

**International Journal of TROPICAL DISEASE  
& Health**  
4(4): 437-443, 2014



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## **Radiological Features of Right Destroyed Lungs Syndrome with Pathologic Dextrocardia**

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**Author's contribution**

*The whole work was carried out by the author MDG.*

**Case Study**

**Received 18<sup>th</sup> September 2013**  
**Accepted 29<sup>th</sup> January 2014**  
**Published 15<sup>th</sup> February 2014**

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### **ABSTRACT**

Chronic lungs disease such as relapsed tuberculosis of the lungs could lead to complications that could alter the gross anatomy of a region of the body. Many complications have been reported due to chronic and relapsed lungs infections such as Mycobacterium tuberculosis, when they are not properly managed, although, our indexed case improved within a short time after admission. The reported case was a rare presentation of complicated relapsed right lungs tuberculosis with pathologic dextrocardia. He was a 45 year old businessman who presented with history of chronic cough of 25 years duration with associated hemoptysis, treated in the past for lung tuberculosis. He had clinical and radiological features of destroyed right lung syndrome with dextrocardia following relapsed tuberculosis with possible superimposed infection. He was managed with category two regimen although did not complete his treatment in this facility. He had his medication for almost 4 months on out-patient basis in this facility. Though, the first 8 days was as in-patient basis. Radiographic complications in the index case were mediastinal shift, gross distortion of the right lung with associated fibrosis, contra-lateral, pathologic dextrocardia, lung emphysema which was noticed to compensate for the destroyed right lung. These findings are strongly consistent with some other reports that artificial/pathologic dextrocardia can be as a result of relapsed tuberculosis with gross distorted chest region. Therefore, physicians can demonstrate clinical destroyed lung syndrome with pathologic dextrocardia through radiographic findings and should guide against relapsed tuberculosis by revamping Direct observe

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treatment (DOT) through counseling, as well as prevent transmission of multi-drug resistance tuberculosis through proper investigation.

*Keywords: Destroyed lungs syndrome; DOT; lungs tuberculosis; pathologic dextrocardia.*

## 1. INTRODUCTION

Radiological presentation of right destroyed lung syndrome as seen in the reported case is rare [1]. Worldwide, however, they are fairly [1] present in developing nations where tuberculosis is still a rampaging infectious disease among its populace, even while in the present day of DOTs.

Primary lung tumours, mediastinal masses, vascular abnormalities and various progressively destructive pulmonary infections such as Mycobacterium tuberculosis [2,3] are considered to be the predominant causes unilateral lung destruction [4,5,6,7,8,9]. The use of TB (Tuberculosis bacilli) smear positive detection still remains poor [10] but the classical presentation of chest x-ray provides high index for the diagnosis of active pulmonary tuberculosis especially for developing countries where tuberculosis disease still rampage its population. The aim of this manuscript was to describe the radiological features of a term known as right destroyed lung syndrome with associated pathologic dextrocardia on a background of relapsed pulmonary tuberculosis.

## 2. CASE REPORT

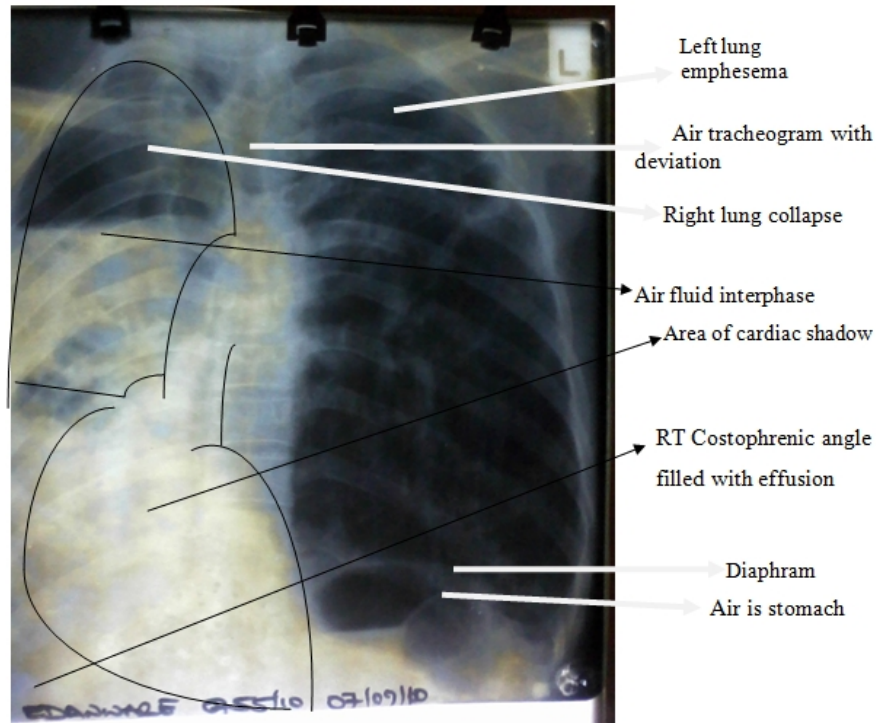
Mr. EI, was a 45 year old businessman who presented through the accident and emergency department with history of cough of 25 years duration, and hemoptysis which started 2 weeks ago, with several and recurrent episodes for the past three days. Few days before admission, he had sputum smear for acid-fast bacilli, performed at a tuberculosis referral centre. Results were negative for all three smears both in 2009 and 2010. He had been diagnosed twice for tuberculosis in the past and treated with anti-tuberculosis drugs twice as well. One of the course lasted for 8 months using category 1 therapy in 2009. A year later, he presented with the above clinical presentation.

