



## Case report

## Pulmonary strongyloidiasis causing septic shock in a patient with Crohn's disease

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## A B S T R A C T

A 58 years old male who was admitted to the intensive care unit for septic shock secondary to pneumonia, he has Crohn's disease currently treated with Vedolizumab and previously with infliximab. He was started on broad spectrum antibiotics and vasopressors for treatment of septic shock without improvement in the following days, sputum & blood cultures were negative. Bronchoscopy was done for non-resolving pneumonia work up, bronchoalveolar lavage smears and cultures were negative for bacteria, tuberculosis and Fungi. Bronchial washings cytology showed filariform larvae and serology was positive for Strongyloides, He was started on ivermectin and his condition improved significantly.

## 1. Introduction

Strongyloidiasis is a parasitic infection that in pulmonary form can present as pneumonia or more severely as septic shock; it should be considered in the differential diagnosis of non-resolving pneumonia, especially in immunocompromised patients.

## 2. Case report

A 58 year old male presented to the emergency department after he was found on the floor of his apartment. The patient was unable to provide detailed history of the events, however, he was noted to have had several episodes of loose bowel movements. He denied any change in the stool color or blood in the diarrhea. There was no associated abdominal pain, nausea, vomiting, recent antibiotics use, fever, cough, chest pain or dyspnea. He was not hospitalized within the past year, moreover, he has never traveled outside the United States. He was diagnosed with Crohn's disease 40 years ago and had multiple bowel resections in the past; he is not on steroids. Currently he is being treated with Vedolizumab for the last 8 months, in addition, he was being treated with infliximab which was stopped prior to the initiation of Vedolizumab. Physical examination showed an emaciated patient, with vital signs as follows: blood pressure 78/50, heart rate 98, respiratory rate 22 & temperature 99° F, lung exam showed crackles over the right lung, abdominal and cardiovascular exam were unremarkable. Investigations were significant for elevated WBCs count to 20.9 (Neutrophils 96.1%, lymphocytes 0.8%, monocytes 2.3%, eosinophils

0%), and chest X ray with multiple opacities in the right lung field (Fig. 1); IgE level was 205, HIV was negative. Accordingly he was admitted to intensive care unit for management of septic shock caused by pneumonia, where he was started on Vancomycin, Aztreonam, Levofloxacin and vasopressors. The clinical picture didn't improve on the following days despite being on antibiotics; sputum and blood cultures were negative. Due to lack of improvement and paucity of microbiological data, patient had a CT of the chest which showed opacification within the entirety of the right lung with air bronchograms (Fig. 2). On the 4th day of admission the patient underwent a bronchoscopy that showed normal mucosa without lesions in the upper and lower airways. Bronchoalveolar lavage was obtained and cultures were negative for bacteria, tuberculosis & fungi. Bronchial washing cytology showed acute inflammation and filariform larvae (Fig. 3) and serology was positive for Strongyloides antibodies. He was started on ivermectin and his condition improved significantly and he was discharged in good condition.

## 3. Discussion

Strongyloidiasis is endemic in tropical and subtropical regions, it can be found the southeastern of the United States, Transmission of strongyloidiasis in long-term care settings has also been described [1].

The infection burden can increase via autoinfection leading to hyperinfection syndrome, especially in immunocompromised patients that can result in massive spread of filariform larvae to the lungs, liver, heart, central nervous system and endocrine glands, inducing

