
RADIOGRAPHIC PATTERNS OF ACTIVE PULMONARY TUBERCULOSIS DISEASE IN FILIPINO PEDIATRIC PATIENTS AND THEIR CORRELATION WITH SYMPTOMS, LENGTH OF HOSPITAL CONFINEMENT AND CLINICAL DISPOSITION

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ABSTRACT

Tuberculosis (TB) is a worldwide public health problem of epidemic proportion with Philippines as one of top affected countries. Chest radiographs are mainstay in the diagnosis of primary TB presenting with wide spectrum of radiographic patterns. Despite high incidence in the Philippines, local epidemiologic data on childhood TB is limited.

The purpose of this study is to determine the common radiographic patterns in Filipino pediatric patients with proven active tuberculosis disease and to validate its correlation with the symptoms, length of hospital stay and clinical disposition.

This is a retrospective study of 83 chest radiographs of patients with active tuberculosis disease by three pediatric radiologists. Included are pediatric admitted at St. Luke's Medical Center and National Children's Hospital from January 2003 to June 2005 without co-morbidities. The films were assessed using a standardized questionnaire for the presence of pulmonary and extrapulmonary abnormalities. The clinical profile and radiographic data were analyzed using Chi-square, Fischer's exact test and Analysis of Variance.

Radiographic features include normal, lymphadenopathy, air space and cavitary lesions, pleural effusion, pericarditis, miliary and Pott's disease. Lymphadenopathy is predominant intrathoracic radiographic abnormality. Miliary TB was linked with younger age bracket, positive culture results and high mortality. The presence of Pott's disease was related to increased morbidity, requiring longer hospital admission.

The World Health Organization (WHO) declared tuberculosis (TB) as a global emergency in 1993, since it remains to be a worldwide major public health problem, in spite of the advances in the field of medicine. One-third of the world's population is infected with tuberculosis. TB has reached epidemic proportions in many developing countries with the biggest burden in Asia and Africa. The Philippines ranked third in the new-smear positive TB notification rate in the WHO-WPR report 2003. The WHO estimates that the Philippines has nearly 237,000 incidences of TB every year, making it the second in Southeast Asia, next to China and ninth-ranked country in the world in terms of the overall number of cases. The morbidity rate from TB in the Philippines has variable trend, while the mortality rate has fallen over the past 20 years. Still, around 75 Filipinos die each day from TB and some unaccounted numbers of these are children.

An estimated 1.3 million of the 8 million new cases are children in 1990. In 1995, at least 180 million children under 15 years old are infected worldwide and 450,000 children died of tuberculosis. In 1997, National Prevalence Survey in the Philippines conducted by Dr. Tupasi covering 21,960 individuals showed that 27.6% were younger than 10 years old and 22.7% were in the 10-19 years age group.

Given these extensive enormities of international data and the numerous cases in the Philippines, detailed local researches which deal with epidemiologic and radiographic patterns of tuberculosis in Filipino children are still limited. In the light of these present situations, this paper is an attempt at providing a collective local data of radiographic patterns in association with the clinical history and course which will serve as a catalyst to take advertence in this gravely affected young group of population.

The objectives of this study are to determine the common radiographic patterns of proven active primary progressive tuberculosis in Filipino children and to validate their correlation with presenting symptoms, length of hospital stay and disposition after hospital admission.

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METHODS

This is a retrospective review of 83 chest radiographs and charts of proven active tuberculosis patients (male: 55 and female: 28) aged 4 months to 18 years old (mean age: 7.8 years old) admitted at St. Luke's Medical Center and National Children's Hospital from January 2003 to June 2005 selected from a pool of 120 patients known to have primary tuberculosis.

The diagnosis of tuberculosis was based on the clinical bacteriologic and radiologic evaluation. The following parameters were considered: (1) history of exposure to an adult or adolescent with active tuberculosis, (2) one or more symptoms suggestive of tuberculosis namely, cough / fever >2wks, painless lymphadenopathy, poor weight gain, (3) Mantoux tuberculin test /Purified Protein Derivative (PPD) positive (induration of 10 mm or more), (4) positive findings in laboratory tests such as acid-fast bacilli (AFB) smear, gastric aspirate culture and polymerase chain reaction (PCR) and (5) abnormal chest radiographs. Only those who satisfied at least three of the mentioned criteria were included. Patients with congenital TB and distant extrathoracic tuberculosis (such as tuberculous meningitis, hepatorenal TB and scrofuloderma) were excluded. Subjects with co-morbid conditions such as Congenital Heart Disease (CHD), Bronchiolitis Obliterans Organizing Pneumonia (BOOP), pneumothorax, and hematologic malignancies (Leukemia), were not included, as well as those who were discharged against medical advice and readmitted for another circumstance. Incomplete clinical data and unsatisfactory chest radiographs were likewise disqualified. Patients' medical records and charts were retrieved and reviewed to document their initial clinical presentation, hospital stay and state upon discharge from the hospital.

