ATYPICAL PULMONARY PRESENTATION OF *STRONGYLOIDES STERCORALIS* HYPERINFECTION IN A PATIENT WITH PHILADELPHIA CHROMOSOME-POSITIVE ACUTE LYMPHOBLASTIC LEUKEMIA: CASE REPORT

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Introduction

- *Strongyloides stercoralis* is a soil-transmitted helminth endemic to tropical and subtropical regions.
- Rhabditiform larvae in moist soil can develop into filariform larvae that can penetrate human skin and migrate through the circulation to the lungs.[1,2] These larvae escape to the alveolar space and migrate to the pharynx. Larvae can settle in the small intestine and mature into adults after being swallowed in pharyngeal secretion.
- In immunocompromised patients, the parasite can cause autoinfection with progression to hyperinfection syndrome. We present a case of *Strongyloides stercoralis* hyperinfection in a patient who is immunosuppressed secondary to hyper-CVAD chemotherapy regimen for Ph+ ALL.

Case History

- A 32-year-old female, originally from Guatemala, with a significant clinical history of Philadelphia chromosome-positive B-cell acute lymphoblastic leukemia diagnosed in 2019, status post chemotherapy with tyrosine kinase inhibitor plus hyper-CVAD regimen. A computerized tomography (CT) scan showed diffuse interstitial pulmonary edema with septal thickening and small pericardial effusion (Fig. 2A-2D).
- Due to normal ejection fraction, differential diagnosis included non-cardiogenic etiology of pulmonary edema, pericardial effusion, pneumonitis secondary to chemotoxicity and infection.
- She rapidly progressed to acute hypoxic respiratory failure, and a bronchoalveolar lavage study revealed numerous larvae consistent with *Strongyloides* hyperinfection. Further workup revealed eosinophilia of 7.67 x 10(9)/L with negative *Strongyloides* IgG antibody.

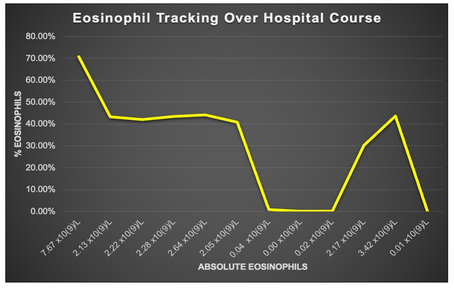

Figure 1: Eosinophil count over the patient's hospital stay.

