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Case Report

Tuberculous empyema necessitans: Case report of a rare occurrence ☆

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ABSTRACT

Empyema necessitans is a rare condition where tuberculosis is the most common cause. It can be found in both immunocompromised and immunocompetent patients, especially in endemic areas. We report a case of a 29-year-old male from North Africa, with an enlarging mass on the right thoracic wall. Imaging, particularly CT showed a cystic lesion in the right chest wall communicating with homolateral pleural effusion, compatible with empyema necessitans. It also showed patterns of pulmonary tuberculosis in the right upper lung. Treatment of empyema necessitans is a combination of medical and surgicaltreatment. Our patient underwent a surgical treatment consisting of flattening of the empyema with a Gene X-pert study of the fluid and the shell, followed by an anti-TB treatment. Anatomopathology confirmed the diagnosis of caseo-follicular tuberculosis.

Introduction

An empyema is a buildup of pus in the pleural space, most commonly associated with pneumonia. Pleural TB (tuberculosis) is the most frequent extrapulmonary tuberculosis presentation and the leading cause of pleural effusion in the world [1].

Empyema necessitans is a clinical entity in which an intrathoracic empyema decompresses by extending itself through the parietal pleura and weakness of the chest wall, forming a collection of pus in the extrathoracic soft tissues [2].

It is a rare presentation of tuberculous infection, commonly encountered in immunocompromised patients [3].

The most commonly observed clinical presentation is an enlarging soft tissue mass on the chest wall. The diagnosis is made via a CT scan, which demonstrates the pathognomonic finding of a pleural effusion connected to the chest wall mass [4].

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Treatment of empyema necessitans is a combination of surgical treatment that consists of flattening of the empyema and removal of all involved tissues, and anti-TB treatment to prevent relapse.

Case report

The patient was a 29-year-old male from North Africa with no particular medical history, complaining of pain and a mass on the right side of the chest.

The symptoms started 3 months before the patient was admitted to our hospital, with the discovery of a thoracic mass over the right pectoral region, which has progressively increased in size, and pleuritic chest pain, which led him to consult in our hospital.

The patient indicated a loss of appetite but no significant loss of weight.

Physical examination

Vital signs were stable. No specific disorders were found in the physical examination of the head and neck, ear, nose, and lymphatic system. Heart sounds were normal.

There was an elliptical anterior thoracic mass of the right hemithorax.

There was no fluctuation in palpation, but there was mild tenderness. There was no rale or decrease in thoracic sound found.

In the chest X-ray, a soft tissue thickness of the right hemithorax was detected. The right costophrenic angle was blunt but without significant fluid. Fibrosis was seen in the right apexes (Fig. 1).

CT scan with and without contrast showed in the right chest wall an 8 × 5 cm-sized peripheral enhancing cystic lesion that enveloped the right 5th and 6th ribs, communicating with homolateral pleural effusion and radiologically compatible with empyema necessitans (Fig. 2).

It also showed rib damage and pleural thickening.

CT also showed patterns of pulmonary tuberculosis at the right upper lobar lung with parenchymal nodules and micronodules of centro-lobular distribution, with retractile apical condensation, attracting pleura and bronchial structures (Fig. 3).

Laboratory tests

CBC and electrolytes were normal; CRP was slightly elevated at 60 mg/L.

The patient underwent a flattening of the empyema followed by a complete resection of the abscess walls, including the involved chest ribs, with an expert gene study of the fluid and the shell. Anatomopathological findings confirmed the diagnosis of caseo-follicular tuberculosis.

After the surgery, the patient was prescribed a 6-month course of anti-TB treatment: A 2-month course of quadruple antituberculosis therapy (Isoniazid, Rifampicin, Ethambutol, and Pyrazinamide), followed by bitherapy (Isoniazid and Rifampicin) for 4 months.

At 6-month follow-up, after completing the medical treatment, our patient had no symptoms and the incision site was fully healed with no sign of relapse. There was no significant impact on our patient's quality of life.

Discussion

Empyema necessitans 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 [4].