All the chest radiographs were done at St. Luke's Medical Center, X-ray Department with mAs ranging from 2 to 5 and kVp of 20-30. Films were taken on anteroposterior and lateral views for children less than 2 years old, while patients with ages 3 years above were taken on posteroanterior and lateral views. An immobilizer was utilized for the younger age group to guarantee good quality radiographs. The films were reviewed by three reputable pediatric radiologists using a standardized questionnaire for the presence of pulmonary and extrapulmonary intrathoracic abnormalities. The evaluators were blinded of clinical information. A consensus reading was made for each film.

All data were coded and statistically analyzed using Chi-square and Fischer's exact test to determine association between categorical variables (frequency data) and Analysis of variance (ANOVA) to compare continuous variables. A 95% confidence level was considered significant.

RESULTS

Clinical and Radiographic Profile of Children with Active Tuberculosis, By Age Group

A total of 83 subjects classified with PTB Disease were included in the study, with ages ranging from 4 months to 18 years. Mean age of the patients was 7.8 years. Nine subjects were less than 1 year, 23 were from ages 1-5 years, 26 were from ages 6-10 years and 25 were 11 years old and above. The demographics together with laboratory work-ups are presented in the graph. There is male preponderance occurring at 66% (n=55), with significantly more in the group of 11 years old above.

The most common symptoms of active tuberculosis were cough (95%) and fever (87%), followed by weight loss (76%). No significant difference among the age groups was demonstrated in most of the presenting signs and symptoms, except for chest pain (P=0.036) and back pain (P=0.035) which were found more in the older groups. More than half (n=45) had been exposed to infected individuals.

Positive Purified Protein Derivative (PPD) was noted within 65% (n=54) of all patients, increasing in incidence with increasing age (P=0.003). There was a higher proportion of children less than 1 year old who presented with a + AFB (P=0.013), in that two out of nine among this group turned out positive. AFB was identified in 16% (n=3) of the 19 culture positive children. Thirty-nine of 72 patients with PCR studies were positive (Table 1).

Of the 83 radiographs reviewed, only 6 (7%) were normal. Majority has lymphadenopathies, reaching up to 64% (n=53). This includes lymph node enlargement as a solitary finding and as part of Ghon focus occurring at 4% (n=2) and 96% (n=51) respectively. The right lymphatic chain was involved in 66% (n=35). There were a significantly higher proportion of subjects with lymphadenopathy among younger groups (P=0.004) than in the older groups. Subsequent bronchial and tracheal compressions were seen in 10 cases (12%). Atelectasis was demonstrated in 22% (n=18). Eighty percent (n=14) of which were sequelae of lymphadenopathies.

Sixty-four patients (78%) have parenchymal infiltrates. Air space opacities were found in 52 patients (63%). Right middle lobe, both lower lobes and lingular segment involvement predominated. Cavitory lesions appeared in 23% (n=19) of these patients. Miliary pattern was evident in 10% (n=8) with significantly higher proportion in subjects younger than 1 year old (P=0.038). Ten (12%) were found with bronchiectasis. Nearly one-seventh (n=12) has fibrotic response and interstitial thickening.

Pleural effusion was present in one-fourth of the primary cases. Five had massive effusion. One of which was proven to be empyema. Two patients presented with cardiac shadow enlargement. One had pericardial effusion,

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Table 1. Gender, Clinical Signs and Symptoms of Active Tuberculosis in Children

	<1 yr N=9	1-5 yrs N=23	6-10 yrs N=26	11-18 yrs N=25	P value	All N=83
Gender						
Male	6 (67%)	10 (43%)	21 (81%)	18 (72%)	0.042	55 (66%)
Female	3 (33%)	13 (57%)	5 (19%)	7 (28%)		28 (34%)
History/Symptoms						
Fever	9	21	20	22	0.260	72 (87%)
Cough	9	22	23	25	0.231	79 (95%)
Hemoptysis	0	1	2	6	0.077	9 (11%)
Chest pain	0	3	5	10	0.036	18 (22%)
Back pain	0	1	1	6	0.035	8 (10%)
Wt loss	7	18	19	19	0.977	63 (76%)
PTB Exposure	6	16	15	18	0.720	45 (55%)
Examinations						
+PPD	2 (22%)	12 (52%)	22 (85%)	18 (72%)	0.003	54 (65%)
+AFB smear	2	0	1	0	0.013	3
+Culture	4	3	9	3	0.061	19
+PCR	5/7	10/20	13/23	11/22	0.756	39/72

