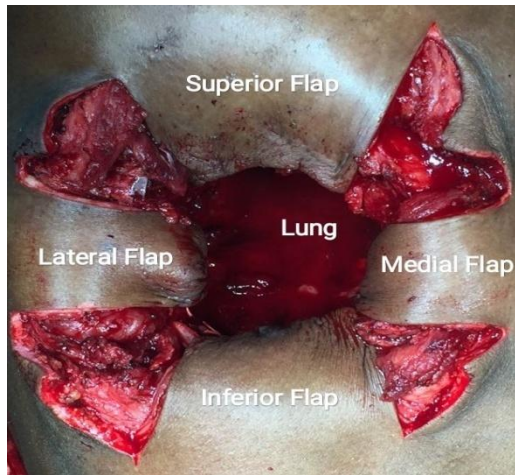


Figure 5

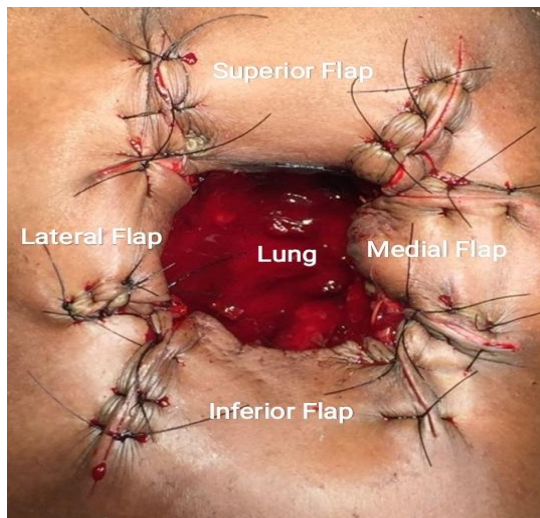


Figure 6



Figure 7

4. Discussion

In 1935 Leo Eloesser I described a superiorly based U-shaped flap for the permanent drainage of chronic tuberculous empyemas. In 1963, Clagett and GeraJ reported the use of permanent drainage in postpneumonectomy empyemas. They described a procedure where, after repeated irrigations, once the empyema cavity was lined by

clean granulations and three consecutive cultures were negative, the cavity could be filled with antibiotic solution and the open pleural window closed. They reported initial success in three patients. Subsequently, others such as Dorman et al and Takaro et al have also reported the successful use of this procedure in postpneumonectomy patients and those with chronic empyemas. Nowadays, while complications of pulmonary tuberculosis are infrequently seen in the West, they continue to be a scourge for the Third World countries due to hostile socioeconomic conditions. We have found the need for prolonged drainage primarily in the tuberculous patient group. The reasons for choosing a permanent drainage procedure as opposed to tube thoracostomy included anticipated prolonged drainage, noncompliant patients. The solution chosen by us for irrigating the empyema cavity was dilute povidone iodine because of its easy availability. Several advantages of a permanent pleurocutaneous fistula have been identified. It is a relatively minor operation well-tolerated even by cachectic, toxic patients. It controls local infection and allows time for re-expansion of tuberculous lungs. A permanent opening is well tolerated and closes on its own over a period of 6 months to one year. Permanent pleurocutaneous fistula using the modified Eloesser flap technique has served as a very useful procedure in selective pyogenic and all tubercular empyema pt.

Make sure mediastinum is fixed before contemplating the procedure.

5. Conclusion

Chronic pyogenic or tubercular organised empyema with evidence of fixed mediastinum promptly and optimally treated by the technique of rib resection and open drainage. Open drainage is the technique of choice in chronic organised empyema irrespective of whether the patient is on ATT or not with BPF and fibrocavitary lesion in lungs. The quadrangular eloesser flap technique (QEFT) modified over a period to overcome the shortfall of classical rib resection and open drainage. It serves all the principles of treatment for chronic organised empyema. It should be the primary modality of treatment for chronic organised empyema irrespective of the cause. The QEFT has the edge over other open drainage techniques, in early control of sepsis, ease of irrigating thoracic cavity, promptly ambulates the patient and allows early chance to go back to work to earn his livelihood. It has least chance of premature fistula closure, so avoids reempyema and redo surgeries. QEFT eventually prevents recurrent sepsis, morbidity and mortality so better quality of life.

