

## **Case Study**

### **Radiological features of Right destroyed lungs syndrome with Pathologic dextrocardia.**

#### **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 complicated relapsed lungs tuberculosis. 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 features 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

24 compensate for the destroyed right lung. These findings are strongly  
25 consistent with some other reports that artificial/pathologic dextrocardia  
26 can be as a result of relapsed tuberculosis with gross distorted chest  
27 region. Therefore, physicians can demonstrate clinical destroyed lung  
28 syndrome with pathologic dextrocardia through radiographic findings  
29 and should guide against relapsed tuberculosis by revamping Direct  
30 observe treatment(DOT) through counseling ,as well as prevent  
31 transmission of multi-drug resistance tuberculosis through proper  
32 investigation.

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38 **Keywords:** Destroyed lungs syndrome, DOT, lungs tuberculosis,  
39 pathologic dextrocardia.

## Introduction :

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

Primary lung tumours, mediastinal masses, vascular abnormalities and various progressively destructive pulmonary infections such as Mycobacterium tuberculosis<sup>[2,3]</sup> are considered to be the predominant causes unilateral lung destruction.<sup>[4,5,6,7,8,9]</sup> The use of TB (Tuberculosis bacilli ) smear positive detection still remains poor<sup>10</sup>, but the classical presentation of chest x-ray still remain high for the diagnosis of active pulmonary tuberculosis especially for developing countries where tuberculosis disease 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 a relapsed pulmonary tuberculosis.

## Case report:

Mr E I , was a 45 year old businessman who presented through the accident and emergency department with history of cough of 25years 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 screened for acid-fast bacilli, performed at a

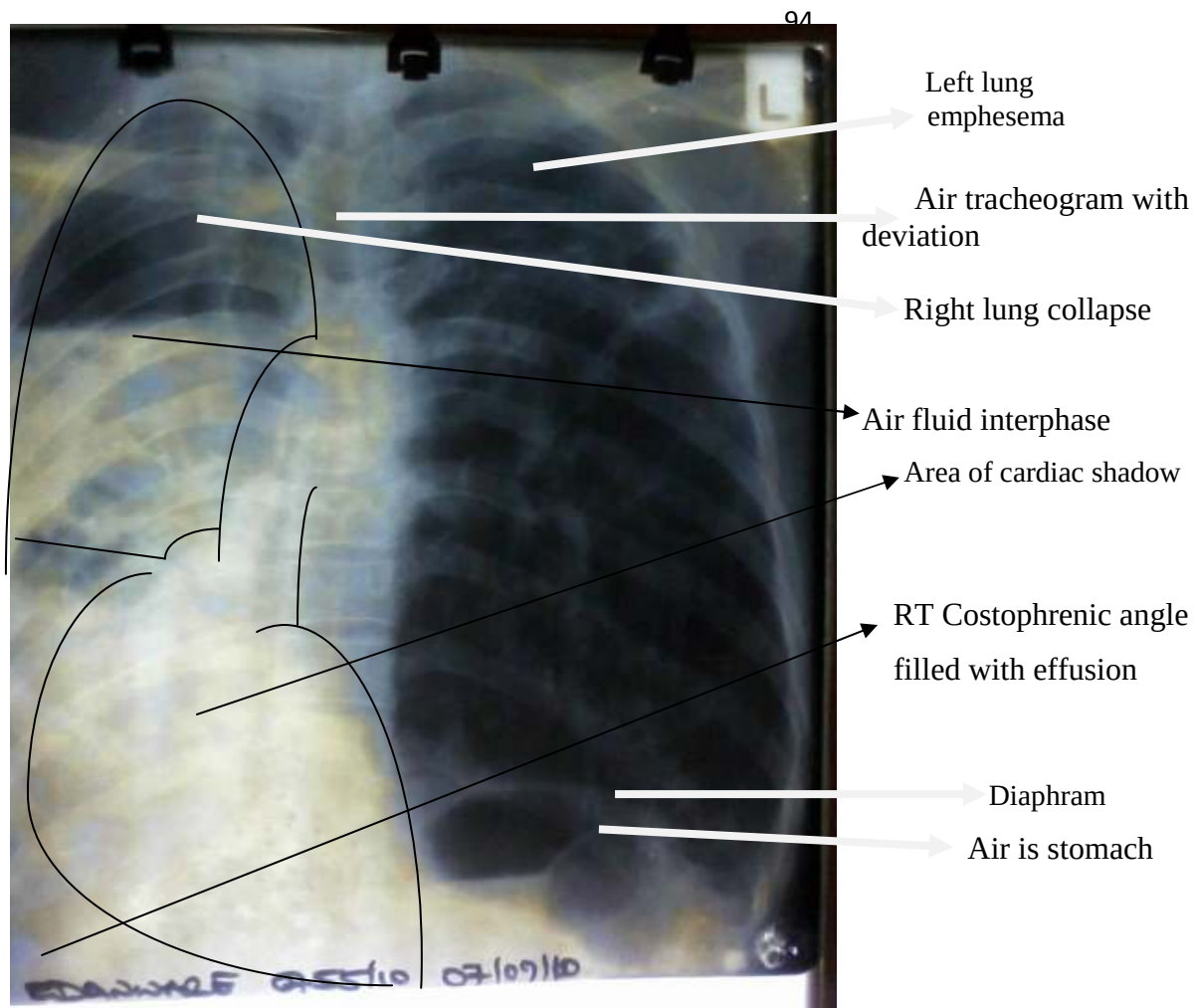
67 tuberculosis referral centre. Result was also negative for all three smears  
68 both in 2009 and 2010. He had been diagnosed twice for tuberculosis in  
69 the past and treated with anti-tuberculosis drugs twice as well. One of  
70 the course lasted for 8 months using category 1 therapy in 2009. A year  
71 later, he presented with the above clinical presentation.

