Eosinophilic pleural effusion in an eleven-year-old boy

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Abstract

Pleural effusion fluid with ≥10% eosinophils may be seen in 5-16% of exudative pleural effusions. Its association with helminthic infestation is reported in the literature. This patient with left-sided eosinophilic pleural effusion was a referred case from another hospital and treated initially as parapneumonic. With inadequate response to antibiotics and a markedly high IgE level praziquantel was started. This resulted in rapid disappearance of symptoms, decrease in the eosinophil count, and radiological improvement. After exclusion of parapneumonic, tuberculosis, autoimmune disease, and malignancy, a trial of antihelminthics should be considered an option. This may spare unnecessary investigations.

Key words: Eosinophilic; Helminthiasis; Pleural effusion; Praziquantel.

INTRODUCTION

When pleural effusion (PE) fluid contains >10% eosinophils it is called eosinophilic PE.1,2 This accounts for 5-16% of exudative PE.2 The causes of PE in children are parapneumonic (50-70%), congestive cardiac failure (5-15%), and malignancy.3 Reports of paediatric eosinophilic PE are infrequently found in the literature. Reports are published regarding parasite infected4 or idiopathic5 cases. Association with subcutaneous cysticercosis,6 giardiasis,7 and idiopathic hypereosinophilic syndromes8 are reported. PE with helminthic infestation including paragonimiasis has been reported from developing countries.9 Here a case of eosinophilic PE in an eleven-year-old boy is presented.

CASE REPORT

An eleven years old male was admitted at Kathmandu Medical College Teaching Hospital, as a referral case from another hospital for fever and cough for 10 days and was not responding to treatment. When attended, he was febrile (temperature 101.8°F), SPO2 99% in room air. His chest X-ray showed left-sided pleural effusion. He was admitted as left-sided parapneumonic effusion and treated with ceftriaxone and vancomycin awaiting investigation reports (Table 1).

Although his fever subsided, cough and chest pain persisted which prompted a second line of investigations (Table 2).

Deworming was done with albendazole 400 mg oral for three consecutive days. Because of markedly high immunoglobulin IgE level (as is seen in parasite infestation) he was treated with praziquantel for 14 days. The response was seen as a progressive reduction in eosinophil count (from 62% to 38%) within a few days of therapy and a decrease in pleural effusion volume as estimated by ultrasonography. He was discharged on day 11 looking cheerful and asymptomatic.

At the follow-up visit, two weeks later, he had put on weight and maintained symptom-free. His eosinophil count had further decreased to 10% and had only a blunted costco- and cardio-phrenic angles radiologically
Table 1: Reports of initial investigation

| Investigation               | Report                                                                 |
|-----------------------------|------------------------------------------------------------------------|
| Total leukocyte count       | 21,410/µL or, 21.41 x10⁹/L (N = 4 - 11 x10⁹/L)                        |
| Differential count          | Neutrophils - 20%, Lymphocytes - 18%, Eosinophils - 62%, Absolute Eosinophil Count (AEC) 15,134/µL |
| Platelets                   | 5,17,000/µL                                                           |
| ESR                         | 55 mm/hr                                                              |
| Haemoglobin                 | 11.7 gm/dL                                                            |
| C-reactive protein          | 30 mg/L                                                               |
| Random blood sugar          | 93 mg/dL                                                              |
| Peripheral blood smear      | Eosinophilic leukocytosis with Neutrophils - 36 %, Lymphocytes - 23%, and Eosinophils - 41% No abnormal cells or haemoparasites found |
| Stool examination           | Ova of Ascaris                                                        |
| Urinalysis                  | Albumin nil, sugar nil, pus cells nil, RBC nil                        |

