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Case Report

Protracted tuberculous empyema necessitans following intercostal drainage tube insertion

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ABSTRACT

Empyema necessitans (EN) is a rare long-term sequela of poorly or untreated empyema thoracis, characterized by the dissection of pus through the soft tissues and skin of the chest wall, ultimately forming a fistula between skin and pleural cavity. We herein present a male patient in his late 30s, a known case of tuberculosis (TB) on anti-tubercular therapy (ATT) under directly observed treatment short-course (DOTS), who recently came with complaints of backache for 3 days. Chest X-ray showed a massive pleural effusion, in view of which an intercostal drainage tube (ICD) was inserted and 1.5 L of pleural fluid was drained. An ultrasound (USG) back done revealed subcutaneous collection with communication to pleural space, which resolved after pleural fluid drainage. As there was a persistent communication between pleural space and right-sided subcutaneous plane with a massive effusion i.e., EN, he was advised to undergo thoracotomy with decortication and resection of communication which he underwent successfully. This case is presented for its rarity with atypical presentation.

Keywords: EN, Pleural effusion, TB, ICD

INTRODUCTION

Empyema necessitans (EN) is a rare long-term sequela of poorly or untreated empyema thoracis, characterized by the dissection of pus through the soft tissues and skin of the chest wall. The pus collection bursts and communicates with the exterior, forming a fistula between the pleural cavity and the skin.

The anterior chest wall between the mid-clavicular and anterior axillary line and between the second and sixth intercostal spaces is the commonest site to develop EN.[1]

Confirming the diagnosis of a tuberculous infection is difficult because of the paucibacillary nature of the lesion.[2,3]

Treatment poses an additional challenge due to the inability of anti-tubercular agents to reach the pathological site. The chances of developing it should be considered in immunocompromised patients, chronic renal failure patients, or anyone who has an ICD tube insertion, as it can pave the way for the bacterium.

Successful management of empyema continues to be cumbersome and recurrent episodes are associated with high mortality rates.

Rapid recognition of the development of empyema is crucial to successful treatment; even with appropriate therapeutic attempts, the mortality of patients with empyema is 15-20%, and higher in immunocompromised patients.[4-6]

CASE REPORT

The patient, a known case of pleural TB on ATT under DOTS, initially presented to the hospital with right-sided chest heaviness and breathlessness for 3 days. The breathlessness was gradually progressive, exacerbated on

activity, and relieved by rest, MMRC grade 2. There was no history of fever, cough with expectoration, hemoptysis or orthopnoea. The patient had similar complaints 3 months back associated with a weight loss of 30 kg and was admitted to the hospital when the work-up and chest x-ray revealed an accumulation of fluid on the right-sided chest for which an ICD was placed. Gene Xpert of pleural fluid was positive for *Mycobacterium tuberculosis* and hence, ATT was started. When the patient presented again to the hospital, there was tenderness and swelling at the ICD site and at the back. Furthermore, examination revealed supraclavicular lymphadenopathy. Chest expansion, vocal fremitus and air entry were reduced on the right side, with dullness to percussion on the right. ICD scar was visible on the right side. The abdomen was distended. Cardiovascular and neurological examinations were within normal limits. On evaluation with a chest X-ray (Figure 1) and computed tomography (CT) thorax (Figure 2), he was found to have a recurrent massive right-sided encysted pleural collection with complete collapse of the right lung, and a diagnostic tap revealed hemorrhagic fluid with no malignant cells. On culture sensitivity testing, *Enterococcus faecium* was isolated and subsequent management with intravenous antibiotics was started, along with ultrasound-guided pleural fluid drainage of 1200 ml. He returned to baseline health and was discharged with advice to continue ATT as per DOTS.