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

78 He had x-ray film taken and reported on 2<sup>nd</sup> day post admission.<sup>[figure 1]</sup>  
79 Report revealed silhouette sign, indeterminate cardiac size, complete  
80 loss of normal cardiac /mediastinal outline, complete mediastinal shift to  
81 the right due to collapse of the right lung ,and thickened chest wall.  
82 Inhomogeneous opacities of right lung field (mid and basal lung zones)  
83 was noted. There were findings consistent with right upper and middle  
84 lobe lung collapse. Ipsilateral apex is devoid of lung marking with  
85 air/fluid level thus hydropneumothorax. There was feature of  
86 compensating emphysema of the left thoracic lung, focal cavitation and  
87 wide spread streaky changes worse in the upper lung zone, thoracic cage  
88 was intact.

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

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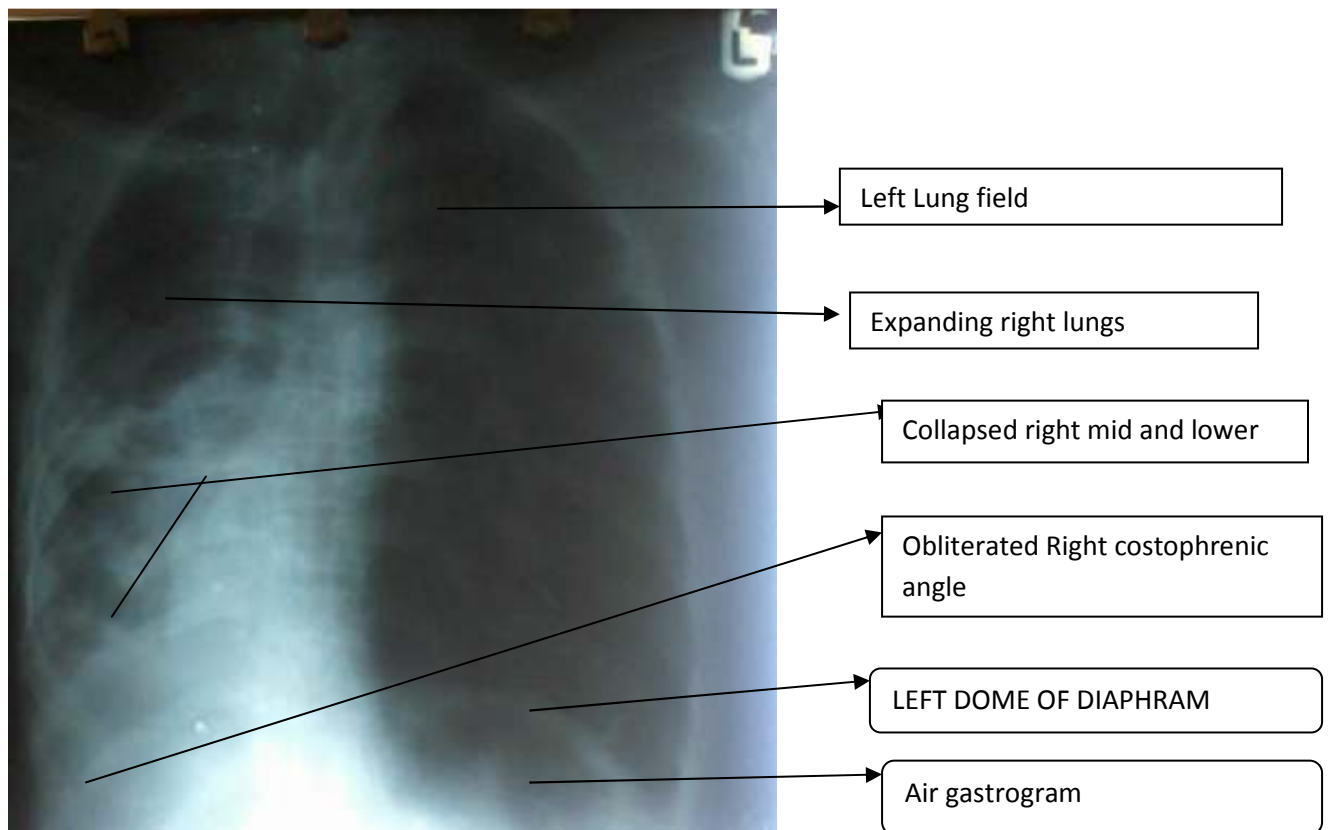