Open drainage with modified Eloesser flap for empyema is an option for the management of chronic empyema patients who are too sick to withstand decortication and whose residual lung is so diseased that it is not expected to re-expand by whatever means. This is particularly true in our environment where patients present late either due to poverty and ignorance or are poorly managed by inexperienced physicians. Pneumothorax is not a complication following this procedure because the chest wall and the mediastinum have been stabilized against atmospheric pressure by the thick empyema membrane.

References

- [1] Light RW. Parapneumonic effusions and empyema. *Proc Am Thorac Soc.* 2006; 3:75-80.
- [2] Molnar TF. Current surgical treatment of thoracic empyema in adults. *Eur J Cardiothorac Surg.* 2007; 32:422-30.
- [3] Andrews N. Management of nontuberculous empyema: A statement the subcommittee on surgery. *Am Rev Respir Dis.* 1962; 85:935-6. J1
- [4] George P Muller. Etiology of chronic empyema. *The American Journal of Surgery.* 1941; 54(1):35-38
- [5] Thourani VH, Lancaster RT, Mansour KA, et al. Twenty-six years of experience with the modified Eloesser flap. *Ann Thorac Surg* 2003; 76:401-406.1
- [6] LeMense GP, Strange C, Sahn SA. Empyema thoracis (therapeutic management and outcome). *Chest* 1995; 10:1532-1537.
- [7] Hayes SW. Tuberculous Empyema. *Diseases of the chest* 1937; 3(1): 15-17. 8. Thurer RJ. Decortication in Thoracic Empyema, Indications and Surgical Technique. *Chest Surg Clin N Am* 1996; 6:461-490.
- [8] Yim AP. The role of video-assisted thoracoscopic surgery in the management of pulmonary tuberculosis. *Chest.* 1996; 110(3):829-32.
- [9] Prakash B, Khare P, Bhatnagar AK. Tuberculous empyema thoracis: clinical, bacteriological features and its medical management. *Int J Sci Study.* 2015; 3(6):120-5.
- [10] Thourani VH, Brady KM, Mansour KA, Miller JI, Lee RB. Evaluation of treatment modalities for thoracic empyema (a cost-effective analysis). *Ann Thorac surg* 1998; 66: 1121-1127.
- [11] Miller JI. The history of surgery of empyema, thoracoplasty, Eloesser flap, and muscle flap transposition. *Chest Surg Clin N Am* 2000; 10: 45-53.
- [12] Denlinger, Chadrick E. Eloesser Flap Thoracostomy Window. *Operative Techniques in Thoracic and Cardiovascular Surgery* 2010; 15(1): 61-69.
- [13] Locicero J. Benign and malignant disorders of the pleura. In: Baue AE, Geha AS, Hammond GL, Laks H, Naunheim KS, th ed., editors. *Glenn's Thoracic and Cardiovascular Surgery.* 6Vol. 1. Stanford, Connecticut: Appleton & Lange; 1996. p. 537-55.
- [14] Aderele WI. Pleural effusion, pneumothorax and bronchiectasis. In: Azubuike JC, Nkanginieme KE, editors. *Pediatrics and Child Health in a Tropical Region.* Owerri: African Educational Services; 1999. p. 246-53.
- [15] Central TB Division (India). Revised National Tuberculosis Control Programme. Training Course for Program Manager (Modules 1-4); April, 2011.
- [16] Satish HS, Rashmi TM, Mithun B, Narmada MG. Sushutra's method not Hilton's Method. *Journal of Ayurveda Physicians and Surgeons* 2017; 4(3):52-54.