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Severe Pectus Excavatum with Apparent Dextrocardia Associated with Pleuro-Bronchopneumonia: Case Report

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Abstract

Pectus excavatum is the most common congenital chest wall deformity. Although usually identified during childhood, its clinical impact may remain silent for decades before becoming evident in adulthood, often in the context of respiratory or cardiovascular complications. We report the case of a 63-year-old male with a history of pulmonary tuberculosis treated and declared cured in 2014, who presented with a productive cough evolving for two weeks. Imaging revealed severe pectus excavatum with a Haller index of 7, responsible for cardiac displacement mimicking dextrocardia. The condition was associated with bilateral sequelae of prior tuberculosis and active pleuro-bronchopneumonia of probable bacillary (tuberculous) origin. This observation highlights the crucial role of computed tomography in assessing chest wall deformities, their cardiopulmonary consequences, and concomitant infectious complications in patients with fragile pulmonary backgrounds.

Keywords

CT-Scan, Dextrocardia, Haller Index, Pectus Excavatum, Tuberculosis, Pleuro-Bronchopneumonia

1. Introduction

Pectus excavatum is characterized by a depression of the sternum and adjacent costal cartilages, giving the thorax a funnel-shaped appearance. Its prevalence is estimated at approximately 1 in 300 - 400 live births, with a clear male predomi-

nance [1]. While often regarded as a benign and cosmetic abnormality, severe forms may cause functional impairment of both respiratory and cardiovascular systems [2].

The severity of the deformity is quantified using the Haller index, which is the ratio between the transverse chest diameter and the shortest anteroposterior diameter measured at the point of maximal sternal depression. A value greater than 3.25 is considered abnormal [3], and a Haller index of 7 reflects a profoundly severe deformity.

In advanced cases, the sternum pushes backward, compressing and shifting the heart toward the right hemithorax. This mechanical displacement creates the illusion of dextrocardia, also known as pseudo-dextrocardia [4]. Unlike congenital dextrocardia, the great vessels remain normally oriented, but the altered heart position can induce electrocardiographic abnormalities and arrhythmias, sometimes leading to diagnostic confusion [5].

The clinical history of the patient presented here is further complicated by a background of pulmonary tuberculosis, a disease highly prevalent in low-resource settings. Sequelae such as bronchiectasis and parenchymal scarring represent fertile ground for recurrent infections or reactivation [6]. The coexistence of a severe thoracic deformity and post-tuberculosis changes provides a rare opportunity to analyze the interplay between structural anomalies and infectious complications, and to underscore the diagnostic value of imaging.

2. Case Presentation

The patient was a 63-year-old man with a history of pulmonary tuberculosis diagnosed and treated in 2014, with documented cure. He presented with a productive cough that had persisted for two weeks and was associated with exertional discomfort. Clinical examination revealed tachycardia and a visible thoracic deformity compatible with pectus excavatum. Electrocardiography demonstrated ventricular tachycardia, atrial flutter, and flattened R waves, consistent with rhythm disturbances potentially related to cardiac displacement.

A chest Computed Tomography (CT) scan was performed using helical acquisition both before and after intravenous administration of iodinated contrast medium.

CT findings showed no evidence of pulmonary embolism or aortic dissection. The most striking morphological feature was severe pectus excavatum with a Haller index of 7 (**Figure 1**), displacing the heart toward the right hemithorax and creating pseudo-dextrocardia (**Figure 2**).

Regarding the pleuropulmonary system, there was bilateral pleural effusion—minimal on the right, moderate on the left. The left lung showed cystic and moniliform bronchiectasis with surrounding atelectasis. At the base, a consolidation zone and nodular opacities were seen, suggestive of active pleuro-bronchopneumonia, likely bacillary (tuberculous) in origin. Additional infiltrates were also identified in the contralateral lung, along with small bilateral hilar lymphadenopathies.

