



Tuberculosis and Bullous Emphysema in Childhood: Autopsy Data

Vitorino Modesto dos Santos^{1*} and Lister Arruda Modesto dos Santos²

¹Professor, Internal Medicine, Catholic University and Armed Forces Hospital, Brasília-DF, Brazil

²Preceptor, General Surgery, State Worker's Hospital of São Paulo-SP, Brazil

*Corresponding Author: Professor Vitorino Modesto dos Santos, Armed Forces Hospital, Cruzeiro Novo, Brasília-DF, Brazil.

Received: September 12, 2018; Published: September 20, 2018

Abstract

Tuberculosis has been a main social and economic burden in Turkey as well as in Brazil, and the work of primary care physicians should play a role in the objective of discover new cases. However, clinical skill to diagnosis has diminished in developed and low-income countries. The case study of an infant with bullous emphysema and miliary tuberculosis diagnosed with base on clinical features, complementary findings and autopsy evaluation is herein described. The main purpose is to shortly comment the main aspects of this exceeding rare association, and enhance the suspicion index of primary care health workers about perinatal tuberculosis.

Keywords: Autopsy; Bullous Emphysema; Tuberculosis

Introduction

Tuberculosis (TB) continues to have a paramount social burden as a public health hazard in Africa as well as in Brazil, and one estimates that 9.6 million people will develop TB and 1.5 million will die worldwide [1]. The role played by primary care physicians have increased of importance as the first step in permanent objective of identifying new cases. Unfortunately, studies revealed that the level of knowledge of family physicians regarding TB is not sufficient and training programs are needed to increase their level of knowledge. Clinical skill to diagnosis has diminished in developed countries with low prevalence and incidence; phenomenon also observed in low-income areas, where TB often affects people under 50 years, which constitute the reproductive and most active productive age group [1]. Because TB is a major public health problem, the role of high suspicion index and clinical, laboratory, histopathology, and imaging tools useful for diagnosis must be emphasized [2-8]. Early diagnosis is challenging due to unspecific symptoms, and late manifestations of pulmonary TB are associated with fever, weight loss, chronic cough and hemoptysis [2-8]. Worthy of note is the ominous outcome associated with a generalized miliary infection [3-8]. A major concern is about predisposing conditions to reactivation of

TB, including HIV infection, diabetes, renal disease, malignancies, and use of immunosuppressive drugs [2-8]. Additional concern is related to high risk of reactivation among people of immigration [2]. Prevention and control involve vaccine, contact investigation, and prompt treatment [2,6-9].

Lung conditions presenting as spaces containing air include: idiopathic giant bullous emphysema or vanishing lung syndrome [10]; multiple thin-walled cysts [11]; cystic lung diseases like bullae, paraseptal emphysema, honeycomb changes, and parenchymal cysts [12]. In vanishing lung syndrome, at least one-third of the hemithorax is affected by idiopathic bullae, which are neither associated with chronic bronchitis, nor pneumoconiosis or TB [10]. Differing from pseudocysts, true cysts are < 2 mm walled lesions lined by epithelium. They may be: congenital or neonatal; due to obstructive lung disease or bronchiectasis; or secondary to infections, thromboembolism, malignancy, and autoimmune diseases [11,12]. TB usually causes irregular thicker cavitory lesions, but thin-walled changes may occur; therefore, coexistent cystic disease and mycobacterial infection should be ruled out [11,12]. This case study is about an infant with bullous emphysema concomitant with miliary TB.

Case Report

A 1-year-old female with anorexia, loss of weight, breathlessness and productive cough with one month of duration was admitted for diagnostic evaluation and treatment. She was referred from a rural community without complementary resources to elucidate the etiology of her disease. She was not vaccinated against tuberculosis, and her mother had antecedent of chronic pulmonary disease. Physical examination revealed undernutrition, dyspnea, coarse breath sounds and crackles on two upper thirds of left lung, as well as fever and lymphadenopathy. The routine laboratory tests showed anemia, leukocytosis with neutrophil-lymphocyte rate (NLR) > 5, hypoalbuminemia, elevated erythrocyte sedimentation rate and C-reactive protein, and normal aminotransferases. The search for acid-fast bacilli (AFB) performed in sputum smear microscopy was negative; whereas bronchoalveolar lavage fluid yielded positive results, as well as the tuberculin test. The plain chest radiography showed bilateral images suggestive of miliary dissemination, focal condensations as well as multiple cavities in the upper areas of the left lung (Figure 1A). The first-line anti-tuberculosis therapy was initiated, but she rapidly evolved to death. After informed consent of the parents the autopsy was performed and the most significant findings were miliary TB and bullae in the left lung (Figures 1B and 2A), with this infection involving lymph nodes and meninges.