The most common etiology of empyema necessitans is Mycobacterium tuberculosis; other differential diagnosis are other infections like Actinomycosis species, *Streptococcus pneumonia, Staphylococcus aureus*, Blastomycosis species, pulmonary aspergilloses, secondary syphilis, and typhoid too have been reported [5,6].

Empyema necessitans have to hold into account, recent travel or residency in an endemic area are some important points for medical history. Noninfectious diseases such as lymphoma and primary lung neoplasm should also be considered [6].

In our case, the patient is originated and living in North Africa which is known to be an endemic area of tuberculosis.

Although, it may sometimes present vaguely with a nonproductive cough and pleuritic chest pain, the most commonly observed presentation is an enlarging soft tissue

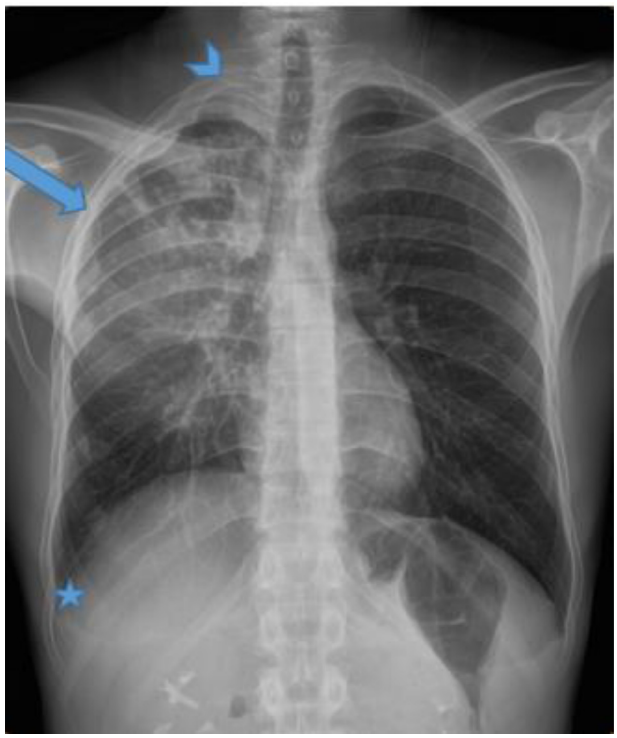

Fig. 1 – *Chest X-Ray:* Soft tissue thickness of the right hémithorax (Arrow). Right costophrenic angle blunt without significant fluid (Asteric). Fibrosis in the right apexes (Arrowhead).

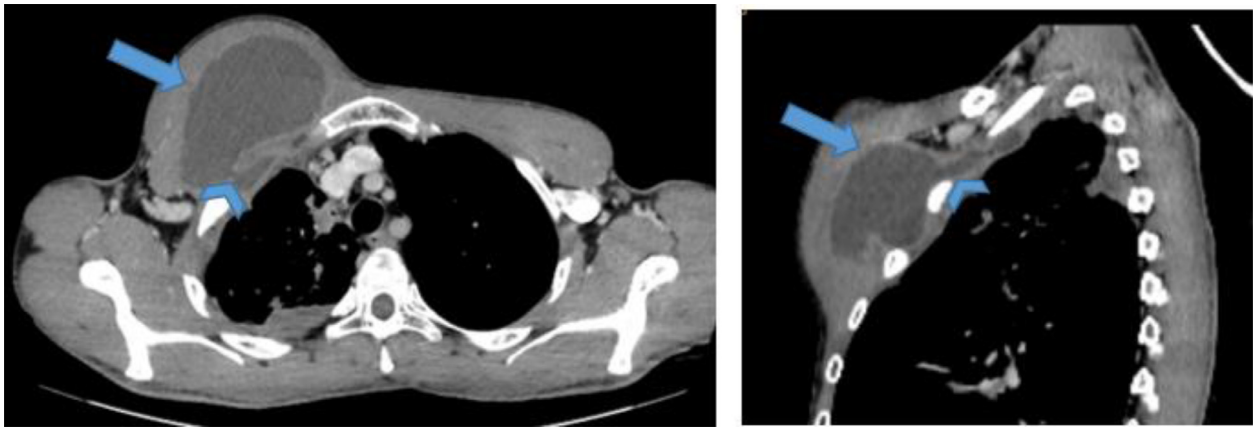

Fig. 2 – *Chest CT:* Right chest parietal cystic lesion (Arrow) communicating with homolateral pleural effusion (Arrowhead).

