

## ORIGINAL ARTICLE

## OPEN WINDOW THORACOSTOMY, STILL AN OPTION IN THE MANAGEMENT OF CHRONIC EMPYEMA: EXPERIENCE FROM AYDER REFERRAL HOSPITAL

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### ABSTRACT

**Objective:** Chronic empyema is a serious problem and is often difficult to manage. Its incidence has dropped worldwide, but continues to pose health problems in low and middle income countries. This study has been conducted to assess the outcome of open thoracic window in patients with neglected chronic thoracic empyema in Ethiopian patients.

**Methods:** A six-year (June 2008 to October 2014) retrospective study was conducted on thirty five patients (ten females and twenty five males, age ranging from 30-70 years). Open window thoracostomy was performed on these patients for chronic empyema with residual lung tissue and with or without bronchopleural fistula who failed to respond to the conventional methods of treatment.

**Results:** The etiology was primary empyema in 16 patients, post-traumatic in 12 patients, and post-thoracotomy in seven patients. Spontaneous closure was achieved in 12 patients; simple closure was done on 18 patients; and closure with muscle flap in five patients. In all patients, the cavity cleared from secretions in two to three weeks and the residual space narrowed in seven to nine months. All patients gained weight following the surgery.

**Conclusion:** Our result has revealed that open thoracic window is still an alternative method for the treatment of chronic empyema when the conventional method of treatment fails.

**Key words;** Chronic Empyema, Open window thoracostomy, Bronchopleural fistula

### INTRODUCTION

Thoracic empyema is one of the first recognized thoracic pathological entities that had posed a therapeutic challenge.(1) Despite improved antimicrobial therapy for the treatment of pulmonary infections, thoracic empyema continues to be a serious problem especially in the developing world. Limited number of qualified health professionals and poor referral systems are factors that contribute to poor outcomes among patients with chronic thoracic empyema. There are many therapeutic procedures employed, including tube thoracostomy and suction drainage, intrapleural debridement using fibrinolytic agents, empyemectomy and decortications with or without resection; when these procedures fail the optimal management remains controversial.(2-5)

Since Eloesser described an operation for open drainage of tuberculous empyema in 1935, several investigators have reported that open window thoracostomy is beneficial for patients with chronic thoracic empyema with or without a bronchopleural fistula that fails to respond to the conventional therapy. This method is also a safe procedure and recommended for all patients who cannot tolerate a more extensive procedure. (2,5,6)

We conducted to assess the outcome of open thoracic window in patients with neglected chronic thoracic empyema as there is no systematically collated and reported data in our setting.

### MATERIALS AND METHODS

This was cross-sectional study based on data collected from clinical records of thirty-five patients from different parts of Tigray, Northern Amhara and Afar

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regions who underwent open window thoracostomy in Ayder Referral Hospital in Mekele, Tigray between June 2008 and October 2014. 25 patients were referred from other hospitals, while 10 were self-referrals following unsuccessful therapy with antibiotics, anti-tuberculosis drugs and repeated tube thoracostomy. The diagnosis of empyema and bronchopleural fistula was confirmed based on thoracic roentgenograms and computerized tomography prior to the intervention. Open window thoracostomy was performed which involved resection of two to three ribs at the appropriate site, incision along the course of the ribs 10-15 cm in length, and development of upper and lower flaps and suturing them to the thick parietal pleura. The window was on the right side in twenty patients and left side in 15 patients.

## RESULTS

The median age of the patients of the 35 patients whose clinical charts were retrieved and analyzed was 50 years. Their age ranged from 30 to 70 years. Twenty five of the patients were men and ten were women. In 16 patients the empyema was primary, in 12 patients post-traumatic and in seven patients post-thoracotomy done for different indications (Table 1).

After the open window thoracostomy, spontaneous closure of the wound was achieved in 12 patients, simple closure was possible in 18 patients, and closure with muscle flap in five patients, and the muscle flap used was latissimusdorsi in all of five patients (Table 2).

Table 1: Causes of Empyema in patients treated with Open Window Thoracostomy at Ayder Referral Hospital from June 2008 to October 2014.

Causes	Number of patients	Percent
Primary empyema	16	45.8
Post traumatic	12	34.2
Post thoracotomy	7	20
Total	35	100

Table 2: Methods of chest closure in patients treated with Open Window Thoracostomy at Ayder Referral Hospital from June 2008 to October 2014.

Methods of closure	Number of patients	Percent
Spontaneous closure	12	34.3
Simple closure	18	51.4
Closure with muscle flap	5	14.3

All patients ceased producing foul-smelling sputum in the first week following the procedure, the cavities cleared of secretions in two to three weeks and became narrow in seven to nine months. All patients gained weight during their stay in hospital following the surgery.

The median hospital stay was three weeks and the average period of follow up for all patients was one to three years. They received wound care at the nearby health institution. Examples that show healing following open window thoracostomy are given in Figure 1-4 below.



Figure 1: Six months after open thoracic window



Fig 2: Nine months after open thoracic window



Figure 3: Simple closure after three months



Figure 4: Spontaneous closure after 6 months

## DISCUSSION

Our study has documented that gender, age, and etiology of the empyema do not influence the outcome of open window thoracostomy and that the presence of bronchopleural fistula prolongs the time of closure. There was no death in our series but recurrence of empyema occurred in three patients. These patients were treated by open window thoracostomy and spontaneous closure was achieved after three to four months. (2,3)

Because of wide cavity in almost all patients in our series a different flap from that used by Eloesser or the modified Eloesser's flap was used. This procedure

was applied after identifying the lower portion of the empyema cavity based on radiological evidence for proper cavity care. In most of the cases one rib above and one rib below the cavity were resected except for few where additional third rib was resected. As also suggested by others, (3) both upper and lower flaps were fixed to the parietal pleura to avoid premature closure.

Clagette's procedure which consists of open pleural drainage, serial operative debridement and eventual chest closure after filling the cavity with two liters of debridement antibiotic solution has been reported to be a successful procedure. (4,7) This procedure was

not employed in our case because of the unavailability of appropriate antibiotic solution as well as presence of bronchopleural fistula in ten of the thirty five patients.

The decision regarding the optimum time for closure of the open window thoracostomy and eliminate the empyema space and the bronchopleural fistula should be individualized. The septic state, general condition of the patient and thoracic muscular condition should be taken into account before closure is considered in order to avoid recurrence. There are reports of recommended average interval of 160 days between window formation and closure and others recommend 90 days for primary empyema following a non-malignant disease and one year for those arising from pulmonary resections for a malignant disease.(3)

These days thoracoplasty has been replaced by open window thoracostomy because of associated pain, high mortality, esthetics (rib cage deformity and scoliosis) and functional damage due to secondary respiratory restrictions. Intrathoracic transposition of pedicle omental flap has advantage of preserving the respiratory and esthetic functions over other extra thoracic muscle flaps. The procedure was not used in our cases to avoid contamination of the peritoneum and because the diaphragm itself was involved in the chronic inflammatory process.

**Conclusion:** Thoracic empyema is a progressive disease and is associated with high morbidity and mortality if not treated adequately and the treatment is not given well in time. Though it can lead to prolonged hospital stay, open window thoracostomy remains an alternative, safe and effective method for the treatment of chronic empyema when the conventional methods fail. It is highly recommended for all patients who cannot tolerate a more extensive surgical procedure.

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