

Case Series

Childhood pulmonary paragonimiasis - a diagnostic conundrum: a case series from a tertiary care hospital in Kohima District of Northeast India

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Abstract

Infestation by Paragonimus westermani is an emerging health concern in Northeast India. The infection is acquired by consuming raw or semi-raw freshwater crabs and crayfish contaminated with Paragonimus. Human pulmonary paragonimiasis often mimics pulmonary tuberculosis due to similar clinical and radiological features and may lead to diagnostic dilemmas. Though it is a common condition in this part of the country, a lack of awareness among the medical fraternity occasionally leads to misdiagnosis and mismanagement. Moreover, there is a dearth of research on this topic. Therefore, we present 3 cases of pulmonary paragonimiasis from the paediatric age group treated in a tertiary care hospital that masqueraded as pulmonary tuberculosis. This might be the one of the very few reported case series on this condition from Northeast India.

Key words: Helminthiasis, Paragonimus westermani, tuberculosis, Nagaland

Introduction

Pulmonary paragonimiasis, food-borne zoonotic helminthiasis, is a parasitic disease of the lungs caused by infection with trematodes species of the genus Paragonimus, the commonest being Paragonimus Westermani. The disease is endemic in many parts of Asia, Africa, and South America (1). In India, a few sporadic cases have been reported from the northeastern states of Manipur, Nagaland, and Assam (2-4). Paragonimiasis causes hepatic, cerebral, and even cutaneous manifestations but chest symptoms are its most distinguishing clinical fea-

ture. Pulmonary manifestations may include pneumonia, pleural effusion, and pneumothorax. Owing to similar history and clinical presentations, it is often misdiagnosed as pulmonary tuberculosis thereby leading to unnecessary antitubercular treatment. We report 3 cases of pediatric pulmonary paragonimiasis with different clinical presentations. Through this case series, we have tried to bring out the importance of considering the diagnosis of paragonimiasis in any child with chronic pulmonary symptoms.

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Case report 1

A 2-year-old, vaccinated for age, male child had presented with complaints of chronic productive cough for 4 months. There was associated history of occasional low-grade fever and loss of appetite. There were 3 family members living in their house of 3 rooms excluding the bathroom. He was afebrile, irritable with mild pallor. Respiratory rate was 45/min and heart rate was 110/min. Saturation at room air was 96% with no signs of respiratory distress. He weighed 9kg which was below the 3rd percentile (IAP growth chart). Systemic examination revealed more scattered crepitations in the right lung and less in the left. There was no history of contact with tuberculosis. The child was admitted for further evaluation and investigations. Chest Xray revealed bilateral opaci-

ties (right greater than left) suggestive of bronchopneumonia. Complete blood count (CBC) showed anemia (haemoglobin 9 g/dl), leucocytosis (14000cells/cu mm) with 45% eosinophils with raised Estimated Sedimentation Rate (ESR) of 55 mm at the end of first hour (AEFH). Considering the chronic nature of the complaints and lab and radiological findings, we had suspected Tuberculosis and so advised a Cartridge Based Nucleic Acid Amplification Test (CBNAAT) of the early morning gastric aspirate. The result was negative. Detailed enquiry into their dietary habits had revealed that they often consumed smoked and pickled crabs collected from the local river. Microscopic investigation of the early morning gastric aspirate and stool finally detected operculated eggs of *P. Westermani*.



Fig1: Chest x-ray of case 1 with bilateral diffuse infiltrates

Case report 2

A 6-year-old boy, vaccinated for date, had presented with complaints of pain on the right side of the chest for 5 months. The pain was

dull aching type and aggravated more on coughing with no postural or diurnal variation. There was also a history of occasional low-grade fever. The family disclosed that they

regularly consumed crabs from the local rivers. On examination, the child was afebrile, respiratory rate was 35/min with no signs of respiratory distress. Anthropometric parameters were appropriate for his age. Auscultatory findings revealed decreased breath sounds over the right lower lung fields. Chest X-ray in erect posture showed right-sided pleural effusion without any radiological signs of mediastinal

shifting. Ultrasound chest confirmed right sided pleural effusion. Blood investigations showed leucocytosis (18000/cu mm), raised ESR 22 mm AEFH with 45% eosinophilia. CBNAAT of gastric aspirate and sputum for AFB were negative. As in the previous case, operculated eggs of *Paragonimus westermani* were detected in the gastric aspirate and stool samples.

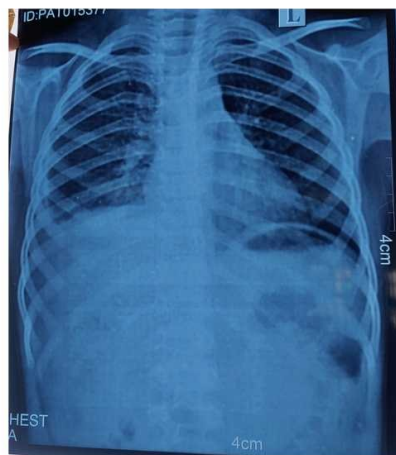


Fig 2: Chest X-ray of case 2 showing right sided pleural effusion

Case report 3

A 9-year-old girl was referred from a rural health center with a chronic cough on and off for the last 8 months. The cough was productive with occasional episodes of expectoration of rusty sputum (suggesting old blood) which was minimal in quantity and odourless. She was initiated Anti-Tubercular therapy from another practitioner 6 months back but her symptoms did not subside. Details of previous investigations and treatment could not be furnished by the parents owing to loss of documents in a natural disaster, but the parents asserted that sputum examination after completion of ATT regi-

men was negative for Tuberculosis and that her drug compliance was good. She was afebrile, respiratory rate was 25/min with no signs of respiratory distress. Her weight and height was 25kg and 125cm respectively, both values were below the 50th percentile for age (IAP growth charts). Systemic examination revealed scattered rhonchi in bilateral lung fields (right greater than left) and consolidation was seen in the right mid zone in chest X-ray. Other than an absolute eosinophil count of 35%, there was no other abnormality in the blood investigations. Workup for *Paragonimus* revealed presence of eggs in the stool but not in the sputum.