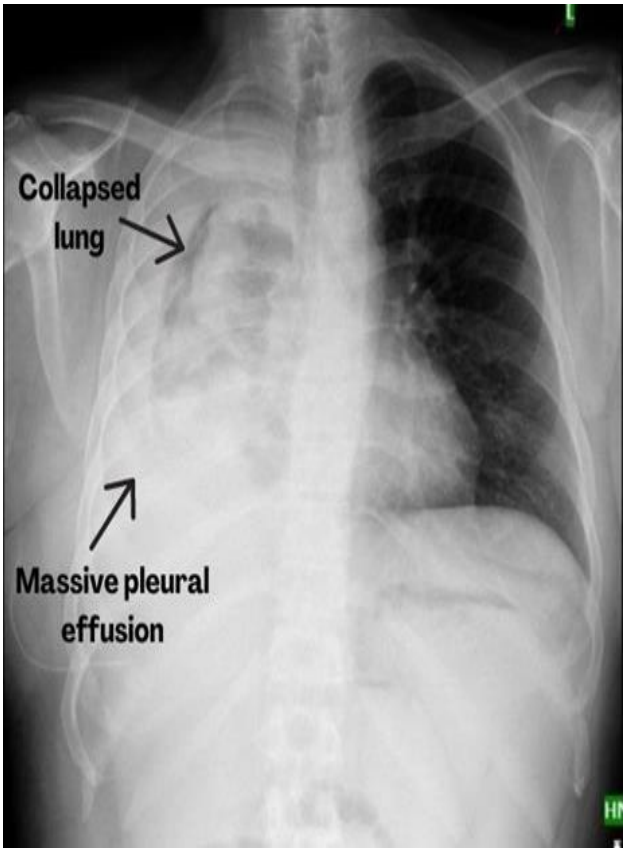

Figure 1: Chest X-Ray showing massive right-sided pleural effusion with complete collapse of the right lung.

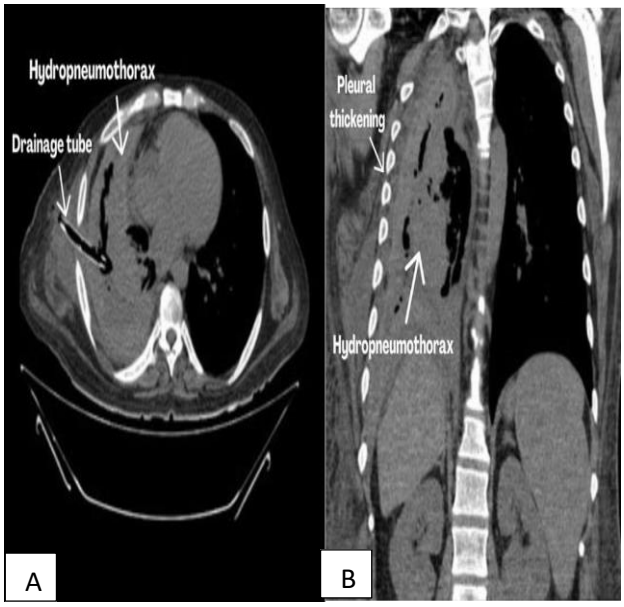

Figure 2 (A and B): CT chest shows right mild hydropneumothorax with diffuse pleural thickening with a maximum thickness of 16 mm extending from the upper lobe to the lower lobe of the right lung causing collapse consolidation of the right lung with interlobular septal thickening noted. Drainage tube noted at the 6th intercostal space in the lateral aspect with adjacent subcutaneous emphysema noted.

One month later, the patient returned to the hospital with complaints of back pain and swelling in the right infra-scapular for 7 days. On admission, vitals were stable. A chest X-ray was done which showed a massive effusion with lung collapse and tracheal shift. Subsequently, a CT thorax was sought which revealed a thickened enhancing pleura, enlarged pre-tracheal and para-tracheal lymph nodes, and confirmed the above X-ray findings. Ultrasound thorax showed a loculated collection with thick irregular peripheral strands in the right pleural cavity measuring 14×15×13 cm, suggestive of encysted empyema. An ill-defined collection measuring 6.4×3.8 cm was noted in the intra-muscular plane of the lower posterior aspect of the right hemithorax with suspicious communication to the above-mentioned pleural collection. An ICD was inserted for pleural fluid drainage and a repeat CT was done to look for lung expansion, which showed a mild right-sided hydro-pneumothorax and diffuse pleural thickening. ICD was removed on symptomatic recovery. Incentive spirometry and chest physiotherapy were advised along with ATT continuation on discharge.