Table 2. Individual Radiographic Findings by Age Group

	<1 yr N=9	1-5 yrs N=23	6-10 yrs N=26	11+ N=25	P value	All N=83
Normal	0	3	1	2	0.507	6 (7%)
Lymphadenopathy	8 (89%)	18 (78%)	17 (65%)	10(40%)	0.004	53 (64%)
• Solitary finding	1	1	0	0		2 (4%)
• Ghon focus	7	17	17	10	51 (96%)	
Air space opacities	3 (33%)	16 (70%)	14 (54%)	18 (76%)	0.061	52 (63%)
Fibrosis/thickening	1	2	4	5	0.721	12 (14%)
Cavitation	0	3	7	9	0.085	19 (23%)
Bronchiectasis	2	2	2	4	0.580	10 (12%)
Atelectasis	2	4	6	6	0.948	18 (22%)
Pleural effusion	1	4	8	8	0.732	21 (25%)
Miliary/disseminated	3	0	3	2	0.038	8 (10%)
Potts disease	0	3	2	3	0.673	8 (10%)
Tracheal/bronchial compression	3	3	2	2	0.229	10 (12%)
Hyperaeration	2	3	1	1	0.039	7 (8%)

Association of Clinical Data of Active Tuberculosis Patients and their Radiographic Patterns

Table 3: Summary of patient grouping according to their radiographic patterns

Groups	Radiographic Patterns
• Group A	Normal
• Group B	Isolated lymphadenopathy and/or air space opacities without findings belonging to the succeeding groups
• Group C	Bronchiectasis
• Group D	Cavitary lesions (may have associated findings other than military TB and Pott's disease)
• Group E	Miliary TB (may have other findings, except for Pott's disease)
• Group F	Potts Disease (with or without other findings)
• Group G	Extrapulmonary intrathoracic features such as pleural effusion/ cardiac shadow abnormalities except those belonging to Groups C-F

while the other had constrictive pericarditis. Paraspinal masses associated with osseous destruction were appreciated in 10% (n=8); Pott's disease was observed in the older age bracket.

Normal chest radiographs are assigned in the first group, Group A. Group B comprised of patients with radiographic findings of air space opacities and/or lymphadenopathy accompanied by atelectasis, tracheal/bronchial compression, fibrosis/ interstitial thickening, hyperaeration. Those with other findings such as cavitations, miliary, Pott's disease, pleural effusion are not integrated with this set. Group C includes bronchiectatic radiographic changes in combination with other uncom-

plicated features. Cavitory lesions belong to group D apart from other findings, while miliary and Pott's disease are automatically clustered in group E and F respectively. The three latter groups stand regardless of other features under Group B, C and G. Group G is composed of subjects with extrapulmonary intrathoracic findings such as cardiac shadow abnormality and pleural effusion with or without accompanying findings in Group B; pleural fluid collection with Bronchiectasis, cavitations, miliary and Pott's disease are excluded from this group. These may have overlapping characteristics; however, the groupings are divided on the basis of severity of the roentgen findings as described.



Figure 1. Normal chest radiograph of a seven-year-old female with cough. PPD, AFB and culture yielded negative results. PCR, on the other hand, was positive. (Group A)

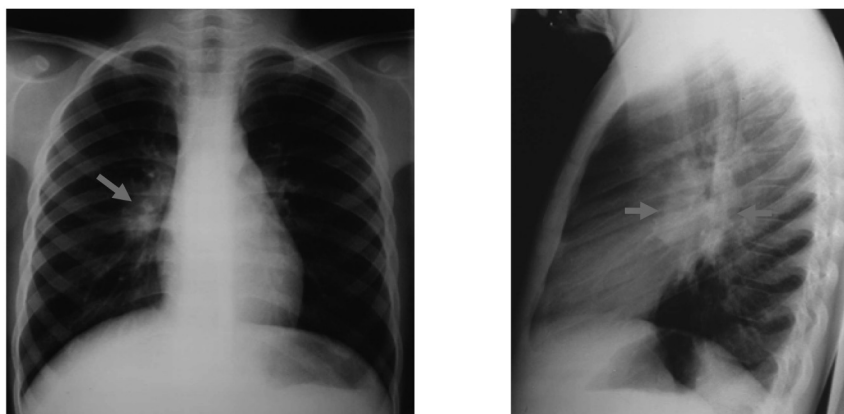


Figure 2. Right parahilar lymphadenopathy (arrow) in a nine year old boy presenting with cough and fever. There was history of exposure. Skin test was positive, while the rest of the examinations were negative. (Group B)

