CASE REPORT

Empyema necessitans: very late complication of pulmonary tuberculosis

Manuel Mendes Gomes, Márcia Alves, José Bernardes Correia, Lèlita Santos

Medicina Interna, Centro Hospitalar e Universitário de Coimbra—pólo HUC, Coimbra, Portugal

Correspondence to

Dr Manuel Mendes Gomes, manuelmgomes@gmail.com

SUMMARY

Empyema necessitans is a rare clinical finding nowadays. We report the case of a patient admitted in our ward for investigation of an unknown onset anterior chest wall mass, with no accompanying signs or symptoms. It is noteworthy that the patient had had pulmonary tuberculosis submitted to thoracoplasty more than 60 years before. Thoracic MRI showed a large heterogeneous mass, with a thick wall and internal septations located at the right anterior chest wall, as well as a heterogeneous content inside the right pleural cavity, with direct communication between both. An aspirative puncture of both masses was performed, with positive cultures for *Mycobacterium tuberculosis*, thus leading to the diagnosis of pleural tuberculosis with anterior chest wall *empyema necessitans*. A drain was inserted and antibiotics started. This case draws our attention to a very rare complication of pulmonary tuberculosis and its surgical treatment, though it aroused many decades after primary infection.

BACKGROUND

Empyema necessitans is a clinical entity in which an intrathoracic empyema decompresses by extending itself through the parietal pleura and a weakness of the chest wall, forming a collection of pus in the extrathoracic soft tissues.^{1–7} Although rare, it can happen in the setting of necrotising pneumonia or pulmonary abscesses; the most common agents are *Actinomyces* spp. and *Mycobacterium tuberculosis*.⁸ Regarding tuberculosis, this kind of complication can occur in the presence of pulmonary tuberculous empyema; it can also occur after an inadequate treatment of such empyema, like the obsolete surgical technique ‘thoracoplasty’ (resection of the postlateral aspects of the ribs, leading to the compression of the lung, collapse of apical lung cavities and pleural space obliteration). Although rarely performed in developed countries nowadays, it was very common in the early 1900s.

This case illustrates a complication of tuberculous pulmonary empyema and its surgical treatment, thoracoplasty, performed 60 years ago. It is a very rare finding, especially in association with tuberculosis (TB) and, moreover, so many decades after primary infection. Tezel *et al*⁴ and McNulty¹ described similar cases (one each); besides those, not many can be found. El-Kersh *et al*⁹ described other late complications of TB, such as pleural calcifications.

Figure 1 Right chest wall mass, with no local inflammatory signs.

CASE PRESENTATION

An elderly patient was electively admitted to an internal medicine ward in order to investigate a right anterior chest wall mass (figure 1), of unknown duration, with no other symptoms, namely local pain, cough, shortness of breath, fever or weight loss.

This patient’s medical history included renal and pulmonary TB at the age of 18, the former treated with right nephrectomy and the latter treated with right thoracoplasty. He also had type 2 diabetes, hypertension and Alzheimer’s disease.

On physical examination, we found chest wall asymmetry, with diminished expansion of the right side, and a mass below his right breast, measuring about 10 cm, soft and non-tender, painless and with no inflammatory signs. The patient also had a large scar located at the right posterior chest wall, in relation with a previous surgery. Pulmonary auscultation showed diminished breath sounds on the right. Right axillary adenopathy was also found.

INVESTIGATIONS

Chest X-ray (figure 2) showed thoracic asymmetry with right-hand side retraction, extensive pleural calcification, right mediastinal deviation and old rib fractures.

Figure 2 Chest X-ray, showing thoracic asymmetry with right-hand side retraction, extensive pleural calcification, right mediastinal deviation and old rib fractures.

CrossMark

To cite: Gomes MM, Alves M, Correia JB, *et al*. *BMJ Case Rep* Published online: [please include Day Month Year] doi:10.1136/bcr-2013-202072

Figure 3 MRI, T1 with contrast.

Thoracic MRI (figures 3 and 4) revealed a large right anterior chest wall mass, measuring about 8 cm, with a heterogeneous liquid content, internal septations and a thick wall. Besides, it showed heterogeneous content of the right pleural cavity, with deviation of the mediastinum. The intrathoracic and extrathoracic structures seemed to communicate with each other through the chest wall (figures 5 and 6).

The biochemical profile showed white cell count $7.8 \times 10^9/L$, haemoglobin 11.9 g/dL, platelet count $217 \times 10^9/L$ and serum creatinine level 0.90 mg/dL.

Sputum smear (Ziehl-Neelsen staining) and culture were negative, including for *M tuberculosis*.

Purified protein derivative (PPD) for tuberculous skin test was negative.

Aspirative puncture of both intrapleural and extrapleural masses was then performed (CT-guided, figures 5–8). The liquid obtained was similar in both masses: milky and turbid appearance, with polymorphonuclear cells, some histiocytes and evidence of necrosis. No neoplastic cells were found. Liquid cultures were positive for *M tuberculosis* complex, susceptible to all tested antibiotics.