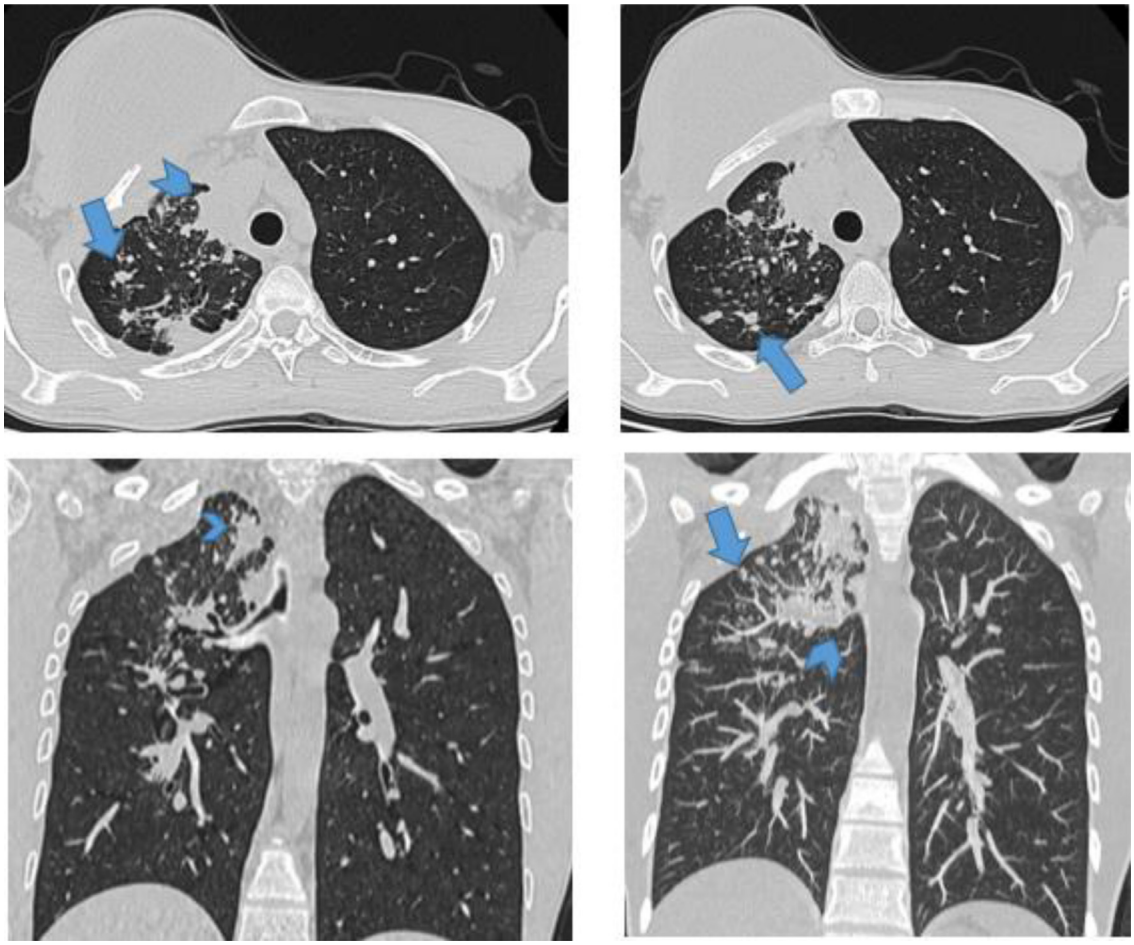

Fig. 3 – Chest CT: Right upper lobar lung parenchymal nodules and micronodules, with centro-lobular distribution (Arrow). Retractile apical condensation, attracting pleura and bronchial structures (Arrowhead).

mass present on the chest wall [4], as in our case where the patient presented with an anterior right chest mass.

The presence of a chest wall mass in a patient from a TB pandemic area should raise clinical suspicion for empyema necessitatis [1].

