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ASCARIS LUMBRICOIDES THROUGH AN INTERCOSTAL CHEST TUBE IN A CASE WITH HODGKIN'S LYMPHOMA

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ABSTRACT

Introduction: Ascaris lumbricoides typically mimics pneumonia during its larval migration phase. However, its presentation with pleural effusion and the recovery of a live adult worm through an intercostal chest tube is extraordinarily rare. This case highlights a unique opportunistic parasitic infection in an immunocompromised paediatric patient, emphasising the need to consider parasitic aetiologies in refractory pulmonary symptoms within oncology settings.

Case description: A 15-year-old female with stage IIIA Hodgkin's lymphoma presented with fever, cough and respiratory distress five days after completing her second cycle of COPDAC chemotherapy. Despite broad-spectrum antibiotics and bilateral chest tube insertion for persistent pleural effusion, her clinical condition remained refractory. A live, 15-cm adult *A. lumbricoides* was unexpectedly recovered from the right chest tube. Following a 21-day course of albendazole, the patient showed complete clinical and radiological resolution.

Conclusion: In paediatric oncology patients, standard treatments for pneumonia may fail when atypical pathogens are involved. This case underscores that clinicians should maintain a high index of suspicion for helminthic infections in immunocompromised hosts presenting with atypical or refractory pleural and pulmonary findings.

KEYWORDS

Hodgkin's lymphoma, *Ascaris lumbricoides*, albendazole, antihelminthic

LEARNING POINTS

- *Atypical parasitic presentation:* Clinicians should consider parasitic aetiologies, such as *Ascaris lumbricoides*, in immunocompromised paediatric oncology patients presenting with refractory pneumonia and severe pleural effusion that do not respond to standard antimicrobial therapies.
- *Chemotherapy-induced vulnerability:* Severe immunosuppression and corticosteroid use associated with lymphoma protocols can alter standard biological barriers, facilitating aberrant migration pathways for helminths into the pleural cavity.
- *Diagnostic vigilance:* The unexpected extraction of a live adult worm from an intercostal chest tube emphasises the critical need for comprehensive screening and high clinical suspicion for atypical pathogens in endemic regions.

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INTRODUCTION

Immunocompromised individuals are highly susceptible to severe and potentially life-threatening infections due to defects in normal host defence mechanisms responsible for protection against infectious agents[1]. Especially individuals who have received cancer treatment including targeted biological agents, chemotherapy, radiotherapy and haematopoietic stem cell transplantation, have increased the incidence of secondary immunodeficiencies and the diversity of associated infectious complications[2].

Opportunistic parasitic infections are often mild or asymptomatic in immunocompetent individuals; however, in patients with impaired immune function, they frequently cause severe and sometimes fatal disease. The most common parasites responsible for morbidity and mortality in this population include gastrointestinal pathogens (*Cryptosporidium parvum*, *Cyclospora cayetanensis*, *Giardia lamblia* and *Strongyloides stercoralis*) and parasites affecting the reticuloendothelial system (*Toxoplasma gondii* and Leishmania species)[1]. Malignancies such as lymphoma, leukaemia and solid tumours – through both the disease process itself and the immunosuppressive effects of therapy – disrupt humoral and cellular immunity, thereby creating a favourable environment for parasitic colonisation and dissemination[2].

In immunosuppressed patients, the clinical course of such infections is often atypical, severe and refractory to standard treatments. Certain parasitic infections, including *Ascaris lumbricoides*, can cause severe and persistent pneumonia that does not respond to conventional antibacterial or antifungal treatment, particularly in hosts with compromised immune systems. *A. lumbricoides* is one of the most common soil-transmitted helminths worldwide and affects approximately 800 million people, primarily in tropical and subtropical regions. Its life cycle involves a complex systemic migration; after ingestion, the larvae hatch in the small intestine, penetrate the mucosa and reach the lungs via the portal and systemic circulation. In this pulmonary stage, known as the Loeffler syndrome, the larvae cross the alveolar-capillary membrane to enter the airways, are eventually coughed up and swallowed, and mature in the intestine. Physical disruption of the alveolar-capillary barrier and the subsequent intense Th2-mediated inflammatory response may lead to protein-rich exudative changes[3]. Although pulmonary involvement typically presents as self-limiting eosinophilic pneumonia (Loeffler's syndrome), recent clinical data suggest that in immunocompromised hosts, this migration may lead to more severe and atypical complications. Although rare, this inflammatory process may spread to the pleural surface and result in significant pleural effusion. Radiographic findings may include transient pulmonary infiltrates, peripheral confluence and lesions that may progress to intra-alveolar haemorrhage, often accompanied by exudative changes[4].