Figure 4 MRI, T2.

Figure 5 A CT-guided aspirative puncture (intrapleural mass). Arrow indicates possible communication path between intrathoracic and extrathoracic masses.

DIFFERENTIAL DIAGNOSIS

Differential diagnosis of the chest wall mass includes benign and malignant soft tissue tumours, soft tissue infection and abscess and skeletal lesions.¹⁰ Some of the benign tumours causing chest wall masses are lipomas, lymphangiomas, haemangiomas or desmoid tumours. Malignant tumours may be sarcomas, malignant fibrous histiocytomas, liposarcomas or neurofibrosarcomas; metastatic disease is also possible. Pain is one of the most common symptoms of benign and malignant tumours. The presence of other signs and symptoms is critical to a diagnostic approach; although imaging is a precious help, most of the time, biopsy is mandatory.

Although the patient's medical history included TB, at the present time there were no respiratory symptoms which would make us think of pulmonary TB. Furthermore, there was no history of weight loss or fever. The absence of local inflammatory signs goes against soft tissue infection as the cause of empyema. Again, the lack of constitutional symptoms makes it less likely to be cancer.

As for this case in particular, the big question is whether this empyema is a reactivation of an old disease or a consequence of its surgical treatment, as discussed later.

Figure 6 A CT-guided aspirative puncture (extrapleural mass). Arrow indicates possible communication path between intrathoracic and extrathoracic masses.

Figure 7 CT scan, sagittal view.

TREATMENT

After multidisciplinary reunion with chest Surgeons and pulmonologists, we decided to start the patient on rifampicin, isoniazid, pyrazinamide and ethambutol, even though there was no risk of contagion. Chest wall mass was drained with aspirative drain. Although we proposed draining of intrapleural empyema, the chest surgeons decided not to because of high risk of new fistulisation.

The patient was also submitted to chest physiotherapy.

OUTCOME AND FOLLOW-UP

The patient was discharged from the hospital after initiation of antibiotics. Despite the effective treatment of the chest wall

mass, the overall condition went into decline. The patient returned to the hospital 1 month after discharge and died due to a hospital-acquired pneumonia with sepsis. Once again, it is hard to determine if the patient would have improved if the intrathoracic empyema had been drained as well, regarding that this was most likely a chronic empyema. Despite that, the literature recommends draining in most cases.^{11–14}

DISCUSSION

There are very few case reports of *empyema necessitans* related to pulmonary TB and its surgical treatment. Tezel *et al*⁴ and McNulty¹ reported two similar cases in 2008, although the clinical presentation was more acute than ours.

Thoracoplasty fell into disuse in the 1940s, when the use of antibiotics started for the treatment of TB. Hence, its complications are rarely seen in the present. To our knowledge, only a few cases of *empyema necessitans* related to pulmonary TB were reported, making this a precious description of an endangered clinical entity.

Despite the fact that thoracoplasty is rarely used in developed countries, in some developing countries it is still a clinical option and with acceptable outcomes. Dewan *et al*¹⁵ describe a cohort of patients submitted to this procedure in India, mainly not only in the setting of tubercular empyema, but also in patients with drug-resistant TB. With the stream of immigration, it became more likely to come across such patients therefore making the knowledge of the possible complications of thoracoplasty very useful.

It can also be a complication of pulmonary tuberculous empyema; there are some reports of *empyema necessitans* in patients with primary TB infection and relapse.^{16–18}

Concerning our particular case, after discarding other possible causes for this chest wall mass and concluding that *M tuberculosis* was deeply implied in its origin, our major doubt now lied on whether it was a relapse of an old infection or a late complication of a chronic empyema. The role of thoracoplasty was also to be clarified, as it could have had a major influence in the formation of this *empyema necessitans*.

It is known that the geriatric population may lack symptoms when it comes to pulmonary tuberculosis; besides, PPD may be negative even in people with active disease.^{19–21} Despite that, a reactivation of a previous TB pulmonary infection (or even a reinfection) implies positive sputum cultures for *M tuberculosis*. Also, chronic tuberculous empyema is known for its paucity of clinical symptoms as well. Sometimes its diagnosis is considered

Figure 8 CT scan, coronal view.

Learning points

- ▶ This case illustrates how a clinician ought to know all possible therapeutic approaches of tuberculosis (TB), even if obsolete, since complications may emerge a long time after primary infection.
- ▶ *Empyema necessitans* is, indeed, a possible complication of TB-related empyema in all ages.
- ▶ The absence of respiratory and constitutional symptoms does not rule out TB.
- ▶ Thoracoplasty is still used in developing countries; so, immigrants with personal history of TB-related empyema may show up with such findings.
- ▶ Knowledge of such cases is crucial, since a high index of suspicion is the key to its adequate management.

when a patient develops a bronchopleural fistula or an *empyema necessitans*.² So, in our patient, the absence of symptoms and of a positive PPD would not exclude a reactivation of pulmonary TB, but would certainly make it less likely. Negative sputum smear does not rule out active disease,^{20 21} but negative sputum culture virtually does. Therefore, in this setting, we believe that our patient had a chronic pulmonary tuberculous empyema which led to the development of an *empyema necessitans*.