Fig 3: Wet mount specimen of sputum showing operculated egg of *Paragonimus westermani*

Discussion

Paragonimiasis is a parasitic disease caused by a trematode of the genus *Paragonimus*, and the World Health Organization (WHO) has described it as one of the neglected tropical diseases worldwide (5).

Paragonimiasis in humans results from the consumption of raw, undercooked, smoked or pickled crab or crayfish infected with metacercariae, the infective stage. Adult flukes live in human lungs and deposit eggs in the bronchi. Eggs are expelled either by coughing or swallowed and passed in human faeces. Eggs then develop in water for 2 to 3 weeks and then release miracidia that invade the first intermediate host (snail). These miracidia then develop into cercariae which invade the second intermediate host (crabs or crayfish) where they develop into metacercariae. Human consumption of raw, undercooked, smoked or alcohol-pickled crab or crayfish bearing metacercariae completes the cycle of infection. These metacercariae excyst in the duodenum, penetrate the gut wall to migrate up through the tissues to the pleural cavities and lungs and form a cap-

sule in which the adult pair resides and produces eggs (6).

Clinical manifestations depend on the site of invasion and include pulmonary and extrapulmonary symptoms. Pulmonary paragonimiasis is the most common clinical form of paragonimiasis occurring in 76-90 percent of cases (7). Generally, most children are ambulatory and apparently healthy. Major presenting symptoms comprise of pain or tightness in the chest, difficulty breathing and coughing up rusty brown or blood-stained sputum or recurrent haemoptysis. The chronic infection may be associated with fever, anaemia, weakness, and weight loss. Among the 3 cases reported here, one case had signs of pallor and was underweight.

Extrapulmonary paragonimiasis can occur either from the migration of flukes to various organs or from eggs that enter the circulation and are carried to the following sites namely liver, spleen, brain, peritoneum and subcutaneous tissue. It is more likely to occur in children and in heavy infections.

Out of the 3 cases reported in our hospital, 2 patients had consolidation and the other had pleural effusion. Sometimes, both pleura and lung parenchyma are affected concomitantly and is called pleuropulmonary paragonimiasis. The clinical manifestations may include chest pain, dyspnoea, coughing up of blood-stained sputum or haemoptysis and may be associated with fever.

Routine blood examination usually shows leucocytosis and eosinophilia which was seen in our patients too. Retroviral status of all the three cases were negative. Radiological investigations (Chest X ray and CT scan) may reveal non-specific findings like consolidation and pleural effusion. Since these clinical manifestations and investigative results are similar to those of tuberculosis, pneumonia, aspergillosis, hyper eosinophilic syndrome, many paragonimiasis patients are initially misdiagnosed and treated for other diseases resulting in improper treatment, multiple hospital visits eventually causing physical and mental anguish to the patient. Definitive diagnosis of paragonimiasis is presence of *Paragonimus* egg or parasite in sputum, faeces, bronchoalveolar lavage, lung or pleural biopsy specimens or bodily fluids by microscope.

Anthelmintic drugs are approved for treatment of paragonimiasis. These include Praziquantel, Bithionol and Triclabendazole. Drug of choice for both pulmonary and extrapulmonary paragonimiasis is Praziquantel at a dose of 75mg/kg/day for 3 days. It has an efficacy of 80-90%. Bithionol was the drug widely

used before Praziquantel was available. It is given in the dose of 40/mg in two divided doses on alternate days for 10-20 doses. Side effects include urticaria, nausea, vomiting, diarrhoea. Recently, Triclabendazole at a single dose of 10 mg/kg is being used and is seen to have comparable efficacy, safety and tolerability with Praziquantel. The above-mentioned cases were treated with Praziquantel for 3 days with no reported adverse effects.

In the recent years, Paragonimiasis has emerged as an important food-borne parasitic disease in India, mainly in the Northeastern states of India. The control strategies for paragonimiasis should include epidemiological surveys to determine the real magnitude of the problem and regular training of public health care providers about the diagnosis and management of paragonimiasis. People should be educated about avoiding consumption of raw and improperly cooked crabs and crayfish, and to clean hands, utensils, cutlery boards, strainers, knives, etc. after handling fresh crabs and crayfish. Since the drug of choice Praziquantel is sometimes difficult to procure, public health authorities should ensure the continuous supply of Praziquantel in the hospitals and dispensaries. Awareness among public and medical practitioners is imperative to achieve appropriate control of this parasitic infestation.

This case series also highlights the importance of taking a detailed dietary history and to include Paragonimiasis among the differential diagnosis while treating any case with pulmonary symptoms and do the necessary work up.

Declarations

Ethical consideration: Ethical approval is not required as patient data has been anonymized.

Conflicts of interest: The author declares the absence of any conflict of interest.

Author contribution: The author is responsible for the project administration, conception, and design of the study, data curation, data analysis, manuscript preparation, and revision.

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