Two months after, the patient presented to the hospital with complaints of lower back pain for 3 days. The pain was associated with radiation to the upper thoracic and cervical region with an inability to lie down on the right side and back. It was exacerbated on walking and relieved on lying down on the left side. It was also associated with an evening rise of temperature. There was no history of numbness, tingling or weakness of the

extremities. A USG back was done in view of back pain which revealed ill-defined collections in the deep subcutaneous plane in communication with the right pleural effusion. CECT thorax confirmed the same. In view of this, an ICD was inserted and 1.5 L of pleural fluid was drained, post which air entry improved and a repeat X-ray showed tracheal normalization, with full resolution of back pain. As there was a persistent communication between pleural space and right-sided subcutaneous plane with a non-resolving massive effusion i.e., EN, he was advised to undergo thoracotomy with decortication and resection of communication which he underwent successfully and is recovering well. This case is being presented for its complexity of disease with respect to diagnosis, protracted course and management with atypical presentation.

Treatment and follow-up

The patient was started on ATT as per DOTS as soon as he was diagnosed with TB. ICD drainage was done 3 times in view of recurrent pleural effusion as elaborated above. The patient finally underwent thoracotomy with decortication and resection of the tract connecting the skin and pleural cavity in view of EN successfully. The patient is recovering well post the surgical intervention and is being followed up on a monthly outpatient basis without any evidence of relapse up till now.

DISCUSSION

EN is a rare complication of empyema, characterized by the dissection of pus through the soft tissues of the chest wall and eventually through the skin. Although it may sometimes present vaguely with a non-productive cough and pleuritic chest pain, the most commonly observed presentation is an enlarging soft tissue mass present on the chest wall.[7] The diagnosis is made via a computerized tomography scan which demonstrates the pathognomonic finding of a pleural effusion connected to the chest wall mass.[8]

Empyema is usually expected to occur in immunocompromised individuals, which contrasted with our study where the patient had no prior chronic medical illnesses.

The median age at diagnosis of EN is 44.5 years, with a range spanning anywhere from 3 months to 81 years.[8, 9]

Empyema, being a disease of primarily the pre-antibiotic era, has reduced drastically in terms of incidence since the advent of antibiotics.[10] *M. tuberculosis* remains the most common etiologic agent, followed by *Actinomyces* as the second most common cause. Less common organisms include *Enterococcus faecium*, *S. aureus*, *Streptococcus milleri*.[10,11] Interestingly, a prior history of ICD insertion for managing pleural effusion may sometimes facilitate the development of EN by creating a path towards the skin.

Contrary to the non-tuberculous empyema management, tuberculous empyema patients have a poorer outcome, requiring prolonged intercostal tube drainage and complicated surgery. These are consistent with other Indian studies.[12-16]

As a rule of thumb, TB should always be suspected in endemic areas while treating empyema.

Surgical drainage and antimicrobial therapy remain the mainstay of treatment in empyema. As soon as a diagnosis of empyema is made, the patient should be started on a prophylactic antibiotic regime for the possible pathogens, with subsequent alteration to the appropriate anti-microbial once the susceptibility patterns of the cultured organisms are available. It should be noted that routine ATT may fail in pleural TB as antibiotics may fail to reach the pathological site. Recurrent pleural fluid collection is an indication for surgical intervention. Surgery plays a critical role in cavity obliteration and normalization of pulmonary function, with options ranging from tube drainage, open drainage, and decortication.

Even though no fatalities have been documented since the advent of antimicrobial therapy, a few cases of EN are still being reported, necessitating the need for prompt drainage of pleural effusion to prevent simple empyema from progressing and thus, reducing the need for surgery.