Table 2: Reports of second line of investigation

| Investigation                                           | Report                                                                 |
|---------------------------------------------------------|------------------------------------------------------------------------|
| USG-guided pleurocentesis                              | Left-sided septated, pleural effusion                                  |
| Pleural fluid analysis                                 |                                                                        |
| Sugar                                                   | 25 mg/dL                                                               |
| Protein                                                 | 6.9 gm/dL                                                              |
| Total cell count                                        | 34/mm³                                                                |
| Differential cell count                                 | Eosinophils 60%, Lymphocytes 15%, Neutrophils 25%, no malignant cells |
| Lactate dehydrogenase (LDH)                            |                                                                        |
| Adenosine deaminase (ADA)                              | 16.80 IU/L                                                             |
| Pleural fluid LDH/Serum LDH                            | 26 U/L                                                                |
| XpertMTB/RIF test                                      | 5.36 (>0.6)                                                           |
| XpertMTB/RIF test                                       | Negative for *Mycobacterium tuberculosis*                             |
| Mantoux test                                            | No induration                                                          |
| Sputum 3 consecutive specimens for AFB                 | AFB negative                                                           |
| Antinuclear antibodies                                  | Negative                                                               |
| Serum Immunoglobulin E (IgE)                           | 4824.00 kUA/L (Reference : <85.00 kUA/L)                              |
| Serum protein                                           | 10.5 gm/dL                                                             |
| Serum LDH                                               | 313 IU/L                                                               |
| Serum ADA                                               | 26 IU/L                                                                |
| Pleural fluid LDH/Serum LDH ratio                       | 5.36 (>0.6)                                                           |
| Pleural fluid protein/ Serum protein ratio             | 0.6 (>0.5)                                                            |
| Light's criteria                                        | Exudative pleural effusion                                             |

DISCUSSION

The patient was receiving antibiotics for respiratory symptoms, at presentation but did not respond adequately despite upgrading of antibiotics. Further investigations fulfilled criteria for exudative pleural effusion, associated with markedly elevated IgE level. The eosinophil count in the pleural effusion fluid was 60%. After exclusion of tuberculosis and autoimmune aetiology, the helminthic infestation was considered as the most likely cause.

Helminthiasis is a macro parasitic disease in which part of the body is infested with helminths of which there are numerous species classified broadly into tapeworms, flukes, and roundworms. These infest mostly the gastrointestinal tract of the host but occasionally burrow into other organ systems causing lesions. They induce an immune response and immune-mediated inflammatory changes in the organs including the lungs and pleura, causing eosinophilia and oedema as the T helper cells and eosinophils respond to helminth infestation.
Pleural parasitic infestation (PPI) is a rare pleural disease caused by a variety of parasites, such as the lung fluke *Paragonimus westermani*, *Toxocara* spp., *Clonorchis sinenis* *Spirometra* spp. and *Taenia solium*, etc. New cases are being reported in the literature. These may have pleural involvement only, or with other non-specific pulmonary manifestations.

Praziquantel (PZQT) is a pyrazinoisoquinoline with the chemical name 2-cyclohexylcarbonyl-1,2,3,6,7,11b-hexahydropyrazino (2, 1-a) isoquinolin-4-one. It is a broad-spectrum anthelmintic in use since 1980, with activity against trematode or cestode helminthic infestations. It has been used in the treatment of schistosomiasis in a large scale, and also for the treatment of cysticercosis and *Hymenolepsis nana* infestation as an off-label drug.

PZQT causes paralytic muscular contraction by increased intracellular Ca$^{++}$ influx and tegumental disruption and expels the worms from their primary habitat, after which they degenerate.

In a retrospective series of PPI, nine patients were treated with praziquantel which resulted in the resolution of symptoms and abnormal pleural/pulmonary radiographic features without recurrences.

CONCLUSION

Eosinophilic pleural effusion may result from parasitic pleural infestation. Possibility of parapneumonic, tuberculosis, autoimmune disease, and malignancy should be considered in the differential diagnosis of exudative pleural effusion. A trial of antihelmintic medication should be considered an option.

Conflict of interest: None

Source(s) of support: None

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