

Case Report

A 3-month-old child with miliary tuberculosis: a case report

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ABSTRACT

Miliary tuberculosis (TB) is a severe form of disseminated TB that could be fatal without treatment. It remains a significant health problem in endemic countries such as Indonesia. A 3-month-old child was admitted to the hospital with chief complain of shortness of breath, cough, and intermittent low-grade fever. Significant clinical findings were lack of weight gain, previous contact with confirmed cases of TB, and severe malnutrition. Significant laboratory findings were anemia, elevated CRP, and hypoalbuminemia. Radiological findings were suggestive of miliary TB with bilateral diffuse reticulonodular lung lesion on chest CT-scan. Diagnosis of miliary TB is difficult because of nonspecific, atypical symptoms and varied clinical signs. It is needed multiple diagnostic approach, especially for children. Miliary TB remain to be a difficult case that require an early intervention despite difficulties in its diagnosis, to prevent morbidity and mortality of patient.

Keywords: Children, Miliary TB, TB

INTRODUCTION

Tuberculosis (TB) is one of the major causes of childhood mortality, especially in endemic areas. It is estimated that 239,000 children died from TB worldwide in 2015, with more than 96% of all deaths occurred in children not receiving treatment.¹ According to WHO annual report, TB prevalence in Indonesia remains one the highest in Asia region. Data released by the Indonesia ministry of health in 2014 showed a total reported case of 845,000 TB, with a mortality number of 98,000. It is equal to 11 deaths per hour.²

Miliary TB is caused dissemination of *Mycobacterium bacteria* in the body via hematogenous and lymphatogenous route that could infect multiple organs. It accounts for 3-7% of all TB cases. Although there have been few reports on the prevalence of miliary TB in Indonesian children, the Indonesian Ministry of health reported 1.168 cases of pediatric pulmonary acid-fast

bacilli (AFB) positive TB in 2014. The mortality rate from miliary TB is high, around 25% and may reach 100% if left untreated.³

CASE REPORT

A 3-month-old girl presented with a chief complain of breathlessness of 1 days prior to admission, accompanied by cough and intermitted low-grade fever for 3 weeks. The patient also had decreased appetite and lack of significant weight gain. The patient's vaccination status was unknown. There was history of previous TB contact, her father is currently on TB medication for 3 months. The child was delivered at full term by spontaneous delivery with appropriate birth weight (3.5 kg). Her diet is formula milk since birth.

Physical examination showed severe malnutrition (z score <-3 SD) (her current weight 3.7 kg) moderate distress with bronchial rales and moderate subcostal retractions. No

additional sound was found on chest. Lymph node palpation was normal. No BCG scar was noted. Laboratory values showed anemia (haemoglobin 7.9 g/dl), normal leukocyte (10.62/ul) with neutrophilia (74.3%) and increased C-reactive protein (9.66 mg/dl). COVID-19 test were negative and hypoalbuminemia (2.2 g/dl). Tuberculin test was not performed in the patient.

Figure 1 initial chest x-ray showed nodular infiltrate and diffuse consolidation suggestive of bronchopneumonia. Further examination by Thoracic multi-slice spiral CT (MSCT) Figure 2 performed one day later, bilateral diffuse reticulonodular lung lesion suggestive miliary TB, with mild pleural effusion.

Following the result, anti-TB regimen was started with separate drug formulation. Improvements were noted and the patient discharged after 12 days of hospitalization.



Figure 1: Initial chest x-ray in ER.