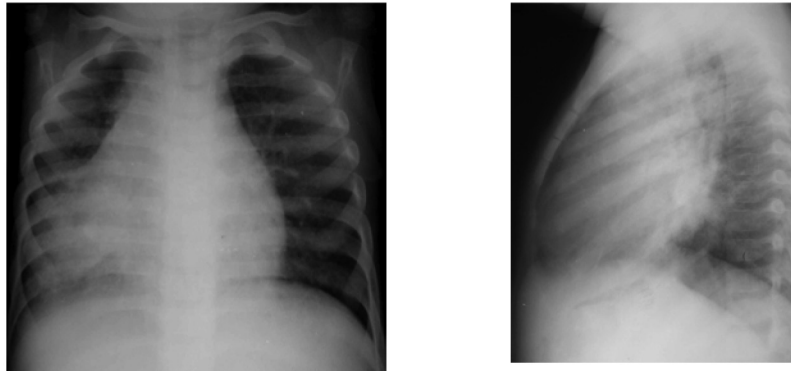


Figure 3. Chest radiographs obtained from an eighteen-month-old boy showing bilateral paratracheal and parahilar lymph node enlargement with infiltrates predominating the right middle lobe. Chief complaint were cough, fever and chills. Weight loss was also noted. PPD was positive. AFB, culture and PCR were negative. (Group B)

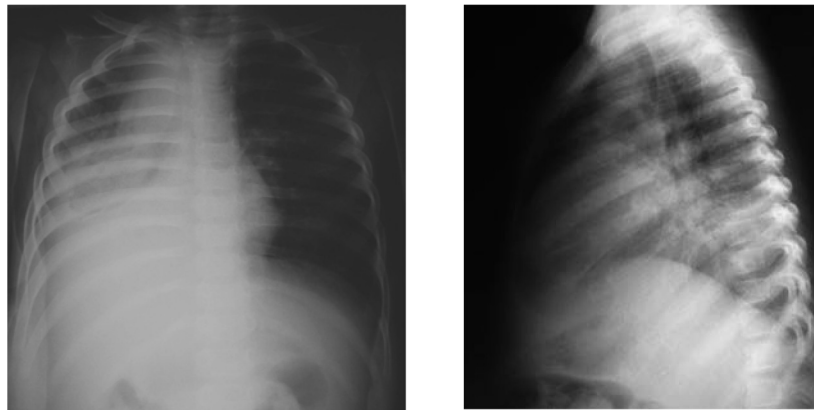


Figure 4. Another case of a one-year and six-month old boy with endobronchial TB presenting with prolonged fever and cough. Examinations, including PCR, yielded negative results. Chest radiograph shows enlarged paratracheal and perihilar lymph nodes with consolidation of the right middle lobe accompanied by air bronchogram. He stayed in the hospital for nearly a month and was discharged improved. (Group B)

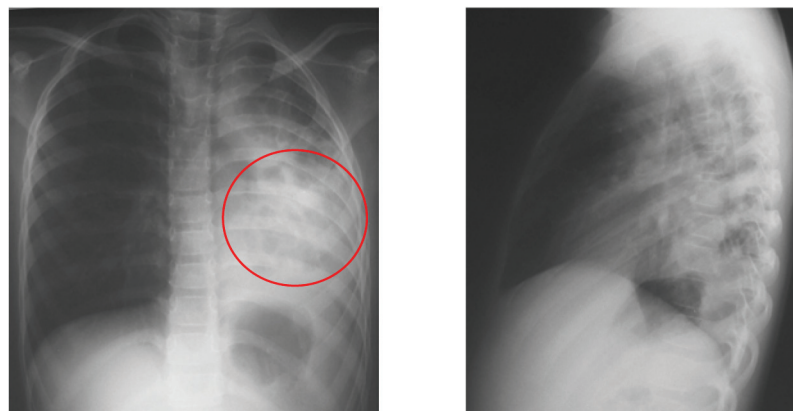


Figure 5. Bronchiectatic changes in the left lung (encircled) with ipsilateral shifting of the mediastinal structures and compensatory hyperaeration of the right lung indicative of volume loss. The patient is a six year-old malnourished girl presenting with chronic cough, fever, anorexia, and weakness. PCR yielded positive results. She was admitted for a week and was discharged improved. (Group C)

