

## Pleurostomy for Persistent Tuberculous Empyema with Broncho Pleural Fistula: A Case Report From the Festoc Center in Bamako

Diarra BI<sup>1</sup>, Doumbia M<sup>1</sup>, Keita F<sup>5</sup>, Sidibé A<sup>1</sup>, Coulibaly B<sup>1</sup>, Daffe S<sup>2</sup>, Doucouré O<sup>1</sup>, Coulibaly B M<sup>1</sup>, Cissé M<sup>1</sup>, Traoré K<sup>1</sup>, Traoré S<sup>1</sup>, Diallo B<sup>1</sup>, Koita S S<sup>1-3</sup>, Keita S<sup>3</sup>, Togola B<sup>3</sup>, Togo S<sup>3,4</sup>, Ouattara M A<sup>3,4</sup> and Yena S<sup>3,4</sup>

<sup>1</sup>Thoracic and Cardio-Vascular Surgery Department (Andre Festoc center; bamako).

<sup>2</sup>Cardiology Department of the "Luxembourg" Mother-Child Hospital in Bamako, Mali.

<sup>3</sup>Faculty of Medicine and Odontostomatology, University of Technical Sciences and Technologies of Bamako; Mali.

<sup>4</sup>Thoracic Surgery Department « hopital du mali ».

<sup>5</sup>Kati Military Polyclinic.

### \*Correspondence:

Dr. Baba Ibrahima DIARRA, Cardio-Vascular and Thoracic Surgeon.

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### ABSTRACT

Thoracic empyema (TE) is a pyogenic infection of a previously sterile pleural cavity characterized by an accumulation of pus [1]. Its tuberculous form is the most frequent and represents a late and serious complication of tuberculous pulmonary infection [1]. We report the case of a 30-year-old patient who had been followed up since 2021 in a country of the sub-region for bifocal tuberculosis (pulmonary and pleural). Her symptoms were nocturnal fever with sweating, rest dyspnea and basithoracic pain. This was associated with a productive cough bringing up yellowish sputum, and weight loss. She had been on anti-tuberculosis treatment for six months and underwent left pleural drainage, which returned frank pus. The thoracic CT scan showed a large left hydropneumothorax with homolateral pulmonary collapse. She underwent a second left thoracic drainage, which initially yielded 2 liters of frank pus and air.

The postoperative period was marked by persistent drain production in excess of 200ml/24h and the presence of a broncho pleural fistula. A left pleurostomy was recommended and performed. Cytobacteriological examination of the fluid carried out 1 month after pleurostomy isolated *Pseudomonas Aeruginosa* (B. pyocyaneus) and *Klebsiella pneumoniae*. The evolution was favorable, with disappearance of the pleural effusion and progressive spontaneous closure of the pleurostomy cavity. Thoracoplasty with closure of the pleurostomy orifice was not necessary.

### Keywords

Pleurostomy, Empyema, Broncho pleural fistula, Tuberculosis, Festoc Center.

### Introduction

Thoracic empyema (TE) is a pyogenic infection of a previously sterile pleural cavity, characterized by an accumulation of pus [2]. Pneumonia and thoracic trauma are the usual causes in developed countries, while tuberculosis is the main cause in

developing countries [3]. Tuberculosis is the most common form of the disease, and is a late and serious complication of pulmonary tuberculosis infection [1]. Diagnosis can be made by acid-fast bacilli (AFB) smear and gene expert analysis of sputum or pleural fluid. Management is based on correct anti-tuberculosis treatment and thoracic drainage. A wide variety of surgical interventions, notably open-window thoracostomy (pleurostomy), have been proposed by authors in certain cases of persistent empyema associated with a broncho pleural fistula.

The aim of our study is to report a case of pleurostomy for persistent tuberculous empyema with broncho pleural fistula.

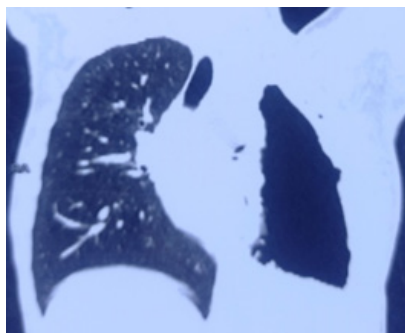
### Case Report

This is a 30-year-old female patient with no particular history who had been followed up since 2021 in a country in the subregion for bacteriologically confirmed bifocal tuberculosis (pulmonary and pleural). Symptoms included nocturnal fever with sweating, dyspnea at rest and point-side pain. This was associated with a productive cough producing yellowish sputum, and a weight loss that was not quantified. She had been receiving anti-tuberculosis treatment for six months and underwent left pleural drainage, which returned frank pus. Cytobacteriological and chemical examination was in favor of a predominantly lymphocytic exudate. The evolution was marked by a recurrence one year later. On admission, the general examination revealed an altered general condition and a body mass index of around 17 kg/m<sup>2</sup>.