On examination he was cachetic, orthopneic, weak, and he had features of right pleural effusion, with fibrosis (tracheal deviation to the right, while auscultation of heart sound was on the right side of the chest. The patient was clinically assessed as a case of destroyed lungs syndrome and dextrocardia secondary to relapsed Smear negative pulmonary tuberculosis with super-imposed infection.

He had x-ray film taken and reported on 2<sup>nd</sup> day post admission Fig. 1.

Report revealed silhouette sign, indeterminate cardiac size, complete loss of normal cardiac /mediastinal outline, complete mediastinal shift to the right due to collapse of the right lung, and thickened chest wall. Inhomogeneous opacities of right lung field (mid and basal lung zones) was noted. There were findings consistent with right upper and middle lobe lung collapse. Ipsilateral apex is devoid of lung marking with air/fluid level thus hydropneumothorax. There was feature of compensating emphysema of the left thoracic lung, focal cavitation and wide spread streaky changes worse in the upper lung zone, and thoracic cage was intact.

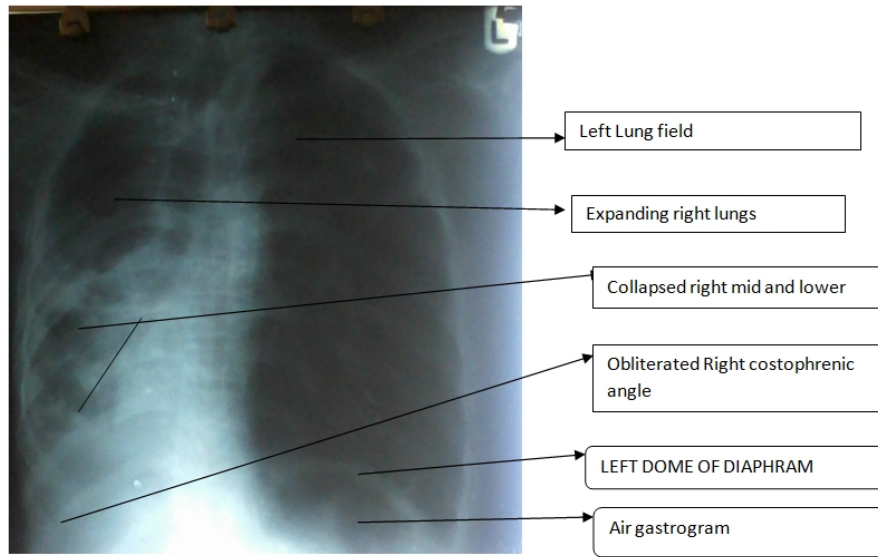
Pleural tap of 4mls of bloody fluid was collected in 5ml syringe while in emergency unit, smear showed few lymphocyte with fungal hyphae, probably contaminant, no malignant cell seen, therefore malignancy was ruled out.



**Fig. 1. Second day film of destroyed left lung syndrome**

His full blood count showed packed cell volume of 24%, white blood cell count of  $79 \times 10^9$  cells/L. Among the white blood cells, neutrophil and lymphocyte consisted 75 and 24 percents respectively, which was reported seventh day later, after admission. He was transfused with 2 units of sedimented blood cells and 1 unit of whole blood. He was placed on category 11 anti tuberculosis therapy. A combination therapy consisting Rifampicin, Isoniazid, Pyrazinamide and Ethambutol. Three tablets of these combination daily was administered as well as intramuscular streptomycin, (0.75g) 1.5mls in accordance with his weight estimation. Streptomycin was taken three times in a week, least alternate days. He had his medication for up to for almost 4 months on out-patient basis in this facility. However from recent follow-up of the patient, He had continued his medication for up to 4 months on out-patient basis before he stopped visiting this facility, the severity of orthopnoea, dyspnoea and cough had drastically reduced after 8 days of medication on an in-patient basis.

A repeat X-ray film Fig. 2 of the chest performed 14 days later, showed silhouette sign with associated inhomogeneous opacities and cavitations within the right lungs field. Features were consisted with right lung collapse, especially the mid and lower lobes. There was obliteration of the right costophrenic and diaphragmatic angle with effusions but reduced as compared to previous X-ray film Fig. 1. The left lung field was spared and bony thorax was intact.