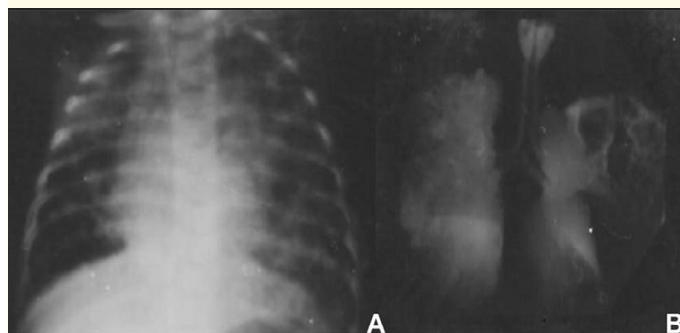


Figure 1: (Plain radiographs) A: Chest images indicative of tuberculous dissemination, mainly on the middle and upper thirds of the left lung with bullae; and B: Images of autopsied tracheobronchial tree and lung bloc, confirming the presence of multiple cavities.

Histopathological data confirmed the diagnosis of miliary tuberculosis associated with caseum within some bronchioles, as well as advanced bullous emphysema (Figures 2B to 2F). Accentuated fibrosis and calcified foci of TB were also observed in thoracic lymph nodes (Figure 2G); moreover, organizing meningeal involvement by TB was detected (Figure 2I).

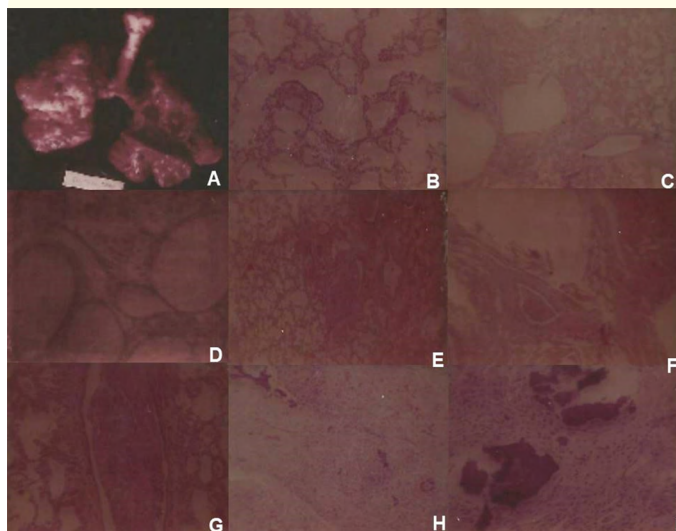


Figure 2: A: Gross aspect of the lungs showing predominant bullous changes on the left side; B to F: Photomicrographs of pulmonary samples revealing conspicuous bullous emphysema and consistent findings of miliary pulmonary tuberculosis, bronchioles containing caseum, and calcified granulomas; G: aspect of lymph nodal fibrosis and calcified foci of tuberculosis; and I: meningeal specimen showing features of tuberculous meningitis with calcifications.

Discussion

TB is among the ten major infectious causes of death in all over the world, with prevalence up to 60 or 101 cases per 100,000 persons per year in high burden countries [5-7]. Miliary dissemination is a very ominous condition with additional diagnostic challenges [3-6].

Effective control of TB infections in all over the world is hindered by adverse role of under nutrition, poor educational and social status and immunosuppressive conditions; and the vast majority of deaths due to this infection occur in low- and middle-income countries [3-7]. The lack of vaccination, extremes of age and hematogenous route yield additional risks [3-9]. Mortality rate in miliary TB ranges between 3% and 50% but may be up to 65% of cases [4].

This non-vaccinated infant with miliary TB and bullous emphysema was infected by her mother, as frequently occurs in populations of low-income regions all over the world. The undernourished patient was tardily referred to the hospital with an advanced phase of disease. As often occurs in lymphohematogenous disseminations, she had a short course of acute respiratory stress followed by irreversible circulatory shock with multi-organ failure

[4]. Concordant with literature, she was an undernourished very young female with severe lung comorbidity, anemia, hypoalbuminemia, NLR > 5, and elevated acute-phase reactants [3-8]. In poor rural regions the lack of resources frequently hinders the adequate evaluation that is necessary to establish early diagnosis and prompt treatment of TB, favoring bad outcomes [2].