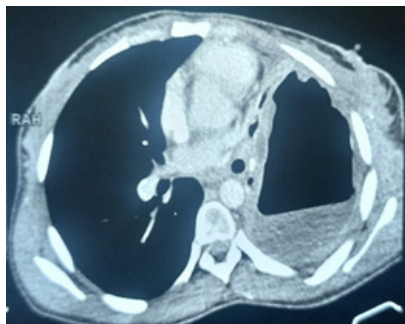
Pleuropulmonary examination revealed: thoracic asymmetry with deformation of the left hemithorax, dullness at the left pulmonary base, abolition of vesicular murmur and vocal vibration. The rest of the physical examination was unremarkable.

The thoracic CT scan showed a large left hydropneumothorax with homolateral lung collapse (figure 1,2).

Biological tests showed normocytic normochromic anemia. She underwent left thoracic drainage, which initially yielded 2 liters of frank pus and air.



**Figure 1:** (CT thoracic frontal section parenchymal window): mixed effusion with pulmonary collapse



**Figure 2 :** (CT thoracic horizontal section mediastinal window): mixed effusion



**Figure 3:** (chest x-ray): left hydro pneumothorax with drain in place and homolateral collapse

Final treatment: 25 days after drainage

The evolution was marked by persistent drain production and the presence of a broncho pleural fistula. A left pleurostomy was recommended and performed (Figure 4,5).



**Figure 4:** Orifice de pleurostomie.



**Figure 5:** bag in place.

Cytobacteriological examination of the fluid one month after pleurostomy isolated *Pseudomonas Aeruginosa* (B. pyocyannique); *Klebsiella pneumoniae*.

The directed antibiogram was:

- Cefotaxime (21 days) followed by Amoxicilin-clavulanic acid
- Amikacin (05 days)

Chest X-ray 73 days later showed a detorgated cavity (Figure 6):



**Figure 6:** (chest x-ray): a left pneumothorax with a decrease in volume after pleurostomy.

The evolution was favourable, with apyrexia and improvement of biological and clinical inflammatory symptoms.

Pleural effusion disappeared, and spontaneous progressive closure of the pleurostomy orifice was observed (Figure 7,8).

A series of bacteriological tests carried out on the drainage fluid revealed the same germs.



**Figure 7:** Pleurostomy orifice after 1 month



**Figure 8:** Pleurostomy orifice after 2 months

Thoracoplasty was not necessary.

The sputum gene expert returned with traces of BK, requiring reintroduction of anti-tuberculosis treatment for 1 year.

## Discussion

Thoracic empyema is divided into three stages: stage I is an acute exudative phase lasting one to two weeks; stage II is a sub-acute fibro-purulent phase lasting two to four weeks, and stage III is the chronic organizational phase otherwise known as chronic thoracic empyema lasting four weeks or more [4,5].

Tuberculosis remains the most common form of the disease in developing countries, with high morbidity and mortality rates [1]. Tuberculosis remains a major health problem in Mali, its incidence rate according to the WHO's 2019 annual report [6] was estimated at 53 (35-76) cases per 100,000 inhabitants in 2018, and mortality (all forms, excluding HIV+) estimated at 7.7 (4.6-11) deaths per 100,000 inhabitants. The diagnosis of tuberculous empyema comprises two elements, firstly the diagnosis of tuberculosis and secondly confirmation that the collection is an empyema and not a transudate [7].

In the study by Kundu et al. [8], 29 patients (38.7%) out of 73 with pleural empyema were of tuberculous origin, whereas in the series by Mariano et al. [9], 22 patients out of 40 presented with chronic post-tuberculous empyema with broncho pleural fistula.

Chronic tuberculous pleural empyema (CTE) is the late sequela of pleuropulmonary tuberculosis resulting from rupture of the sub pleural lesion, nodal or hematogenous spread of the primary pulmonary disease to the pleural space [4]. It affects people of all ages and both sexes, but is more common in men [10]. In our case, the patient was a woman.

Diagnosis is based on the patient's history, clinical signs and symptoms, and microscopic and radiological features. Once the diagnosis of tuberculous empyema has been established, management is aimed at two objectives: firstly, infection control using anti-tuberculosis drugs in addition to antimicrobial agents, depending on the culture, and secondly, evacuation of the pus with obliteration of the space created. As soon as the diagnosis of CTE is confirmed, an appropriate drainage procedure must be instituted. Its management depends on the surgical principles proposed by Graham [11]: drainage of the empyema cavity and obliteration of the pleural space. Broncho pleural fistula (BPF) is a relatively rare but potentially fatal complication of tuberculosis, with a mortality rate varying between 18% and 67% [12], although BPF most often manifests itself as a postoperative complication of lung resection, particularly pneumonectomy [13]. In the series by J West [14], 3.6% of patients presenting with tuberculous thoracic empyema had a broncho pleural fistula.