As for the role of thoracoplasty, it induces a weakness in the chest wall, favouring a disruption of the intrathoracic empyema through soft tissues and thus leading to the formation of an extrathoracic concomitant mass.^{1 11 22} So, the emergence of this *empyema necessitans* in our patient was probably favoured by a pre-existing frailty.

Contributors MMG and MA were the responsible residents at the time of dealing with the patient; MMG wrote and designed the article. MA helped with collecting data. JBC and LS reviewed it, criticised it and finally approved it for submission.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

REFERENCES

- McNulty NJ. Reactivation Mycobacterium tuberculosis presenting as empyema necessitans 55 years following thoracoplasty. *Radiol Case Rep* [Online] 2008;3:183.
- Sahn SA, Iseman MD. Tuberculous empyema. *Semin Respir Infect* 1999;14:82–7.
- Scott A, Kono DO, Trenton D, et al. Contemporary empyema necessitatis. *Am J Med* 2007;120:303–5.
- Tezel C, Kiral H, Tezel Y, et al. Case review of an old disease: empyema necessitatis. *Emerg Med J* 2008;25:114.
- Reyes CV. Cutaneous tumefaction in empyema necessitatis. *Int J Dermatol* 2007;46:1294–7.
- Porcel JM, Madronero AB, Bielsa S. Tuberculous empyema necessitatis. *Respiration* 2004;71:191.
- Brownrigg GM. Thoracoplasty for pulmonary tuberculosis. *Can MAJ* 1949;61:601–2.
- Llamas-Velasco M, Domínguez I, Ovejero E, et al. Empyema necessitatis revisited. *Eur J Dermatol* 2010;20:115–19, January–February, Clinical report.
- El-Kersh K, Rawasia WF. Late sequelae of pulmonary tuberculosis. *BMJ Case Rep* 2013;2013:pil:bcr2013-009294.
- David EA, Marshall MB. Review of chest wall tumours: a diagnostic, therapeutic, and reconstructive challenge. *Semin Plast Surg* 2011;25:16–24.
- Kim HY, Song K-S, Goo JM, et al. Thoracic sequelae and complications of tuberculosis. *Radiographics* 2001;21:839–60.
- Lorenz J, Thomas JL. Complications of percutaneous fluid drainage. *Semin Intervent Radiol* 2006;23:194–204.
- Wali SO. An update on the drainage of pyogenic lung abscesses. *Ann Thorac Med* 2012;7:3–7.
- Yunus M. CT guided transthoracic catheter drainage of intrapulmonary abscess. *J Pak Med Assoc* 2009;59:703–9.
- Dewan RK, Singh S, Kumar A, et al. Thoracoplasty: an obsolete procedure? *Indian J Chest Dis Allied Sci* 1999;41:83–8.
- Jover F, Andreu L, Cuadrado J-M, et al. Tuberculosis empyema necessitatis in a man infected with the human immunodeficiency virus. *South Med J* 2002;95:751–2.
- Schaeffer-Pautz A, Laos LF, Sorresso DP, et al. A chest-wall mass in a 73-year-old man. *Chest* 2001;120:2051–2.
- Magness DJ. Empyema necessitans caused by *Mycobacterium tuberculosis* in an immunocompetent patient. *WMJ* 2013;112:129–30.
- Rajagopalan S. Tuberculosis and aging: a global health problem. *Clin Infect Dis* 2001;33:1034–9.
- Bachh AA, Gupta R, Haq I, et al. Diagnosing sputum/smear-negative pulmonary tuberculosis: does fibre-optic bronchoscopy play a significant role? *Lung India* 2010;27:58–62.
- Kanaya AM, Glidden DV, Chamber HF. Identifying pulmonary tuberculosis in patients with negative sputum smear results. *Chest* 2001;120:349–55.
- Shepherd MP. Plombage in the 1980s. *Thorax* 1985;40:328–40.

Copyright 2013 BMJ Publishing Group. All rights reserved. For permission to reuse any of this content visit <http://group.bmj.com/group/rights-licensing/permissions>.
BMJ Case Report Fellows may re-use this article for personal use and teaching without any further permission.

Become a Fellow of BMJ Case Reports today and you can:

- ▶ Submit as many cases as you like
- ▶ Enjoy fast sympathetic peer review and rapid publication of accepted articles
- ▶ Access all the published articles
- ▶ Re-use any of the published material for personal use and teaching without further permission

For information on Institutional Fellowships contact consortiasales@bmjgroup.com

Visit casereports.bmj.com for more articles like this and to become a Fellow