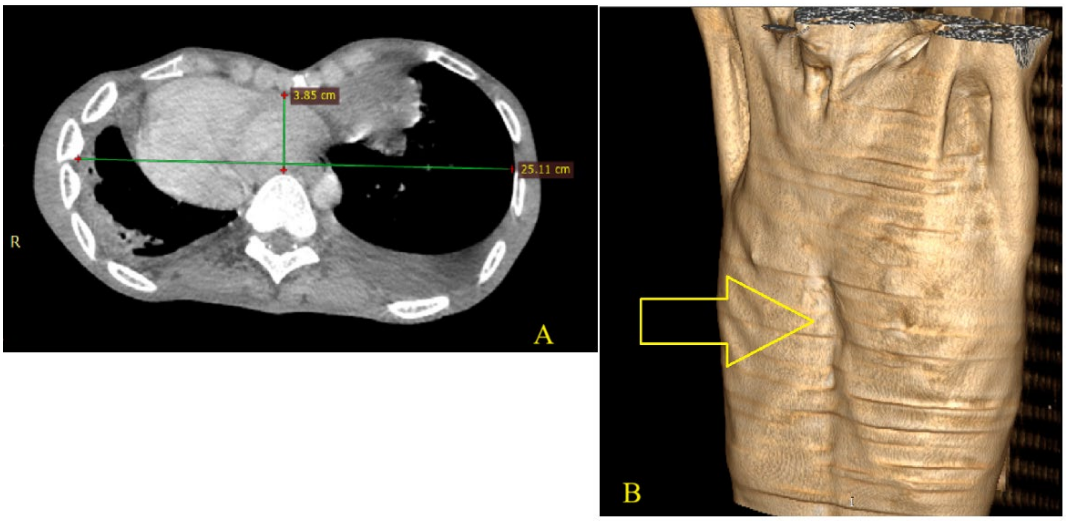

Figure 1. Chest CT scan**.** (A) Parenchymal window showing a severe Haller index; (B) Three-dimensional volume reconstruction demonstrating the pectus excavatum deformity.

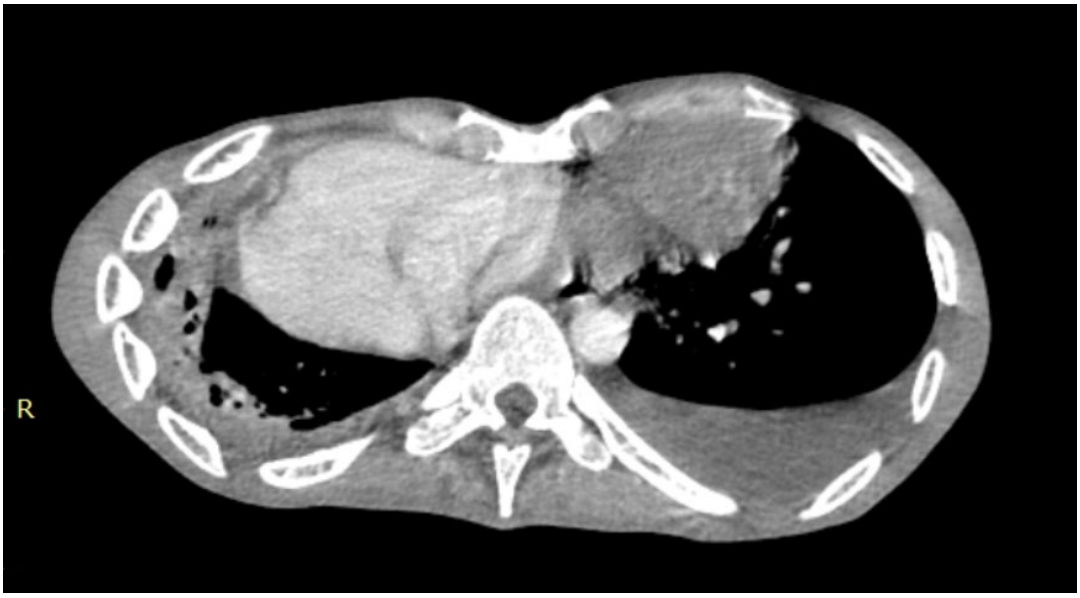

Figure 2. Chest CT-scan showing in mediastinal window the pseudo-dextrocardia.

These findings indicated an infectious process superimposed on bilateral post-tuberculosis sequelae, complicated by severe thoracic deformity (**Figure 3**).

Treatment and outcome:

The patient received empirical anti-tuberculous therapy after sputum PCR confirmation of Mycobacterium tuberculosis, along with broad-spectrum antibiotics to cover secondary bacterial infection. Rhythm disturbances were controlled with beta-blockers. After three weeks, the patient's respiratory symptoms improved significantly, and a follow-up CT after two months showed regression of parenchymal consolidation. Surgical correction of the deformity was not pursued due to age and high operative risk.

