

Case Study

Radiological features of Right destroyed lungs syndrome with pathologic dextrocardia.

Abstract:

Chronic lungs disease such relapsed tuberculosis of the lungs could lead to complications that could alter the gross anatomy of a region of the body. Complications have been reported from chronic and relapsed lungs infections such as Mycobateruim 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 dextro cardia 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. With first 8 days on in-patient basis.

Radiographic complications in the index case were mediastinal shift, gross distortion of the right lung with associated fibrosis ,contra-lateral 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 should guide against relapsed tuberculosis by revamping direct observe treatment(DOT) through counseling ,as well as prevent transmission of multi-drug resistance tuberculosis through proper investigation.

Keywords: Destroy lungs syndrome, DOT, lungs tuberculosis.

Introduction :

Radiological presentation of destroyed lung syndrome as 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 in this present days 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 (Tuberculous bacilli) smear positive detection still remains poor¹⁰, 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 is to described the the radiological features of a term known as destroyed lung syndrome with associated pathologic dextrocardia on a background of a relapsed pulmonary tuberculosis.

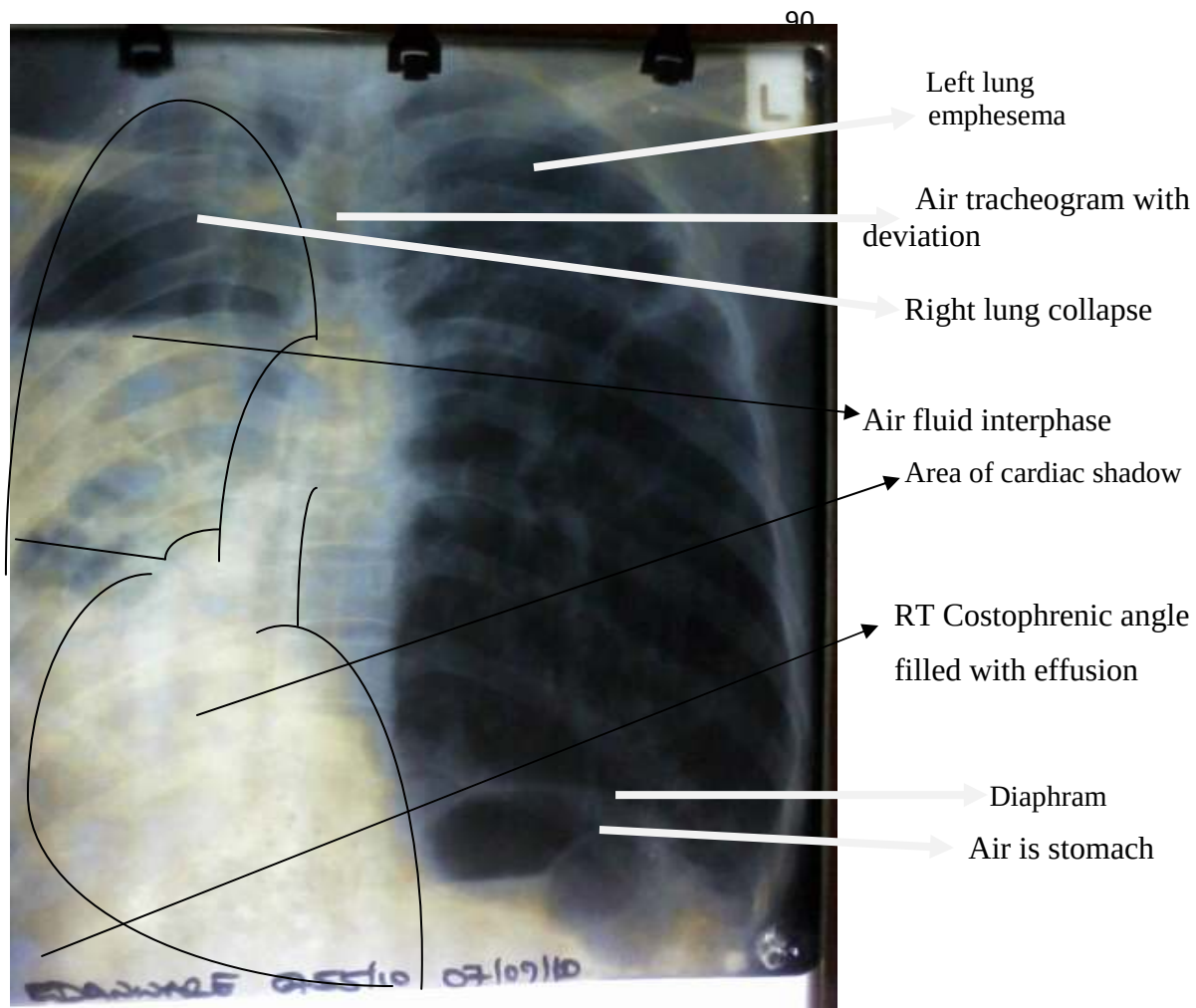
Case report:

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 tuberculosis referral centre. Result was 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, 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 dextro-cardia secondary to relapsed Smear negative Pulmonary tuberculosis with super-imposed infection.

He had x-ray film taken and reported on 2nd day post admission.^[figure 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 was consistent finding of 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, 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.



110 **Figure 1:**Second day film of destroyed left lung syndrome
 111 His full blood count showed packed cell volume of 24%, white blood
 112 cell count of 79×10^9 cells/L. Among the white blood cells, neutrophil
 113 and lymphocyte consist 75 and 24 percents respectively, which was
 114 reported seventh day later, after admission. HE was transfused with 2
 115 units of sedimented blood cells and 1 unit of whole blood. He was
 116 placed on category 11 anti tuberculosis therapy. A combination therapy
 117 consisting Rifampicin, Isoniazid , Pyrazinamide and Ethambutol. Three

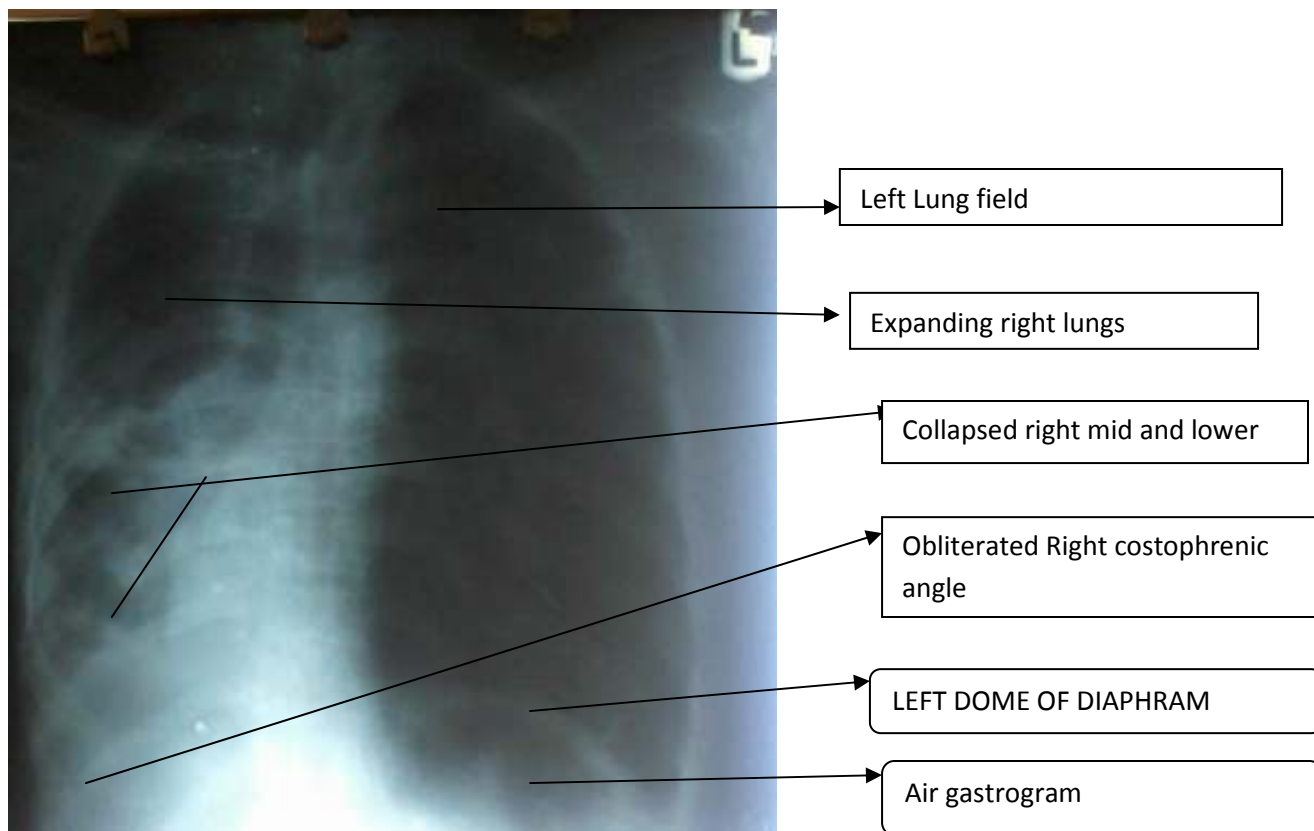
118 tablets of these combination daily was administered as well as
119 intramuscular streptomycin, (0.75g) 1.5mls in accordance with his
120 weight estimation. streptomycin was taken three times in a week, a
121 least alternate days. He had his medication for up to for almost 4
122 months on out-patient basis in this facility. However from recent follow-
123 up of the patient, He had continued his medication for up to 4 months
124 on out-patient basis before he stopped visiting this facility, the severity
125 of orthopnoea, dyspnoea and cough had drastically reduced after 8
126 days of medication on in-patient basis.

127 A repeat X-ray film^[figure2] of the chest performed 14 days later,
128 showed silhouette sign with associated inhomogeneous opacities and
129 cavitations within the right lungs field. Features were consisted with
130 right lung collapse, especially the mid and lower lobes. There was
131 obliteration of the right costophrenic and diaphragmatic angle with
132 effusions but reduced as compared to previous X-ray film^[fig 1]. The left
133 lung field was spared and bony thorax was intact.

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143 Figure2; Resolving Pleural effusion

144 Taken 20/9/10

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151 Discussion:

152 Destroyed lungs syndrome is one of the morbidity of relapsed lungs
153 tuberculosis, and commonly affect the left ^[1] because of its anatomical
154 characteristics. Adefuye et al ^[1] demonstrated in a poster presentation,
155 that destroyed lung syndrome could involve the right lung rather than the
156 left lung which was the same with the reported case. A clinical study^[2]