**Fig. 2. Resolving Pleural effusion taken 20/9/10**

### 3. DISCUSSION

Destroyed lungs syndrome is one of the morbidity of relapsed lungs tuberculosis, and commonly affect the left [1] because of its anatomical characteristics. Adefuye et al. [1] demonstrated in a poster presentation, that destroyed lung syndrome could involve the right lung rather than the left lung which was the same with the reported case. A clinical study [2] that was carried out between January 1996 and December 1997, showed that out of Five hundred newly diagnosed cases of Pulmonary Tuberculosis that were treated with directly observed short-course treatment (DOT). Hundred of them had chest radiographic examination done, out of which 5(5%)<sup>2</sup> had Destroyed lung syndrome. Another [10] series reported that out of 172 patients, a total of 116 patients had a destroyed left lung and 56 cases had a destroyed right lung. This further confirms that left are mostly involved than a right [10]. Cases of destroyed lung syndrome stands at 5(5%)<sup>2</sup>, while 80% where in HIV sero-positive patients. This fact proves that the reported complication is not a common phenomenon and is more associated with HIV sero-positive patients rather than sero-negative patient. The index case was HIV sero-negative. Moreover, the client had features of fibrosis as confirmed in the x-ray film. The reviewed study [2] stated that 70% of studied films had fibrosis in about 57.1% patients which were sero-negative. Other complications seen in the reported patients were pleural effusion, contra-lateral emphysema with cavitation. The listed complications in the reported patient showed some of the radiographic patterns as reported by Dosumu [2] in 2005. Obviously, the patient did not have congenital situs-inversus because even on the both X-ray-film, the stomach lies in the left side of the film as proven by the lucency of gastric air bubble (air gastrogram) Figs. 1 and 2, therefore congenital situs-inversus was ruled out. Detection of destroyed lung should be easy with this review, beginning from clinical examination of the patient which may reveal heart sounds on contra- lateral side, increased tympanicity of the compensating lung zone. Other investigations that can be carried out are chest X-ray Figs.1and 2 and computed topography [3]. Chest X-ray and TB smears are the available investigations that are within reach in our centre, and are the basic for DOT programmes especially in developing countries as

recommended by WHO [11]. Other investigations complicated respiratory diseases such as bronchoscopy, CT-Scan [10] and Pleural Biopsy are not at our disposal and pleasure for DOT practice. Moreover, patients cannot easily afford the cost for such investigations because most clients are of low socio-economical class. Our recent development is the installation of Gene-Expert for the diagnosis of Rifampicin resistant strain of *Mycobacterium tuberculosis* in a centralized TB center within the state. This development was few years after this patient was seen, and the service is yet to kick-off.

The presence of fibrosis, mediastinal shift to the right, contra-lateral left compensatory emphysema and right sided tracheal deviation in the patient are strong clues for the possible cause of the pathologic dextrocardia demonstrated by the absence of cardiac shadow on the left side of both radiographic films Figs.1 and 2. Therefore, the hypothetical pathologic process that followed as aftermath of the chronic lung parenchyma disease could be described as thus; Lung collapse resulted from air leak into intra-thoracic space which has negative pressure followed by fibrosis formed from scar tissue of destroyed air sacs, lung tissue and capillaries, then next to follow is tracheal deviation and mediastinal shift due to contracted fibrous tissue. Dosumu [2] went further stating that upper lung lobes are affected by tuberculosis rather than the lower lobes, as seen in the patient. However the left lung is reported [1] to be more affected in destroyed lung syndrome due to the anatomical structure of the left main bronchus, but for the index patient radiographic film shows otherwise. The Histopathologic analysis of Pleura tap showed no malignancy, but reported that there were fungal hyphae as contaminant. It could be possible that there was fungal infection which may have been part of the pathology the lung. Other reports [3,12] have notice fungal infection following pulmonary tuberculosis and that surgery is a viable treatment option. Prognosis for Tuberculosis destroyed lung is poor [13] Example of surgical options for destroyed lungs [5] from chronic infections such as pulmonary tuberculosis [10] and Aspergilosis [12] are thoracostomy with chest tube insertion and pneumonectomy [10,12,13]. This may be considered as options where conservative management and DOT fails, putting into perspective, the clinical state of the respiratory system. However the surgical option have been reported to be faced with dire complications [10,13,14]. Based on the graphical descriptions and other notable references, the radiological syndromic features of a Tuberculosis destroyed lung syndrome are contra-lateral emphysema, tracheal deviation to affected side with fibrosis, mediastinal shift, distant heart sounds, lung collapse, and pyothorax. These must be supported by clinical history of profuse night sweat, weight loss, chronic cough and hemoptysis, even when Tb smear or culture are negative.

#### **4. CONCLUSION**

The radiographic changes described along with other references [1,2,3], Figs.1 and 2 can be a aid-tool to assist physicians make diagnosis of destroyed lungs syndrome, and recognized that pathologic dextrocardia may be a component of this syndrome furthermore, the case scenario indicated that there should be a strong advocacy for multi-drug resistance testing [1] to strengthened DOTs and prevent recurrence, thereby, reducing morbidity and mortality that may arise.

#### **CONSENT**

An informed consent was obtained from the patient or for publication of this case report and accompanying images.

## **ETHICAL APPROVAL**

Not applicable.

## **COMPETING INTERESTS**

Author has declared that no competing interests exist.

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