CONCLUSION

EN is a disease entity that can contribute to significant morbidity in terms of protracted course of the disease and disabling symptoms and hence, needs to be identified and managed at the earliest. TB as an etiology of empyema should always be suspected, especially in endemic areas and if found positive, should be promptly started on ATT. It is reasonable to note that routine ATT may fail in pleural TB as the medication might fail to reach the pathological site of interest. In such cases of recurrence, timely surgical intervention such as tube drainage, open drainage or decortication should be sought, which helps in pleural cavity obliteration and therefore, prevention of fluid re-accumulation in the pleural cavity and normalization of pulmonary function.

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REFERENCES

1. Moh IH, Lee YK, Kim HJ, Jung HY, Park JH, Ahn HK et al. Empyema necessitatis in a patient on peritoneal dialysis. Tuberculosis Respiratory Dis. 2014;77(2):94-7.
2. Senent C, Betlloch I, Chiner E, Llombart M, Moragón M. Tuberculous empyema necessitatis. A

rare cause of cutaneous abscess in the XXI century. Dermatol J. 2008;14(3):11.
3. Chaiyasate K, Hramiec J. Images in clinical medicine. Tuberculosis empyema necessitatis. N England J Med. 2005;352(9):e8.
4. Davies CW, Kearney SE, Gleeson FV, Davies RJ. Predictors of outcome and long-term survival in patients with pleural infection. American journal of respiratory and critical care medicine, 1996;160(5 Pt 1):1682-7.
5. Ferguson AD, Prescott RJ, Selkon JB, Watson D, Swinburn CR. The clinical course and management of thoracic empyema. QJM. 1996;89(4):285-9.
6. Maskell NA, Davies CW, Nunn AJ, Hedley EL, Gleeson FV, Miller R et al. Multicenter Intrapleural Sepsis Trial (MIST1) Group (2005). U.K. Controlled trial of intrapleural streptokinase for pleural infection. New England J Med. 2005;352(9):865-74.
7. Cesar R. Cutaneous tumefaction in empyema necessitatis. Int J Dermatol. 2008;46:1294-7.
8. Freeman AF, Ben-Ami T, Shulman ST. *Streptococcus pneumoniae* empyema necessitatis. Pediatr Infect Dis J. 2004;23(2):177-9.
9. Moore FO, Berne JD, McGovern TM, Ravishankar S, Slamon NB, Hertzog JH. Empyema necessitatis in an infant: a rare surgical disease. J Pediatr Surg 2006;41(7):e5-7.
10. Tonna I, Conlon CP, Davies RJ. A case of empyema necessitatis. Eur J Internal Med. 2007;18(5):441-2.
11. Stallworth J, Mack E, Ozimek C. Methicillin-resistant Staphylococcus aureus empyema necessitatis in an eight-month-old child. Southern Med J. 2005;98(11):1130-31.
12. Malhotra P, Aggarwal AN, Agarwal R, Ray P, Gupta D, Jindal SK. Clinical characteristics and outcomes of empyema thoracis in 117 patients: a comparative analysis of tuberculous vs. non-tuberculous aetiologies. Respiratory Med. 2007;101(3):423-30.
13. Battu VV, Tewari S, Prasad BN, Nikumb SK. Empyema Thoracis-Study of present day clinical and etiological profile and management techniques. Ann Thorac Med. 1998;1.
14. Goyal SP, Tandon RK, Patney NL, Mishra OP. Management of tubercular empyema thoracis: A review of 53 cases. Ind J Tub. 1976;23:103-9.
15. Acharya PR, Shah KV. Empyema thoracis: a clinical study. Anna Thoracic Med. 2007;2(1):14-7.
16. Sharma TN, Jain NK, Madan A, Sarkar SK, Durlabhji P. Tubercular empyema thoracis: a diagnostic and therapeutic problem. Indian J Chest Diseases Allied sci. 1983;25(2):127-31.

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