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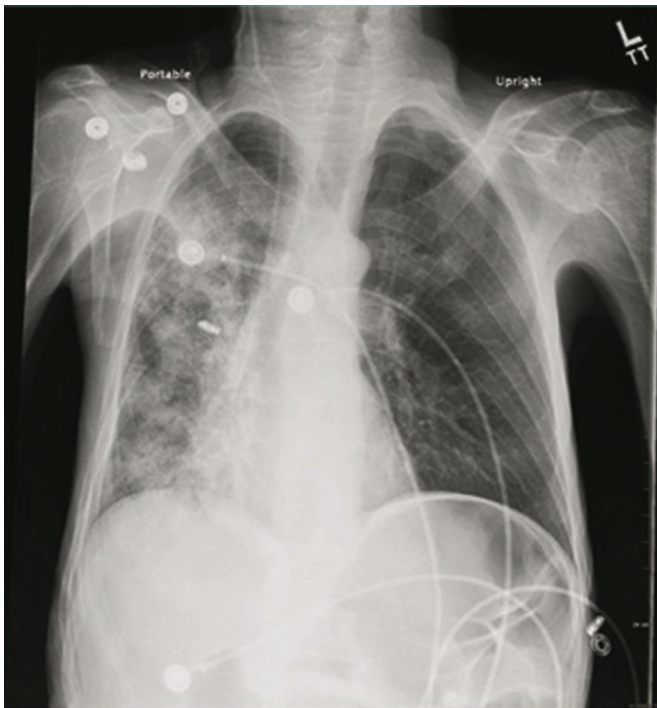


Fig. 1. Parenchymal infiltrations seen in the right lung.

inflammation that may lead to organ dysfunction, septic shock and acute respiratory distress syndrome [2,3].

Risk factors for strongyloides infection include HIV, HTLV-1 infection, alcoholism, hematologic malignancies, biliary cancer, pancreatic cancer and immunocompromised conditions [9], Also Strongyloidiasis risk increases with steroids and Anti-TNF therapy [4].

Pulmonary strongyloidiasis may present as asthma that paradoxically worsens with corticosteroid use [7] or dyspnea due to restrictive pulmonary disease [8].

Vedolizumab is a monoclonal antibody that targets alpha 4 beta 7 integrin thus inhibits the migration of memory T-lymphocytes into gastrointestinal tract which then decreases chronic inflammation in inflammatory bowel disease. This immune system modulation may impair cell mediated immunity in the gastrointestinal tract possibly increasing the risk of hyperinfection with strongyloidiasis which predisposes to dissemination and thus pulmonary infection.

Vedolizumab is associated with higher risk of nasopharyngitis [10], upper respiratory tract infection, sinusitis, and urinary tract infection. Uncommon infections reported with Vedolizumab include abscess, sepsis, tuberculosis, salmonella sepsis, Listeria meningitis, giardiasis and cytomegalovirus colitis [11–13].

Diagnosis of strongyloidiasis is by detection of larvae in samples of stool, sputum, bronchoalveolar lavage fluid, pleural fluid, peritoneal fluid or skin biopsy. Other diagnostic modalities include serology: ELISA for IgG Abs can be 89% sensitive and 97.2% specific [5].

Treatment is by Ivermectin or albendazole, Albendazole is less effective than Ivermectin [6].



Fig. 2. CT chest showing Opacification within the entirety of the right lung with air bronchograms suggestive of a infectious process and Bilateral pleural effusion.

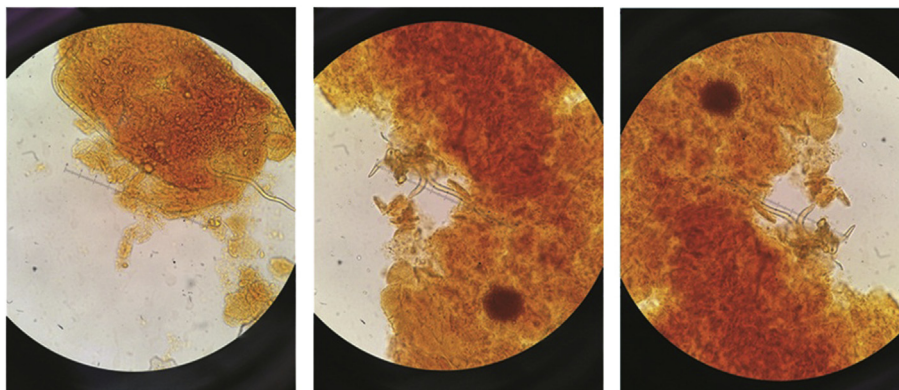


Fig. 3. Bronchial washing showing Acute inflammation and microorganisms present suspicious for filariform larvae, serology was positive for Strongyloides.