157 that was carried out between January 1996 and December 1997, showed
158 that of Five hundred newly diagnosed cases of Pulmonary Tuberculosis
159 that were treated with directly observed short-course
160 treatment(DOT).Hundred of them had chest radiographic examination
161 done. Another series reported that out of 172 patients, a total of 116 patients had
162 a destroyed left lung and 56 cases had a destroyed right lung.This further confirms
163 that left are mostly involved than a right ¹⁰. Cases of destroyed lung syndrome
164 stands at 5(5%),while 80% where in HIV sero-positive patients. This
165 fact proves that the reported complication is not a common phenomenon
166 and is more associated with HIV sero-positive patients rather than sero-
167 negative patient. The index case was HIV sero-negative. Moreover there
168 was fibrosis in the right lungs field as confirmed in the x-ray film. This
169 complication was noticed in my client as well. The reviewed study^[2]
170 stated that 70% of studied films had fibrosis in about 57.1% patients
171 which were sero-negative. Other complications seen in the reported
172 patients were pleural effusion , contra-lateral emphysema with cavitation
173 .The listed complications in the reported patient showed some of the
174 radiographic patterns as reported by Dosumu^[2] in 2005 .Obviously, the
175 patient did not have congenital situs-inversus because even on the both
176 X-ray-film ,the stomach lies in the left side of the film as proven by the
177 lucency of gastric air bubble , therefore congenital situs-inversus was
178 ruled out. Detection of destroyed lung are quite easy ,beginning from
179 clinical examination of the patient which may reveal heart sounds on

180 contra- lateral side, increased tympanicity of the compensating lung
181 zone. Other investigations that can be carried out are chest X-ray^[fig1&2]
182 and computed topography^[3]. Chest X-ray and TB smears are the
183 available investigations that are within reach in our centre, and are the
184 basic for our DOT programmes especially in developing countries as
185 recommended by WHO¹⁴. Other investigations for such complicated
186 respiratory diseases such as bronchoscopy, CT-Scan¹⁰, and Pleural
187 Biopsy are not at our disposal and pleasure for DOT practice moreover,
188 patients cannot easily afford the cost for the expenses because most
189 clients are of low socio-economical class. Our recent development is the
190 installation of Gene-Expert for the diagnosis of Rifampicin resistant
191 strain of Mycobacterium tuberculosis in a Centralised TB center. This
192 development was few years later after this patient was seen.

193 The presence of fibrosis , mediastinal shift to the right, contra-lateral
194 left compensatory emphysema and right sided tracheal deviation in the
195 patient ,are strong clues for the possible cause of the pathologic
196 dextrocardia demonstrated by the absence of cardiac shadow on the left
197 side of both radiographic films^[fig1&2]. Therefore, the hypothetical
198 pathologic process that followed as aftermath of chronic lung
199 parenchyma disease could be described as thus; Lung collapse resulted
200 from air leak into intra-thoracic space which has negative pressure
201 followed by fibrosis formed from scar tissue of destroyed air sacs, lung
202 tissue and capillaries ,then next to follow is tracheal deviation and

203 mediastinal shift due to contracted fibrous tissue. Dosumu^[2] went further
204 stating that upper lung lobes are affected by tuberculosis other rather
205 than the lower lobes ,as seen in the patient .However the left lung is
206 reported¹ to be more affected in destroyed lung syndrome due to the
207 anatomical structure of the left main bronchus, but for the index
208 patient radiographic film shows otherwise. Pleura tap of the reported
209 showed no malignancy, but reported that there was fungal hyphae as
210 contaminant. It could be possible that there was fungal infection which
211 was part of the pathology the lung. Other reports^[3,11] have notice fungal
212 infection following pulmonary tuberculosis, and that surgery is a viable
213 treatment option. Prognosis for Tuberculosis destroyed lung is poor¹³
214 Example of surgical options for destroyed lungs^[5] from chronic
215 infections such as pulmonary tuberculosis^[10] and Aspergilosis^[11] are
216 thoracostomy with chest tube insertion and pneumonectomy^[10,11,12]. This
217 may be considered as options where conservative management and DOT
218 fails putting into perspective, the clinical state of the respiratory
219 system. However the surgical option have been reported to be faced
220 with dire complications.^{10,12,13} The radiological syndromic features of a
221 Tuberculosis destroyed lung based the graphical description and other
222 references are contralateral emphesema, fibrosis, tracheal deviation to
223 affected side with fibrosis, distant heart sounds, lung collapse, and
224 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^{1,2,3,fig1&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 testing¹ to strengthened DOTs and prevent recurrence, thereby reducing morbidity and mortality that may arise.

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