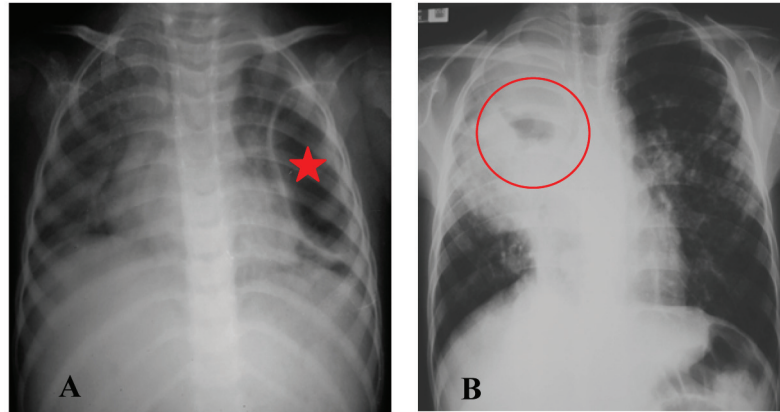


Figure 6. Cavitory lesions. Fig. 6 A is a posteroanterior chest radiograph from a five and a half old female with cough and hemoptysis. All of the examinations done were negative except for PCR. Patient was admitted for 28 days and subsequently clinically improved. The frontal projection reveals streaky opacities in both middle and lower lobes with large cavity formation on the left lung encompassing the upper and lower zones (asterisk). Fig. 6 B is from a thirteen-year old male presenting with cough and dyspnea. It shows perihilar opacities with right upper lobe alveolar densities and a cavity with air-fluid level (encircled). There is interstitial thickening of the left upper lobe and lingular segment. Evident miliary pattern is also appreciated. (Group D)

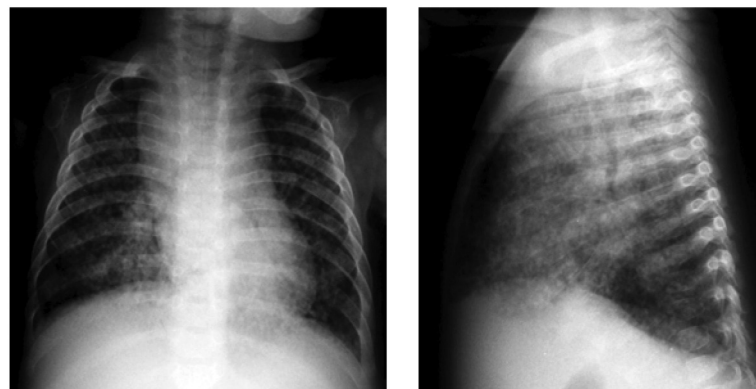


Figure 7. Miliary TB in a five-month-old male infant who manifested with fever, cough, multiple palpable neck nodes and failure to thrive. Patient was apparently exposed to an infected adult. Culture and PCR were positive for mycobacterium. The film taken upon admission clearly depicts uniform stippling of both lungs. He was confined for 34 days and was discharged improved. (Group E)

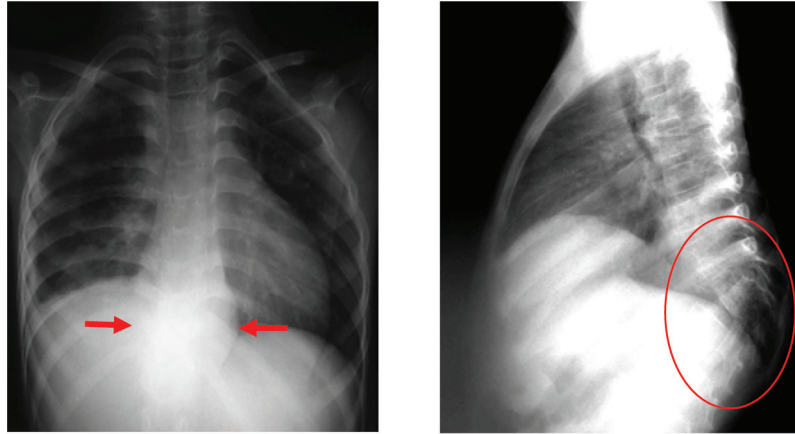


Figure 8. Paraspinal mass (arrows) with associated destruction of the adjacent thoracic spine (encircled). The eight-year-old boy complained of nagging back pain. He also had cough. There was positive history of exposure. He had a 15mm induration with Mantoux test. AFB and culture were negative, but PCR was positive. He was in the hospital for 40 days. (Group F)