Empyema management depends on the stage. Stages I and II can be managed conservatively with antibiotics and drainage

[15]. On the other hand, in the more advanced stages of fibrosing pleural thickening, evacuation of the pus may require pulmonary decortication by thoracotomy or, in some cases, thoracostomy [16].

Thoracostomy, also known as "Open Windows Thoracostomy" or cutaneous pleurostomy with rib resection, is a technique first described in 1916 by Robinson [15] for non-tuberculous empyema, then in 1935 by Eloesser [17] for tuberculous empyema.

It is indicated in cases of failure of previous techniques in persistent pleural empyema with or without broncho pleural fistula, enabling rapid control of sepsis impossible to achieve by other means [18]. Antony et al. [19] reported a case of malignant pleural effusion successfully treated by open-window thoracostomy after failure of indwelling pleural catheter drainage.

In the series reported by Fadil et al. [20], the indications for pleurostomy were as follows: failure of conventional treatment, failure of drainage and decortication, debilitated patients and post-pneumonectomy empyema with or without broncho pleural fistula. Mariano's series [21] 40 patients with chronic pleural empyema were all treated by open-window thoracostomy, with two patients requiring thoracomyoplasty for closure. Weissberg [22] reports successful open-window thoracostomy in 12 patients with empyema and broncho pleural fistula after failure of conventional treatment. In the Regnard et al. [23] series, 84% of patients with post-lung resection broncho pleural fistulas benefited from open window thoracostomy.

Harmouchi et al. [24] reported a case of chronic calcified pleural empyema in closed thoracic trauma effectively treated by open window thoracostomy after failure of other procedures. The procedure involved resection of the costal arches, the adjoining intercostal spaces and the pachypleuritis adjoining this wall, opposite an empyema pocket. The skin edges opposite the resection are invaginated and sutured to the pleural plane. The parietal opening must be sufficiently wide (resection of around three ribs) and the cutaneous edges well hemmed around the periphery of the orifice to allow pain-free dressing. In Anthony's case [19], three ribs were resected. The site of fenestration depends on the indication, either directly opposite an encysted pleural pocket, or on the lower part of the old thoracotomy, or even in the axilla in the case of pneumonectomy [16].

In the case reported by Harmouchi et al. [24], the procedure was performed in the axillary region, with resection of the middle arch of around 6 to 8 cm from the 5th, 6th and 7th ribs. Deslauriers [25] recommends resecting two to three ribs over 15 cm, as well as the intercostal muscles and intercostal vascular and neural pedicles. Regnard [23] performs parietectomies involving two to four ribs. Weissberg [22] resected 15 to 20 cm of three or four ribs. In the present case, the fenestration site was the axillary region, thus sparing the former drainage site, and two ribs were resected over a length of 05 cm.

The consequences for the quality of life of patients who have benefited from open-window thoracostomy remain unexplored to date. This fenestration may be transient or permanent, depending on comorbidities and local evolution [26]. It was definitive in 10 out of 46 patients in Regnard's series [23].

The time taken to close the wall is not always easy to define, and varies from three weeks to around a year according to Bribiesco [27]. Filling of the wall is usually achieved using the latissimus dorsi muscle, which must not be cut during thoracostomy. For this reason, thoracostomy must be performed on a patient in good general condition, who must be on a high-protein, high-calorie diet after surgery [22]. Closure of the orifice by muscle plasty, as described by Hertzog [28], is often necessary at the end of treatment. Of 40 patients operated on, Regnard [23] noted only one case of spontaneous closure.

In the series by Bellamy and Florin [29], five (5) cases of closure by myoplasty and eight cases of spontaneous closure were reported. In our case, complete closure of the orifice was achieved over a period of six months without recourse to thoracoplasty.

The operative mortality of this technique is less than 10%, and the success rate is over 80% [30]. Mariano et al. recorded one (1) death, i.e. 2.5% [9].

## Conclusion

Tuberculous pleural empyema manifests itself mainly as pyopneumothorax, due to the frequency of associated bronchopulmonary fistulas, making it difficult to achieve good pulmonary re-expansion after surgical treatment.

Open-window pleurostomy or thoracostomy is therefore the surgical technique most widely adopted in our country, as it requires a short operating time, resolves the problem of lack of post-operative pulmonary re-expansion and has a low mortality rate.

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