114 **Figure 1:**Second day film of destroyed left lung syndrome  
115 His full blood count showed packed cell volume of 24%, white blood  
116 cell count of  $79 \times 10^9$  cells/L. Among the white blood cells, neutrophil  
117 and lymphocyte consisted 75 and 24 percents respectively, which was

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, a 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<sup>[figure2]</sup> 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<sup>[fig 1]</sup>. The left lung field was spared and bony thorax was intact.

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147 Figure2; Resolving Pleural effusion  
148 Taken 20/9/10

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## Discussion:

Destroyed lungs syndrome is one of the morbidity of relapsed lungs tuberculosis, and commonly affect the left<sup>[1]</sup> because of its anatomical characteristics. Adefuye et al<sup>[1]</sup> 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<sup>[2]</sup> 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<sup>10</sup> 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<sup>10</sup>. 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 there was fibrosis in the right lungs field as confirmed in the x-ray film. This complication was noticed in my client as well. The reviewed study<sup>[2]</sup> 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

180 radiographic patterns as reported by Dosumu<sup>[2]</sup> in 2005 .Obviously, the  
181 patient did not have congenital situs-inversus because even on the both  
182 X-ray-film ,the stomach lies in the left side of the film as proven by the  
183 lucency of gastric air bubble(air gastrogram), therefore congenital situs-  
184 inversus was ruled out. Detection of destroyed lung should be easy with  
185 this review, beginning from clinical examination of the patient which  
186 may reveal heart sounds on contra- lateral side, increased tympanicity of  
187 the compensating lung zone. Other investigations that can be carried out  
188 are chest X-ray<sup>[fig1&2]</sup> and computed topography<sup>[3]</sup>. Chest X-ray and TB  
189 smears are the available investigations that are within reach in our  
190 centre, and are the basic for our DOT programmes especially in  
191 developing countries as recommended by WHO<sup>14</sup>. Other investigations  
192 for such complicated respiratory diseases such as bronchoscopy, CT-  
193 Scan<sup>10</sup>, and Pleural Biopsy are not at our disposal and pleasure for DOT  
194 practice moreover, patients cannot easily afford the cost for the  
195 investigations because most clients are of low socio-economical class.  
196 Our recent development is the installation of Gene-Expert for the  
197 diagnosis of Rifampicin resistant strain of Mycobacterium tuberculosis  
198 in a centralized TB center within the state. This development was few  
199 years later after this patient was seen, and the service is yet to kick-off.

200 The presence of fibrosis, mediastinal shift to the right, contra-lateral  
201 left compensatory emphysema and right sided tracheal deviation in the  
202 patient ,are strong clues for the possible cause of the pathologic

203 dextrocardia demonstrated by the absence of cardiac shadow on the left  
204 side of both radiographic films <sup>[fig1&2]</sup>. Therefore, the hypothetical  
205 pathologic process that followed as aftermath of chronic lung  
206 parenchyma disease could be described as thus; Lung collapse resulted  
207 from air leak into intra-thoracic space which has negative pressure  
208 followed by fibrosis formed from scar tissue of destroyed air sacs, lung  
209 tissue and capillaries ,then next to follow is tracheal deviation and  
210 mediastinal shift due to contracted fibrous tissue. Dosumu<sup>[2]</sup> went further  
211 stating that upper lung lobes are affected by tuberculosis other rather  
212 than the lower lobes ,as seen in the patient .However the left lung is  
213 reported<sup>1</sup> to be more affected in destroyed lung syndrome due to the  
214 anatomical structure of the left main bronchus, but for the index  
215 patient radiographic film shows otherwise. **The Histopathologic analysis**  
216 of Pleura tap showed no malignancy, but reported that there was fungal  
217 hyphae as contaminant. It could be possible that there was fungal  
218 infection which was part of the pathology the lung. Other reports <sup>[3,11]</sup>  
219 have notice fungal infection following pulmonary tuberculosis, and that  
220 surgery is a viable treatment option. Prognosis for Tuberculosis  
221 destroyed lung is poor <sup>13</sup> Example of surgical options for destroyed  
222 lungs<sup>[5]</sup> from chronic infections such as pulmonary tuberculosis<sup>[10]</sup> and  
223 Aspergilosis<sup>[11]</sup> are thoracostomy with chest tube insertion and  
224 pneumonectomy<sup>[10,11,12]</sup>. This may be considered as options where  
225 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.<sup>10,12,13</sup>.The radiological syndromic features of a Tuberculosis destroyed lung based the graphical description and other references are contra-lateral emphysema, fibrosis, tracheal deviation to affected side with fibrosis, 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.