The most common site is the anterior chest wall between the midclavicular and anterior axillary line and between the second and sixth intercostal spaces. Less commonly, it can involve the bronchus, vertebral column, diaphragm, breast, mediastinum, retroperitoneum, esophagus, pericardium, flank, or groin [5].

Empyema necessitans can be quite harmful. It has the potential to cause bone erosion and soft tissue ulceration. This may be asymptomatic at first and proceed at a slow and steady pace [1]. In our case, the patient had some rib damage.

While chest radiography can suggest the diagnosis, demonstrating a loculated pleural effusion in a patient with a past history of pulmonary tuberculosis presenting with an anterior chest wall mass, the definitive imaging findings are usually seen with CT [8].

On CT, empyema shows enhancement of thickened inner visceral and outer parietal pleura, which are separated by the collection. This is called a split pleura sign. It shows an obtuse margin with lung parenchyma, which is compressed as opposed to a lung abscess which shows an acute angle. Also, empyema shows a lenticular shape and has smooth margins [9].

CT findings in tuberculous empyema include pleural thickening and calcification associated with pleural collection and with or without extrapleural fat proliferation [9].

Contrast-enhanced CT clearly demonstrates the existence of communication between the empyema and a well-delineated chest wall fluid collection with thickened and enhanced walls, representing an abscess [8]. Rib thickening is usually seen [6].

Sonography is a cost-benefit way that can show subcostal necrosis and associated soft tissue abscesses [6].

Molecular biology techniques are essential in tuberculosis pathology. Gene X-pert study is used to confirm the diagnosis and test its sensitivity, particularly in groups at high risk of Multidrug-resistant TB [7].

Diagnosis without surgery is usually difficult because acid-fast bacillus smear and culture, FNA (fine needle aspiration), and PCR have false negative results [6]. Treatment of empyema necessitans is a combination of surgical treatment and medical treatment [6].

Surgery is essential to drain the abscess and eradicate any residual lesions. Many authors, particularly in Asia, propose an aggressive approach with complete resection of the abscess walls, including the involved chest wall, after flattening and debridement to prevent relapse, with filling and coverage if necessary, by local muscle plasty (pectoralis major, dorsalis major, serratus major, etc.) or reconstruction using costernal arches or implants [10].

Surgery's mortality rate is about 5% [6].

All this is combined with appropriate antituberculosis treatment and nutritional supplements [10].

Anti-TB treatment is necessary for the prevention of relapses [11]. Conventional drug treatment for tuberculosis is based on a 2-month course of quadruple antituberculosis therapy (Isoniazid, Rifampicin, Ethambutol, and Pyrazinamide) followed by bitherapy (Isoniazid and Rifampicin), with a total course of treatment lasting between 9 and 12 months [12].

When operating on a TB empyema, and especially a TB empyema necessitans, one of the potential complications is TB seeding in the surgical incision, causing infection and eventual pleural-cutaneous fistulation [13].

Other postoperative complications are persistent sepsis, fistulation of the empyema through the skin or into other viscera, the development of restrictive fibrothorax, prolonged bubbling, broncho-pleural fistula, infection, hemorrhage, and respiratory failure [10,13].

Our patient had surgery consisting of drainage and flattening of the empyema, followed by antituberculous medication. At 6-month follow-up, he had no symptoms, and the incision site was fully healed with no sign of relapse.

Empyema necessitans can recur in the first 10 years after the treatment; therefore, these patients should be monitored for years. Relapse is often attributable to incomplete surgical resection of the affected tissue or suboptimal antimicrobial therapy. Hence, it is important to identify the underlying cause to ensure targeted antimicrobial therapy on top of surgical drainage and debridement to ensure a complete recovery [14,15].

Conclusion

Empyema necessitans is a rare complication of tuberculosis where an empyema diffuses to extrapleural spaces.

CT is useful to demonstrate the presence of continuity between the empyema and the subcutaneous abscess and to consolidate the diagnosis [16].

Surgery and histological evidence are necessary to rule out a neoplastic origin, particularly in immunocompetent patients. Prognosis is usually good with medical therapy and surgical removal [12].

Patient consent

Informed written consent was obtained from the patient for publication of the case report and all imaging studies.

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