In paediatric oncology, secondary immunodeficiency and the use of corticosteroids may mask the typical symptoms of helminth infection or increase the parasitic burden, leading to clinical presentations resembling hyper infection. Despite its global prevalence, the removal of a live adult worm from the pleural cavity via a chest tube remains an extraordinary clinical event with very few reported cases. This report describes a unique case of a 15-year-old patient with Hodgkin's lymphoma who presented with refractory pleural effusion and pneumonia, leading to the unexpected discovery of *A. lumbricoides* via the intercostal drainage system. This case highlights the importance of considering parasitic aetiologies in children with immunodeficiency who do not respond to standard antimicrobial therapy.

CASE DESCRIPTION

A 15-year-old girl with stage IIIA Hodgkin lymphoma presented with fever and respiratory distress five days after completing two cycles of OEPA (vincristine sulfate [Oncovin™], etoposide, prednisone, doxorubicin hydrochloride [Adriamycin™]), and one cycle of COPDAC (cyclophosphamide, vincristine sulfate [Oncovin™], prednisolone, dacarbazine) chemotherapy administered according to the EuroNet-PHL-C1 protocol. On physical examination, she was tachypnoeic (33 breaths/min) and tachycardic (150 beats/min), with an oxygen saturation of 92% on room air; rales were auscultated at the base of the right lung. Chest imaging revealed lobar pneumonia. Laboratory evaluation demonstrated severe pancytopenia (haemoglobin 7.9 g/dl, platelet count 53,000/mm^3, leukocyte count 900/mm^3, absolute neutrophil count 340/mm^3) and markedly elevated inflammatory markers (C-reactive protein 134 mg/l, procalcitonin 3.05 ng/ml). Given the presence of pancytopenia, broad-spectrum antibacterial and antifungal therapy (vancomycin, meropenem, amphotericin B and trimethoprim-sulfamethoxazole) was initiated. Due to the lack of clinical improvement, further evaluation for immunodeficiency was performed, revealing decreased immunoglobulin levels (IgG 3.61 g/l [7–16], IgA 0.66 g/l [0.7–4], IgM 0.23 g/l [0.04–2.3]). Notably, immunoglobulin levels were within normal limits at the initiation of lymphoma treatment (IgG 8.08 g/l, IgA 0.83 g/l, IgM 0.38 g/l). Whole-exome sequencing was performed, and no underlying primary immunodeficiency was identified.

Given persistent clinical deterioration, chest computed tomography revealed pleural effusions measuring 8 cm at the left base and 7 cm at the right base, prompting placement of bilateral chest tubes. On the third day of follow-up, a live adult worm was recovered from the right chest tube drainage *(Fig. 1)*. A consultant parasitologist performed a definitive parasitological examination of the specimen, identifying it as an adult *A. lumbricoides* based on its characteristic macroscopic morphology. No faecal examination for eggs and parasites (ova and parasite test) was carried out.

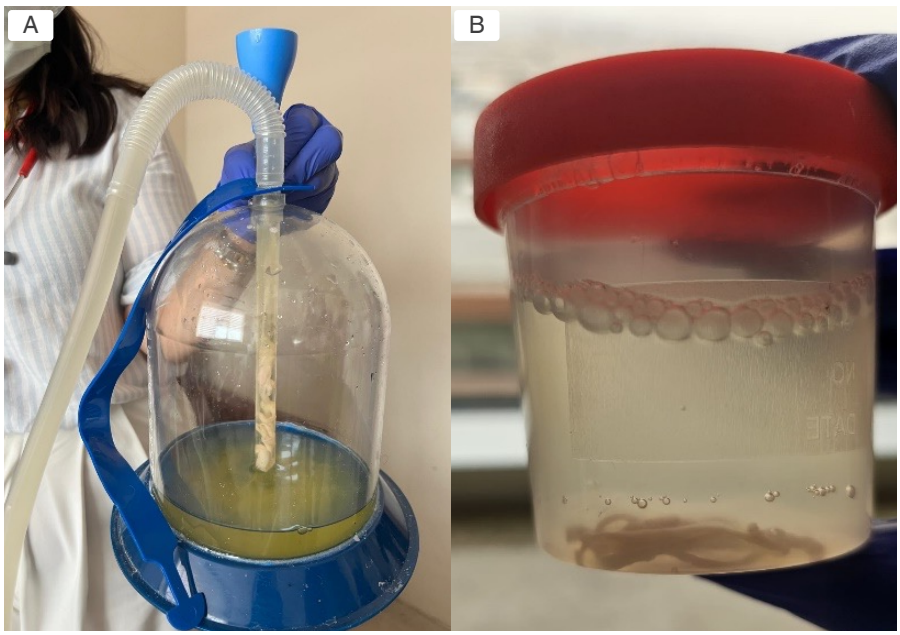


Figure 1. *The Ascaris lumbricoides worm emerging from the chest tube.*

Following the addition of albendazole therapy, marked clinical improvement and a reduction in oxygen requirement were observed by the fifth day of treatment. Chest tubes were removed on day 14, and the patient was discharged in good condition after completing a 21-day course of albendazole.