## Appendix A. Supplementary data

Supplementary data related to this article can be found at <http://dx.doi.org/10.1016/j.rmcr.2018.04.003>.

## References

- [1] Centers for Disease Control and Prevention, Notes from the field: strongyloides infection among patients at a long-term care facility—Florida, 2010–2012, *MMWR Morb. Mortal. Wkly. Rep.* 62 (2013) 844.
- [2] D.L. Longworth, P.F. Weller, Hyperinfection syndrome with strongyloidiasis, in: J.S. Remington, M.N. Swartz (Eds.), *Current Clinical Topics in Infectious Diseases*, seventh ed., McGraw-Hill, New York, NY, 1986.
- [3] J.H. Woodring, H. Halfhill 2nd, J.C. Reed, Pulmonary strongyloidiasis: clinical and imaging features, *AJR Am. J. Roentgenol.* 162 (1994) 537.
- [4] R. Krishnamurthy, H.E. Dincer, D. Whittemore, Strongyloides stercoralis hyperinfection in a patient with rheumatoid arthritis after anti-TNF-alpha therapy, *J. Clin. Rheumatol.* 13 (2007) 150.
- [5] H.R. van Doorn, R. Koelewijn, H. Hofwegen, et al., Use of enzyme-linked immunosorbent assay and dipstick assay for detection of Strongyloides stercoralis infection in humans, *J. Clin. Microbiol.* 45 (2007) 438.
- [6] H. Marti, H.J. Haji, L. Savioli, et al., A comparative trial of a single-dose ivermectin versus three days of albendazole for treatment of Strongyloides stercoralis and other soil-transmitted helminth infections in children, *Am. J. Trop. Med. Hyg.* 55 (1996) 477.
- [7] J.H. Wehner, C.M. Kirsch, F.T. Kagawa, et al., The prevalence and response to therapy of Strongyloides stercoralis in patients with asthma from endemic areas, *Chest* 106 (1994) 762.
- [8] A.L. Lin, N. Kessimian, J.O. Benditt, Restrictive pulmonary disease due to interlobular septal fibrosis associated with disseminated infection by Strongyloides stercoralis, *Am. J. Respir. Crit. Care Med.* 151 (1995) 205.
- [9] F. Schär, U. Trostsdorf, F. Giardina, et al., Strongyloides stercoralis: global distribution and risk factors, *Brooker S, PLoS Neglected Trop. Dis.* 7 (7) (2013) e2288, <http://dx.doi.org/10.1371/journal.pntd.0002288>.
- [10] M.C. Wang, L.Y. Zhang, W. Han, et al., PRISMA—efficacy and safety of Vedolizumab for inflammatory bowel diseases: a systematic review and meta-analysis of randomized controlled trials, *Lympelopoulos. A, Medicine* 93 (28) (2014) e326, <http://dx.doi.org/10.1097/MD.0000000000000326>.
- [11] W.J. Sandborn, B.G. Feagan, P. Rutgeerts, et al., Vedolizumab as induction and maintenance therapy for Crohn's disease, *N. Engl. J. Med.* 369 (2013) 711–721.
- [12] L. Hahn, A. Beggs, K. Wahaib, L. Kodali, V. Kirkwood, Vedolizumab: an integrin-receptor antagonist for treatment of Crohn's disease and ulcerative colitis, *Am. J. Health Syst. Pharm.* 72 (15) (2015 Aug 1) 1271–1278, <http://dx.doi.org/10.2146/ajhp140449> Review. PubMed PMID: 26195652.
- [13] Entyvio (Vedolizumab) Package Insert, Takeda Pharmaceuticals America, Deerfield, IL, 2014 May.