Being a very young patient, the first concern was about congenital or neonatal TB. Actually, vertical transmission of TB should be considered in the current scenery because this mechanism of TB infection is increasing among pregnant women in low-income regions [7]. Congenital TB was first described in 1935 based on autopsy studies of infants in the first week of life; diagnostic criteria include exclusion of postnatal exposure and involvement of the liver or other pathological data consistent with infection *Mycobacterium tuberculosis* [7]. Secondary criteria are findings of *M. tuberculosis* in the mother genital tract or placenta. The transplacental infection during the late phase of pregnancy and perinatal aspiration of contaminated amniotic fluid are the involved mechanisms in congenital transmission of TB. Postnatal TB has been more frequently described than the infections acquired in utero, and precocious postnatal transmission usually arises from close contact in family environment [7]. Worthy of note, if congenital TB is due to inhalation of infected amniotic fluid, the newborn may have no liver or intestinal involvement [7], as observed in the patient herein described. However, considering that 24 (range, 1 - 84) days is the mean age of first manifestations in patients with congenital TB, the present case was consistent with postnatal contamination; our patient was 1-year-old, whereas the most tardive onset in congenital TB was at 154 days [7]. Moreover, there was no significant hepatic involvement by TB as revealed by the normal levels of liver enzymes, as well as the absence of histopathological alterations in this organ. Both in congenital and postnatal TB typical lymph nodal and meningeal changes may occur. Postmortem evaluations are of utmost value in clinically suspected cases of miliary TB [3,6].

Conclusion

Because the diagnosis of perinatal TB constitutes a very challenging task in absence of positive maternal antecedent of TB, the authors believe that even single case studies might contribute to enhance the suspicion index of not specialized primary health care workers. These rare cases of TB must have early diagnosis and prompt onset of appropriate treatment, otherwise, the patient will follow a downhill clinical course ending with unavoidable death. The lack of knowledge of primary health care workers about TB must be adequately solved.

Bibliography

1. Chanda-Kapata P, *et al.* "Tuberculosis in students at the University of Zambia - trends over a seven year period (2008-2014)". *Acta Scientific Medical Sciences* 4.2 (2018): 22-26.
2. Curley CA. "Rule out pulmonary tuberculosis: clinical and radiographic clues for the internist". *Cleveland Clinical Journal Medicine* 82.1 (2015): 32-38.
3. Dos Santos VM and Dos Santos LAM. "Miliary tuberculosis: the role of necropsy studies". *Infezione Medicina* 25.2 (2017): 162-165.
4. Han Y, *et al.* "High blood neutrophil-lymphocyte ratio associated with poor outcomes in miliary tuberculosis". *Journal Thoracic Diseases* 10.1 (2018): 339-346.
5. Lee J, *et al.* "Comparison of clinical manifestations and treatment outcome according to age groups in adult patients with miliary tuberculosis". *Journal Thoracic Diseases* 10.5 (2018): 2881-2889.
6. Santos VM, *et al.* "Miliary tuberculosis - case report". *Revista Sociedade Brasileira Medicina Tropical* 31.3 (1998): 315-318.
7. Saramba MI and Zhao D. "A perspective of the diagnosis and management of congenital tuberculosis". *Journal Pathogens* (2016): 8623825.
8. Vázquez Rosales JG, *et al.* "A case-series analysis of tuberculosis in pediatric patients treated in a tertiary level hospital". *Boletín Médico Hospital Infantil México* 74.1 (2017): 27-33.
9. Zhu B, *et al.* "Tuberculosis vaccines: opportunities and challenges". *Respirology* 23.4 (2018): 359-368.
10. Gao X, *et al.* "Vanishing lung syndrome in one family: Five cases with a 20-year follow-up". *Molecular Medicine Reports* 11.1 (2014): 567-570.
11. Godwin JD, *et al.* "Multiple, thin-walled cystic lesions of the lung". *American Journal of Roentgenology* 135.3 (1980): 593-604.
12. Raof S, *et al.* "Cystic lung diseases algorithmic approach". *Chest* 150.4 (2016): 945-965.

Volume 2 Issue 7 October 2018

© All rights are reserved by Vitorino Modesto dos Santos and Lister Arruda Modesto dos Santos.