Figures

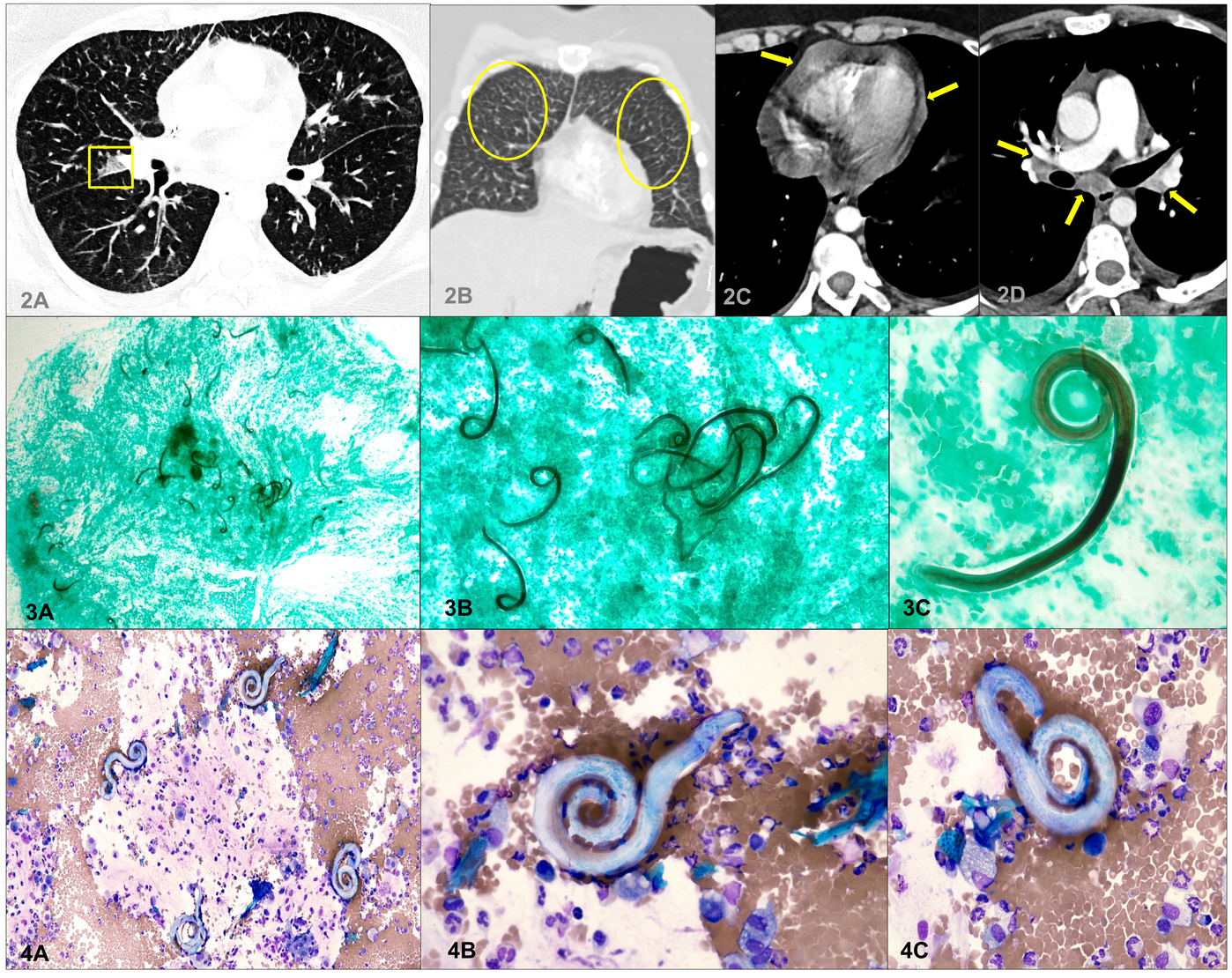

Figure 2: Chest CT. A) axial view, ground glass opacification (yellow box). B) coronal view, interlobular septal thickening and honeycomb appearance consistent with pulmonary edema (yellow circles). C) axial contrast-enhanced, pericardial effusion (yellow arrows). D) axial contrast-enhanced, non-specific mediastinal and bilateral hilar lymph nodes with mild enlargement (yellow arrows).

Figure 3: Bronchoalveolar lavage, Grocott-Gomori methenamine-silver (GMS) stain. A) 20x, numerous *Strongyloides stercoralis* larva. B) 100x, numerous *Strongyloides stercoralis* larva. C) 400x, single *Strongyloides stercoralis* larva with prominent genital primordium.

Figure 4: Bronchoalveolar lavage, Wright-Giemsa stain. A). 400x, four *Strongyloides stercoralis* larva. B) 400x, single *Strongyloides stercoralis* larva. C) 400x, a single *Strongyloides stercoralis* larva.

Results

Computerized tomography (CT) Findings[3,4]	Strongyloidiasis	Chemotherapy-induced toxicity
	Diffuse ground-glass opacity and interlobular septal thickening	Early-onset: infiltrates, pulmonary edema, pleural effusion, ground-glass infiltrates Late onset: infiltrates or fibrosis

Table 1: CT radiographic findings in Strongyloidiasis versus chemotherapy-induced toxicity.

- This presentation, in which a computed tomography scan of the chest revealed diffuse interstitial pulmonary edema with septal thickening and small pericardial effusion, prompted the performance of bronchoscopy.
- In this case, bronchoalveolar fluid cytology confirmed the diagnosis of *Strongyloides stercoralis* larva as the stool was negative for ova and parasites
- Notable was the Strongyloides IgG antibody negative.

Discussion

- The patient presented with shortness of breath and eosinophilia. She had a history of travel to Guatemala, chronic eosinophilia and recurrent rashes, when taken together with her BAL findings, are consistent with a *typical* case of chronic strongyloidiasis.
- However, the patient's complex comorbidities and the CT findings make this an *atypical* presentation of strongyloidiasis. The patient's leukemia and immunosuppression secondary to multiple chemotherapeutic agents combined with the lack of typical ground glass opacities (GGOs) common to many infectious process, especially opportunistic infections on CT imaging, made chemotoxicity the most likely cause of her acute respiratory distress. Bronchoscopy was able to confirm the correct final diagnosis.
- Cytologic examination of bronchoscopy samples is important to assess for pathogens, like *Strongyloides,* that do not grow in routine culture.
  - Ova & parasite testing has very low sensitivity in Strongyloidiasis due to low number of larva shed in stool.
  - Strongyloides IgG antibody testing is more sensitive but can be negative in acute infection, immunosuppression or if infected with similar non-*Strongyloides stercoralis* species (i.e. *Halicephalobus* and *Pelodera*)
- Strongyloidiasis hyperinfection entails a high level of suspicion!
  - Travel history to endemic countries (even if remote, as autoinfection allows the larva to live in the host for a very long life)
  - Reactivation of remote infection (via accelerated autoinfection) is common in immunocompromised patients
  - Eosinophilia can be absent in immunocompromised patients.
  - Sepsis (from autoinfection GI penetration): most common cause death.

Conclusion

- Consider strongyloidiasis if immunocompromised patient with any eosinophilia –or– any tropical/subtropical travel history.
- Cytology (BAL) & histology (GI) evaluation is an important factor for diagnosis.