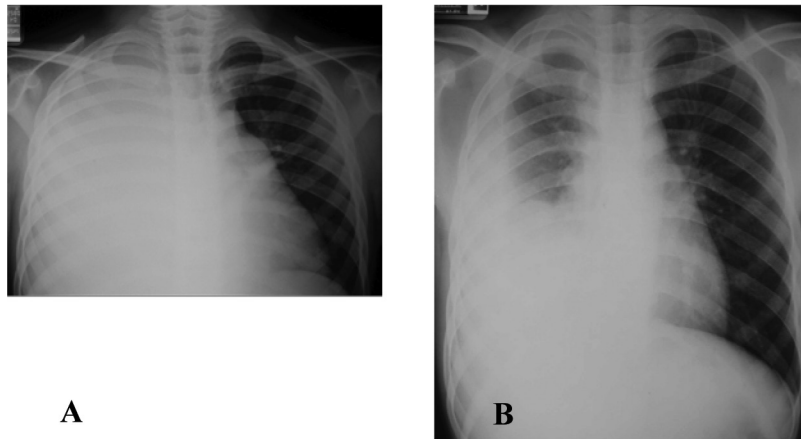


Figure 9. Tuberculous empyema. Fig. 9 A is a radiograph of a seven-year-old boy consulting for fever, cough and dyspnea. Chest x-ray shows complete opacification of the right hemithorax. Culture from the pleural fluid collected upon closed chest tube insertion proved to be positive for *Mycobacterium tuberculosis*. Fig 9 B is from a thirteen-year old boy with fever and cough accompanied by anorexia and weight loss. PPD was positive. Patient has right middle to lower lobe opacities with volume loss with pronounced blunting of the right sulcus and posterior gutter highly suggestive of pleural effusion. (Group G)

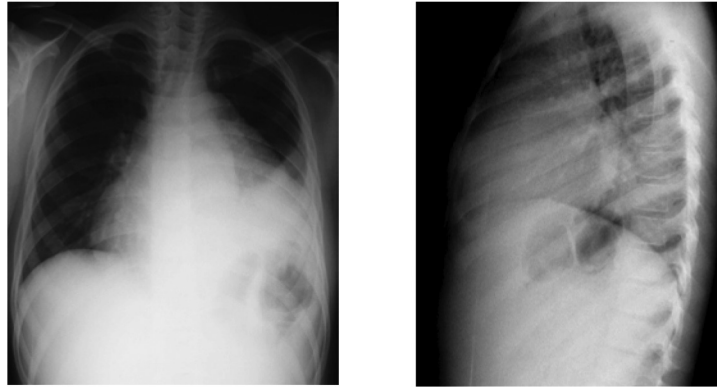


Figure 10. Enlargement of the cardiac shadow with soft tissue density following the pericardium on the left. The left sulcus and hemidiaphragm are likewise obscured secondary to concomitant pleural effusion. This eighteen-year old male was brought to the emergency room because of chest pain. Echocardiograph revealed arrhythmia and pericardial thickening. He was transferred to the Philippine Heart Center for further management. (Group G)

Table 4. Signs and symptoms in correlation with the radiographic groupings

Signs and Symptoms	Grp A N=6	Grp B N=23	Grp C N=9	Grp D N=15	Grp E N=7	Grp F N=8	Grp G N=15	P value
Fever	3	19	7	14	6	7	14	0.851
Cough	6	23	9	14	6	7	14	0.684
Hemoptysis	2	0	1	3	0	0	2	0.123
Chest pain	1	5	1	6	0	2	2	0.375
Back pain	2	1	1	1	0	2	1	0.249
Wt loss	3	16	7	11	5	7	13	0.651
PTB Exposure	6	14	8	8	4	5	10	0.08
Examinations								
+PPD	2	12	7	10	5	8	7	0.09
+AFB smear	0	0	1	0	1	0	1	0.425
+Culture	0	6	2	3	3	0	9	0.023
+PCR	3	13	4	7	5	4	1	0.298

There is no association between symptoms and radiographic patterns was established. Likewise, no correlation was exhibited among the radiographic patterns and skin test, AFB, PCR. However, more tested positive with culture among patients miliary pattern ($P=0.023$).

Hospital confinement ranged from 3 to 90 days. The following illustration exemplifies the comparison of the length of the hospital stay among the different groups. The normal group stayed in the hospital for less than 2 weeks with an average stay of 6 days. There is significant difference in the hospital stay of the normal group when compared to patients with bronchiectasis, cavitations, miliary, and pleural effusion. Group A, B, C, D and E have approximately near average length of stay of more than two weeks. Those with Pott's disease were admitted the longest with a mean of 42 days. Therefore, Group F has significantly longer hospital stay when compared to the rest.

Ninety-five percent ($N=79$) of the patients improved prior to discharged. Miliary pattern is associated with high mortality ($P=0.000$). See Appendix C Table 3. Two out of seven patients died with disseminated tuberculosis. Two patients with constrictive pericarditis and pericardial effusion were transferred, one had pericardiectomy, while the other developed bronchial fistula and subsequently underwent video-assisted thoracostomy.