DISCUSSION

Periods of chemotherapy-induced neutropenia in patients with cancer create a favourable environment for the colonisation and dissemination of parasitic pathogens. Although rare, atypical routes of parasite emergence have been reported in immunosuppressed patients. In the literature, a 68-year-old woman with recently diagnosed small-cell neuroendocrine carcinoma and significant comorbidities, including hypertension and chronic obstructive pulmonary disease, developed pruritus and pain at the catheter insertion site three weeks after placement of a PleurX™ catheter for malignant pleural effusion, where a greyish-white worm was observed; microbiological examination identified *A. lumbricoides*[5]. In another report, *A. lumbricoides* was noted to emerge from a nasogastric tube on postoperative day six in a 59-year-old woman who had undergone jejunal resection for acute mesenteric ischaemia[6].

The pathophysiological mechanism underlying pleural effusion in pulmonary ascariasis is multifaceted, particularly in the context of severe immunosuppression. During the life cycle of *A. lumbricoides*, larvae migrate from the intestine through the portal circulation to the lungs, where they penetrate the alveolar-capillary membrane to enter the bronchial tree. This migration typically causes direct mechanical damage to the capillaries and alveolar walls. In our case, the significant pleural effusion likely resulted from an intense local inflammatory response and hypersensitivity reaction to the larvae, a phenomenon often associated with Löffler's syndrome. Furthermore, the profound neutropenia and decreased immunoglobulin levels induced by the COPDAC chemotherapy (cyclophosphamide, vincristine sulfate [Oncovin™], prednisolone and dacarbazine) may have facilitated a higher parasitic load and systemic dissemination. The use of corticosteroids as part of the malignancy treatment is known to accelerate the autoinfection cycle, potentially leading to hyper infection syndromes where parasites may physically breach the pleural space. Additionally, the presence of the intercostal chest tubes, placed due to persistent effusion, might have served as an inadvertent migration pathway for the adult parasite to emerge from the pleural cavity. This rare presentation underscores that in immunocompromised hosts, the typical barriers to parasitic migration are compromised, leading to atypical clinical features such as refractory lobar pneumonia and significant pleural involvement[3,4].

Bhutia et al.[7] reported a case of intestinal gangrene and mesenteric lymph node infarction caused by *A. lumbricoides* in a 14-year-old patient. Okutan et al.[8] reported Löffler's syndrome secondary to *A. lumbricoides* in a 20-year-old male patient.

Similar to our case, Lone et al.[9] reported a five-year-old child whose liver abscess ruptured into the right pleural cavity; a 7-cm-long *A. lumbricoides* was identified in the chest tube drainage on postoperative day five following intercostal chest tube placement for right pleural effusion.

In our patient, the migration of the parasite into the pleural cavity and its emergence through the chest tube represents one of the rare and unusual presentations described in the literature. The appearance of *A. lumbricoides* via a thoracic tube can be explained by malignancy-related immunosuppression and the presence of the catheter as a potential migration route for the parasite. Immunocompromised patients are particularly prone to atypical infections with unusual clinical manifestations. In this case, the underlying Hodgkin lymphoma and its

treatment likely facilitated this rare presentation. This report highlights the importance of considering parasitic infections in patients with malignancy who present with atypical or persistent symptoms.

The use of immunosuppressive agents, particularly corticosteroids, in haematological malignancies may accelerate the autoinfection cycle of parasites, leading to hyper infection syndromes[1]. Such conditions are often characterised by refractory pneumonia that does not respond to broad-spectrum antibacterial therapy. Especially in patients residing in or with a history of travel to endemic regions, pre-treatment screening for parasitic infections (e.g. stool examination or PCR-based assays) is crucial to prevent potentially fatal complications[10].

CONCLUSION

In immunocompromised patients, parasitic infections should be considered in the differential diagnosis when atypical pulmonary findings persist despite broad-spectrum antibacterial and antifungal therapy. This case underscores that *A. lumbricoides* may represent a rare but significant cause of pneumonia and pleural effusion in paediatric patients receiving chemotherapy.

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