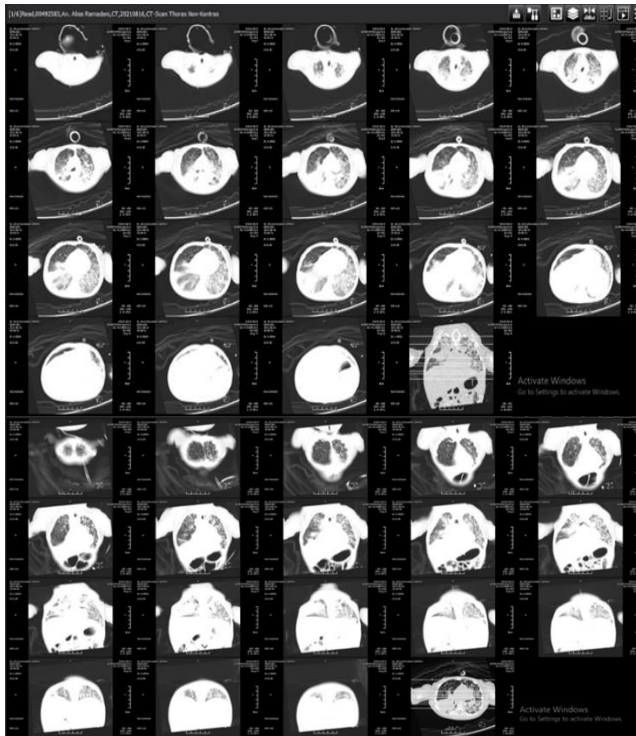


Figure 2: MSCT in PICU.

This study has obtained hospital and patient consent.

DISCUSSION

Miliary TB accounts for 1% of all TB cases and is a clinical picture resulting from massive lymphohematogenous dissemination of bacilli-laden focus. Characteristic histopathological feature of miliary TB is a tubercle (granuloma) measuring 2 mm in ≥ 2 non-contiguous organs.⁴ Miliary TB is a form of extrapulmonary TB (EPTB) and corresponds to 1% of all TB. EPTB cases accounted for 16% of the 7.5 million incident cases worldwide in 2019.⁵

Miliary TB is a severe form of extrapulmonary TB with a high mortality rate without prompt diagnosis and early treatment. In this case report the diagnosis of miliary TB is formulated by TB scoring system and radiological findings on the patient. Diagnosis of miliary TB is difficult because of nonspecific, atypical symptoms and varied clinical signs. Chest X rays with classic miliary shadows is seen very late in the disease.⁶ CT Sharma et al presented a criteria useful for the diagnosis of miliary TB: (i) clinical presentation consistent with a diagnosis of TB such as, fever with evening rise of temperature, weight loss, anorexia, tachycardia and night sweats of greater than six weeks duration responding to anti-TB treatment; (ii) classical miliary pattern on chest radiograph; (iii) bilateral diffuse reticulonodular lung lesions on a background of miliary shadows demonstrable either on plain chest radiograph or high resolution CT; and (iv) microbiological and/or histopathological evidence of TB.⁷

The scoring system was developed by the Indonesian childhood TB working group as a clinical assessment tool diagnose TB in children in endemic area such as Indonesia. The aim of the Scoring system is to aid clinician to diagnose TB in primary health care setting. However due to the lack of studies that showed the efficacy of the scoring system as a clinical assessment tool, but the scoring system is simplify for approaching diagnose of TB. An example of the TB scoring system can be seen in the appendix below.

PARAMETER	0	1	2	3	SKOR
Kontak dengan pasien TB	Tidak jelas		Laporan keluarga, kontak dgn pasien BTA negatif atau tidak tahu, atau BTA tidak jelas	Kontak dengan pasien BTA positif	
Uji Tuberkulin	Negatif			Positif (≥ 10 mm, atau ≥ 5 mm pada keadaan imunosupresi)	
Berat badan/Kondisi gizi (dengan KMS atau tabel)		Gizi kurang: BB/TB < 90% atau BBU < 80%	Gizi buruk: BB/TB < 70% atau BBU < 60%		
Demam tanpa sebab jelas		≥ 2 minggu			
Batuk		≥ 3 minggu			
Pembesaran kelenjar limfe koli, aksila, inguinal		≥ 1 cm			
Pembengkakan tulang/ sendi panggul, lutut, telang		Ada pembengkakan			
Foto dada	Normal/ tidak jelas	Suspek TB			
JUMLAH SKOR					

Figure 3: TB scoring system.