DISCUSSION

Pulmonary tuberculosis is classically divided into primary and post-primary or reactivation TB. Dr. Caffey differentiated primary complex referring to changes in the lungs, lymphatics, and pleura in association with the implanted inhaled mycobacterium from post-primary tuber-

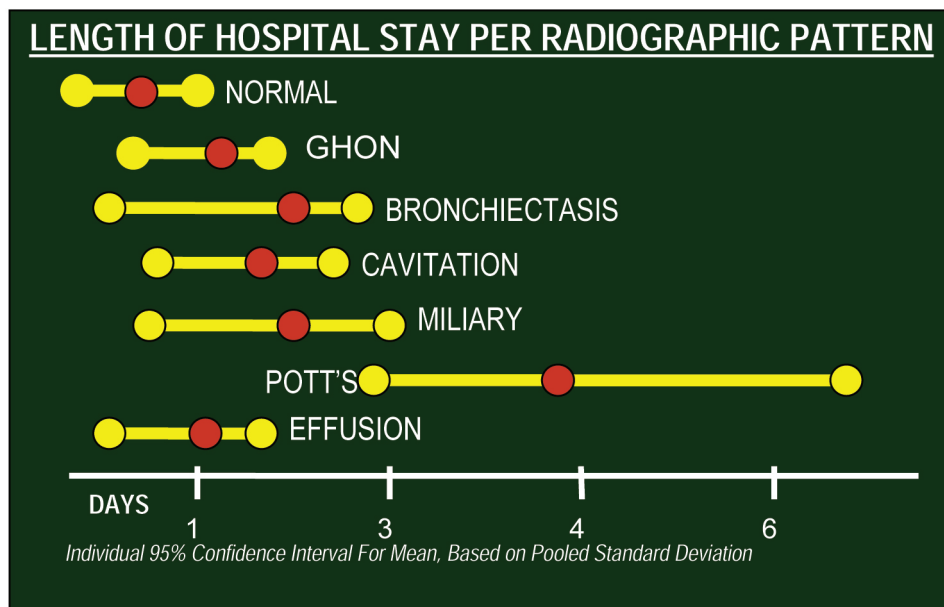


Figure 11. Patients with normal radiographs stayed in the hospital for less than 2 weeks. Patients with bronchiectasis, cavitations, miliary, and pleural effusion. Patients with radiographic patterns of ghon complex, bronchiectasis, cavitation, miliary, and effusion have approximately near average length of stay of more than two weeks. Those with Pott's disease were admitted the longest with a mean of 42 days. Therefore, Group F has significantly longer hospital stay when compared to the rest.

Table 5. Radiographic findings in correlation with disposition of patients

Radiographic Finding	Improved N=79	Died N=2	Transferred N=2	P value
A: Normal (N=6)	6	0	0	0.848
B: Lymphadenopathy and/or air space opacities without cavitation or bronchiectasis or miliary or Pott's disease (N=23)	23	0	1	0.516
C: Bronchiectasis or atelectasis with or without (a) or (b) (N=9)	9	0	0	0.815
D: Cavitary lesion (N=15)	15	0	0	0.502
E: Miliary TB (N=7)	5	2	0	0.000
F: Potts disease (N=8)	8	0	0	0.824
G: Pleural effusion not belonging to groups C, D, E (N=18)	13	0	2	0.489

culosis which results from growth of previously dormant bacilli in the apices of the lungs. There is considerable overlap in the clinical and radiologic manifestations of these two entities. This study deals with patients diagnosed for the first time to have active pulmonary tuberculosis; thus, classified as having primary tuberculosis.

Primary TB is seen in patients not previously infected to M tuberculosis. It is most common in infants and older children with the highest prevalence in children less than

5 years of age. Tuberculosis in childhood poses little risk of transmission, although, it is an indirect measure of spread within the community as it is reflective of the pediatric patients' exposure to a diagnosed or undiagnosed source.

In the diagnosis of tuberculosis, chest radiographs have long been established as a mainstay for both screening and identification of the disease in conjunction with tuberculin skin test. As proven in various published articles,

regional lymphadenopathy is considered the radiologic hallmark of primary infection in children. This explains the nature of the initial spread of tuberculous infection through the lymphatics in the regional nodes into the thoracic ducts then eventually into the bloodstream.

The first reaction to the presence of this air-borne bacilli is the formation of an inflammatory alveolar exudate resulting as an area of localized consolidation known as Ghon focus. The tubercle bacilli in the initial site of parenchymal involvement will rapidly spread into the regional lymphatic vessels subsequently demonstrating Ranke complex which is the combination of a Ghon focus and enlarged lymph nodes. The latter may cause bronchial obstruction due to external compression. These may also result in endobronchial erosion and deposition of caseous plugs, subsequently developing obstructive atelectasis. Bronchial obstruction is also secondary to diffuse tuberculous inflammation of bronchial walls.

Bronchiectasis may likewise develop from the sites of bronchial obstruction and atelectasis both early and late in the disease process. Obstructive emphysema may also ensue which may become sites of formation of future cavitory lesions.