### **Conclusion:**

The radiographic changes described along with other references<sup>1,2,3,fig1&2</sup> 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<sup>1</sup> to strengthened DOTs and prevent recurrence, thereby reducing morbidity and mortality that may arise.

### **References:**

1. Adefuye B.O. ,Adefuye P.O. ,Ogunkoya O.J;Right Destroyed lung in a Nigerian woman with complicated Tuberculosis Simulating **Situs Inversus** ;Abstr, Am J Respir Crit Care Med 181;2010:A5456.
2. Dosumu E.A ; Chest Radiographic Findings in Newly Diagnosed Pulmonary Tuberculosis Cases in Iwo, Nigeria, Nigerian Medical Practitioner , Vol 47, No 1(2005).

3. Masaki I, Makoto S, Hiroshi D.; Resection of bronchial stricture and destroyed lungs after pulmonary tuberculosis. Oxford Journal Medicine Interactive cardiovasc thoracic surgery Doi 10.1093/icvts/ivs054 online ISSN 1569-9285(2012).
4. Rajasekaran S., Vallinayagi V. , Jeyaganesh D. : Unilateral Lung Destruction ; A computed Topographic Evaluation Ind.J.Tub., 1999, 46, 183.
5. Conlan AA, Lukanich JM, Shutz J, Hurwitz SS. Elective pneumonectomy for benign lung disease: modern-day mortality & morbidity J Thorac Cardiovasc Surg 1995; 110(4 pt 1): 1118-1124.
6. Blyth DF, Buckelsa NJ, Sewsunkera R, Sonib MA. Pneumonectomy in children Eur J Cardio Thorac Surg 2002; 22: 587-594.
7. Le Roux BT, Mohlala ML, Odell JA, Whitton ID. Suppurative diseases of the lung and pleural space. . Part II: bronchiectasis. Current problems in surgery, vol. 2. Chicago, IL: Year Book Medical Publishers; 1986. pp. 97-159.
8. Massard G, Dabbagh A, Wihlm JM, et al. Pneumonectomy for chronic infection is a high-risk procedure Ann Thorac Surg 1996; 62: 1033-1038.
9. Fischer WW, del Missier PA. The surgical treatment of tuberculosis in children J Thorac Cardiovasc Surg 1959; 38: 501-522.
10. Lianqi Bai , Zheng Hong, Changfan Gong, Dongjie Yan, Zikun Liang Surgical treatment efficacy in 172 cases of tuberculosis-destroyed lungs. European Journal of Cardio-Thoracic Surgery Advance Access published December 12, 2011 .
11. Altug Kosar, Alpay Orki , Hakan Kiral, Recep Demirhan, Bulent Arman, : Pneumonectomy in Children for Destroyed Lung: Evaluation of 18 Cases; Ann Thorac Surg 2010; 89: 226-231.

- 276 12.Chun Sung Byun, Kyung Young Chung, Kyoung Sik Narm, Jin Gu Lee,  
277 Daejin Hong,and Chang Young Lee; Early and Long-term Outcomes of  
278 Pneumonectomy for Treating Sequelae of Pulmonary Tuberculosis:Korean J  
279 Thorac Cardiovasc Surg. 2012 April; 45(2): 110–11.
- 280 13.Ryu, Y. J. Lee, J. H.Chun, E-M. Chang, J. H, Shim, S. S. Clinical outcomes  
281 and prognostic factors in patients with tuberculous destroyed lung. The  
282 International Journal of Tuberculosis and Lung Disease, Volume  
283 15, Number 2, February 2011 , pp. 246-250(5)
- 284 14.Philip C. Hopewell; International standard for tuberculosis care, WHO,  
285 January 2006 pP 8,