The gold standard for the diagnosing TB in a patient remain to be bacteriological confirmation. One of assement that is highly recommended is the use of gene-Xpert MTB/RIF.⁸ The use of XpertMTB/RIF as a diagnostic tool for TB in children has been recommended by WHO since 2013.⁹ Study by Sekkade et al. reported the sensitivity and specificity of XpertMTB/ RIF examinations to be 79.4% (95% IK: 63, 2-89, 7) and 96.5% (95% CI: 93-98.3) in children with suspected TB compared with M. tuberculosis culture.¹⁰ However these studies may not be available in all primary health care setting in Indonesia. This is due to the difficulty in obtaining sample in children (such as sputum), as well as the high cost of performing such procedure.

Risk factors that contribute to the development of miliary TB were young age, recent measles infection in children, immunodeficiency, malnutrition, and malignancies. Children and immunocompromised patients have a higher risk of miliary TB.¹¹ We did not identify any of these contributing factors in this child, except for young age and malnutrition; however, this patient had not received the Bacillus Calmette-Guérin (BCG) vaccination which is usually given at birth. Some studies showed that BCG protects against CNS TB around 75%-85%.¹²

CONCLUSION

In conclusion, miliary TB remain to be a difficult case that require an early intervention despite difficulties in its diagnosis. Due to the barrier that could be encountered in the microbiological or radiological diagnoses, much emphasis is placed on clinical judgement in order to diagnose miliary TB. In this case, we hope to show the clinical course of a patient that were diagnosed with miliary TB based on clinical assessment tools and supporting investigations.

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REFERENCES

1. Dodd PJ, Yuen CM, Sismanidis C, Seddon JA, Jenkins HE. The global burden of tuberculosis mortality in children: a mathematical modelling study. *Lancet Glob Heal*. 2017;5(9):e898-906.
2. World Health Organization. WHO Global Tuberculosis Report. 2021; background document. World Health Organization. 2021. Available at: <https://www.who.int/teams/global-tuberculosis-programme/tb-reports>. Accessed on 2022 June, 07.
3. Magdalena C, Utomo B, Setyoningrum RA. Risk factors for miliary tuberculosis in children. *Paediatr Indonesiana*. 2017;57(2):63-6.
4. Mert A, Arslan F, Kuyucu T. Miliary tuberculosis Epidemiological and clinical analysis of large-case series from moderate to low tuberculosis endemic Country. *Medicine*. 2017;96:5(e5875).
5. Gopalaswamy R, Dusthacker VN, Kannayan S. Extrapulmonary Tuberculosis-An Update on the Diagnosis, Treatment and Drug Resistance. *J Respiration*. 2021;1(2):141-64.
6. Kumar NS, Naulakha RP, Vashishtha I. Miliary tuberculosis : an atypical presentation. *Int J Contem Pediatr*. 2021;8(6):1111-3.
7. Sharma SK, Mohan A, Pande JN. Clinical profile, laboratory characteristics and outcome in miliary tuberculosis. *Q J Med*. 1995;88:29-37.
8. Zeffira L, Yani FF, Machmud R. Concordance of The Scoring System and Gene-xpertMTB/Rif to Diagnose Childhood Tuberculosis in Primary Health Care. *Eduhlt*. 2022;12:2087-3271.
9. World Health Organization. Automated real-time nucleic acid amplification technology for rapid and simultaneous detection of tuberculosis and rifampicin resistance: Xpert MTB/RIF assay for the diagnosis of pulmonary and extrapulmonary TB in adults and children Policy update; background document. World Health Organization. 2013. Available at: <https://apps.who.int/iris/handle/10665/112472>. Accessed on 2022 June 08
10. Sekadde MP WE, Joloba ML, Sengoba W, Kitembo H, Kittaka SB. Evaluation of the expert MTB/RIF test for the diagnosis of childhood pulmonary tuberculosis in Uganda: a cross-sectional diagnostic study. *BMC Infect Dis*. 2013;13:1-8.
11. Duc AL, Ngoc VD, Trung NN. Miliary brain tuberculosis in an infant. *Elsevier*. 2021;16(10):2882-5.
12. Rock RB, Olin M, Baker CA, Molitor TW, Peterson PK. Central nervous system tuberculosis: pathogenesis and clinical aspects. *Clin Microbiol Rev* 2008;21(2):243-61.

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