TB may even present as a normal chest radiograph. A likely explanation for this is the timing at which the radiograph was taken which may have coincided with the incubation period. At 3 to 10 weeks post-inoculation, the infection is radiographically invisible.

The entire radiographic picture of TB in childhood, as demonstrated in this study, has a wide spectrum of patterns ranging from normal, regional lymphadenopathy and its sequela such as volume loss and endobronchial erosions to the severe manifestations of cavitations and disseminated forms with all the complications depending upon the stage of disease at the time of diagnosis.

The data of these known primary TB patients in this study parallels the fact that there is no pathognomonic finding for Koch's infection except for miliary tuberculosis. Miliary pattern has the characteristic radiographic findings of innumerable, 1–3-mm, non-calcified nodules scattered throughout both lungs. Miliary TB is an acute disseminated infection as a result of hematogenous spread occurring at any age. In the data presented, this pattern was seen in 10% of the subjects, all of whom are younger than 1 year old. The younger population is most affected due to immature immune system.

According to the study on the natural history of childhood intra-thoracic tuberculosis by Dr. Marais, the periods under 2 years of age represents the first high-risk period because infected children showed rapid progression without significant symptoms. As the figures in this study show, miliary pattern is also related to longer hospital confinement and mortality even with relatively non-

specific clinical manifestations. There is no association between symptom and radiographic pattern. Thus, urgent attention and aggressive treatment must be undertaken with this life-threatening radiographic findings such as miliary despite lack of grave symptoms. Typical miliary lesions may not be visible until 3–6 weeks after hematogenous dissemination. Patients with miliary pattern tend to develop tuberculous meningitis in approximately three weeks if left untreated. Even with treatment, mortality is as high as 13-50%.

The adjacent structures within the thorax, particularly the pleura, mediastinum and bones, are likely to be involved due to contiguity and the pathophysiology of the disease process itself. Pleural effusion most often results from the obstruction to lymphatic drainage or hypersensitivity reaction rather direct seeding into the pleura explaining the negativity of pleural fluid cultures. Pleural effusion is an uncommon manifestation of primary TB with only 10% in the study population. The prevalence of pleural effusion increases with age, not usually seen in infants.

Two of the 83 patients presented with an abnormal enlargement of the cardiac shadow attributed to TB pericarditis. TB pericarditis is a relatively an uncommon childhood complication of primary TB. Spread to the pericardium is mostly direct from a Ghon focus at the edge of the lung, or from adjoining mediastinal lymph nodes. The most common form is the serous effusion. Other types include dry pericarditis and constrictive pericarditis. The presence of pericardial fluid or pericardial thickening are confirmed by ultrasound. Diagnosis is then made by pericardial aspiration and tuberculin testing. The standard TB regimen is used together with oral steroids. Surgical stripping of pericardium is seldom needed in childhood. Skeletal involvement occurs in approximately 1%–3% of patients with tuberculosis. In this study, 10% presented with Pott's disease. The spine is the most common site of tuberculous osseous involvement accounting for approximately 50% of cases of skeletal tuberculosis. More than one vertebral body is typically affected. The disease process most often begins in the anterior part of the vertebral body adjacent to the end plate. The disk space may then become involved via a number of routes. Extension may occur along the anterior or posterior longitudinal ligament or directly through the end plate. Less often, posterior elements of the spine may become involved. Collapse of a vertebral body, particularly the anterior segment, results in tuberculous kyphosis. Paraspinal infection may involve the psoas muscle, resulting in psoas abscess which can extend into the groin and thigh. Calcification within the abscess is virtually pathognomonic of tuberculosis. The typical angulation due to collapsed vertebrae also known as Gibbus deformity is seen. The angulation is more ob-

vious in the thoracic spine, where there is a natural kyphosis, than in the cervical or lumbar spine where there is a normal lordosis. As the disease progresses, caseous material may track down the muscle planes causing a cold abscess which may point in an area far distant from the original site. Aside from debilitation, cosmetic and orthopedic deformity, and neurologic complications, the patients with Pott's disease in this study showed increased morbidity requiring longer confinement and longer period of anti-koch's medication.

CONCLUSION

Lymphadenopathy is the predominant intrathoracic radiographic abnormality in pediatric patients. Miliary TB was linked with younger age bracket due to immune system immaturity. This pattern is likewise related to high mortality with younger patients manifesting with non-specific symptoms not proportional to the gravity of the radiographic findings. Pott's disease was related to increased morbidity, requiring longer hospital admission. The radiographic patterns do not correlate with symptomatology; thus, appropriate and urgent management must be provided proportional to the degree of severity of the radiographic findings in correlation to the clinical manifestation.

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