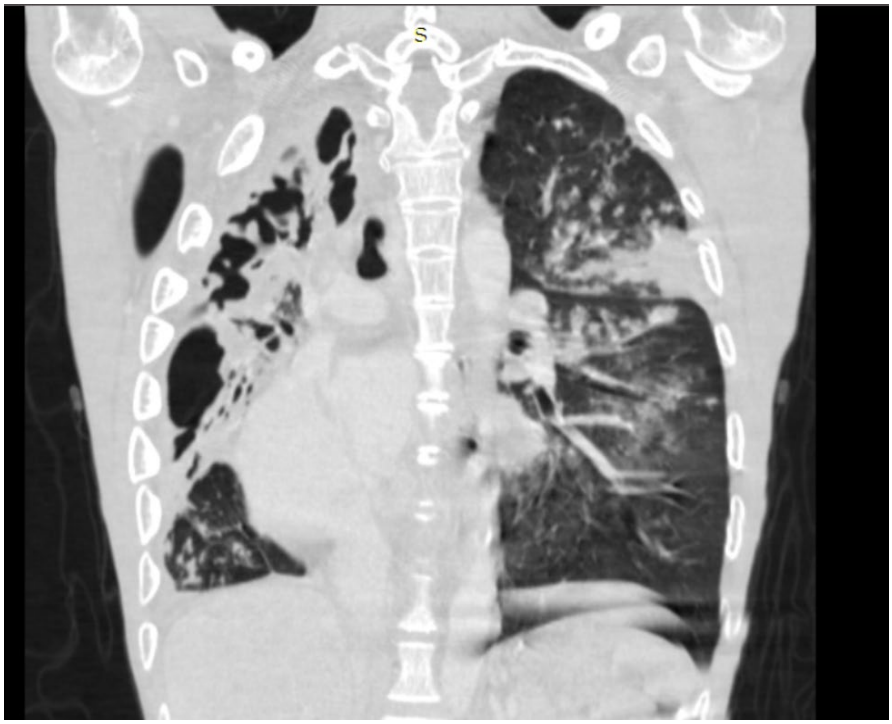

Figure 3. Chest CT-scan showing in parenchymal window the Parenchymal atelectasis on the right.

3. Discussion

This case illustrates the interaction between a severe congenital thoracic deformity, prior infectious sequelae, and active pulmonary pathology.

Pectus excavatum is the most common chest wall deformity [1]. The Haller index objectively quantifies severity [3]; in this patient, a value of 7 indicated extreme sternal depression.

From a cardiovascular perspective, compression of the right atrium and ventricle leads to cardiac displacement into the right hemithorax. This pseudo-dextrocardia may mimic true congenital dextrocardia but differs in that it has the normal orientation of great vessels [4].

Mechanism of arrhythmia:

Sternal compression alters myocardial geometry, particularly of the right chambers, causing mechanical stretch of the conduction tissue. This distortion can lead to premature depolarizations and re-entry circuits, predisposing to atrial flutter and ventricular tachyarrhythmia [5].

Respiratory implications:

Chest wall rigidity reduces thoracic compliance, impairing ventilation [2]. Tuberculosis sequelae further decrease pulmonary reserve through bronchiectasis, fibrosis, and scarring [6] [7]. The combination of reduced chest expansion and distorted lung architecture explains the severe respiratory compromise in this case. The CT features—bilateral infiltrates, nodules, and consolidation—strongly suggested tuberculous reactivation, supported by PCR positivity.

Management and prognosis:

Treatment must prioritize infection control and rhythm stabilization. In elderly patients with fixed deformities, conservative management is often preferred. Surgical correction (Nuss or Ravitch) is mainly indicated in younger, symptomatic patients [8]. A multidisciplinary approach involving pulmonology, cardiology, and infectious disease specialists is essential.

Limitations:

This case lacked pulmonary function testing, which could have quantified restrictive impairment. However, CT and clinical correlation provided sufficient diagnostic confidence.

4. Conclusions

This case underscores the diagnostic complexity that arises when a severe pectus excavatum (Haller index = 7) coexists with pulmonary sequelae of tuberculosis. The deformity caused pseudo-dextrocardia, cardiac displacement, and arrhythmias, while post-tuberculosis changes predisposed to recurrent infection.

Computed tomography remains indispensable for assessing structural deformities, identifying infectious complications, and guiding management.

Clinicians should maintain a high index of suspicion for chest wall deformities in adults presenting with atypical cardiopulmonary findings, especially in those with previous pulmonary disease. Comprehensive, multidisciplinary evaluation allows timely diagnosis and optimal care, even in resource-limited settings.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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Abbreviations

CT	Computed Tomography
PCR	Polymerase Chain Reaction