Chylous ascites as a complication of intraabdominal *Mycobacterium avium* complex immune reconstitution inflammatory syndrome

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ABSTRACT

Chylous ascites is an uncommon finding of triglyceride-rich lymph in the peritoneal cavity. There are a variety of reported etiologies for chylous ascites; however, the reporting of chylous ascites among AIDS/HIV-positive patients is quite uncommon. This finding as a complication of immune reconstitution inflammatory syndrome is even more unusual. Here we report a case of an HIV-positive man with a history of colonic *Mycobacterium avium* complex who developed chylous ascites in the setting of increasing CD4 counts and decreasing viral load, suggestive of immune reconstitution inflammatory syndrome.

KEYWORDS Chylous ascites; immune reconstitution inflammatory syndrome; *Mycobacterium avium* complex; opportunistic infections

Chylous ascites as a late complication of immune reconstitution inflammatory syndrome (IRIS) in patients with HIV and colonic *Mycobacterium avium* complex (MAC) is an uncommon occurrence and has rarely been reported in the literature. Through what we understand about the pathophysiology of the involved disease states, it is possible that this complication should be anticipated. It is a condition that needs to be recognized, assessed, and treated early and appropriately, because the complications of infections or nutritional disturbances have the potential for high morbidity and mortality.

CASE DESCRIPTION

A 51-year-old white man presented to the emergency department with progressive abdominal distension and dyspnea. His past medical history was significant for a diagnosis of a colonic MAC infection found on colonic biopsy and a subsequent diagnosis of AIDS 3 months previously. At the time of his diagnosis, his initial CD4 count was 9 cells/ μ L. He was started on ethambutol, levofloxacin, and rifampin for his MAC infection and subsequently highly active antiretroviral therapy (HAART) with ritonavir, darunavir, lamivudine, and efavirenz. Examination showed abdominal distention and tense ascites. His vital signs showed a temperature of 36.8°C, blood pressure of 110/72 mm Hg, pulse of 90 beats per minute, respiration rate of 20 breaths per minute, and oxygen saturation of 96%

on room air. On laboratory evaluation, his CD4 count was 150 cells/ μ L and his viral load was undetectable. A diagnostic and therapeutic paracentesis removed 9050 mL of milky, white fluid. Its triglyceride level was 1498 mg/dL, a cholesterol level was undetectable, and a cell count was 56% lymphocytes, 38% monocytes, and 2% neutrophils. Further analysis revealed a negative gram stain and culture and no evidence of malignant cells. Serum albumin was 3.1 g/dL with ascitic albumin of 0.7 g/dL. A transjugular liver biopsy showed no fibrosis. An autoimmune workup was negative. Flow cytometry did not show any evidence of malignancy. Lymphoscintigraphy did not show any gross lymphatic leak. Based on the overall negative workup, the etiology of the chylous ascites was thought to be secondary to IRIS. The patient was continued on his MAC and HAART medications as well as treated with intermittent therapeutic paracenteses.

DISCUSSION

The changes in immune capacity after the initiation of HAART may lead to clinical deterioration due to the “new” ability to mount an inflammatory immune response against both infectious and noninfectious antigens, otherwise known as IRIS.¹ To meet the criteria for IRIS, a patient must be HIV positive and receiving HAART, have a decreasing viral load (with or without an increase in CD4 count from baseline), and have clinical symptoms consistent with an inflammatory

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process rather than an expected course from a previously or newly diagnosed opportunistic infection or drug toxicity.²

Chylous ascites is an abnormal accumulation and collection of lipid-rich lymphatic fluid in the peritoneal cavity. Its frequency in the general population is quite low.^{3,4} An abdominal paracentesis is the most important diagnostic tool in the evaluation of ascites. The appearance of chylous ascites is cloudy and turbid. Triglyceride levels are elevated, typically >200 mg/dL. Other features include an elevated cell count of >500 leukocytes/ μ L, showing lymphocytic predominance, and a low cholesterol level (with an ascites/serum ratio <1).⁵ Other important considerations include cytology, a tuberculosis smear, culture, and fluid adenosine deaminase measurements.

The etiology of chylous ascites can be separated into traumatic and atraumatic causes. The most common atraumatic causes include malignancy, cirrhosis, and *Mycobacterium* infections. In the setting of *Mycobacterium* infections, histology has shown well-formed granulomas in lymphatic vessels causing lymphatic obstruction at the base of the mesentery or the cisterna chyli.^{6,7}

During mycobacterial infections, the activation of T cell receptors expressing CD4+ T cells is essential in the formation of granulomas.⁸ Granulomas are formed from a complex cascade of systems. Sensitized type 1 T helper cells are attracted to the site of focally aggregated macrophages that contain ingested bacilli in the case of *Mycobacterium* infections, and the early granuloma organizes into its characteristic structure. CD4+ cells are at the periphery as well as interspersed with the macrophages. Thus, the first step is sequestration of the invading microorganisms by granuloma macrophages.⁹

The timing of initiation of HAART has been studied in those who present with opportunistic infections and its relation to the development of IRIS. Treatment guidelines recommend initiation of HAART within 2 weeks for those who present with most opportunistic infections, including MAC, because early initiation (within 2 weeks) has been associated with decreased AIDS-related mortality without significant treatment-related adverse events. However, it is estimated that IRIS occurs in at least 10% of patients with HIV who are started on HAART with a preexisting *Mycobacterium* infection. Its presentation is variable, though usually with worsening symptoms of the involved system.

The chylous ascites found in our patient was likely a result of granulomatous infiltration of the lymphatic system, causing

obstruction, in the setting of the abrupt restoration of the immune system. Chylous ascites relating to MAC is extremely rare, with only a handful of cases reported in the English literature. However, a retrospective look at patients at a single institution in Canada showed chylous ascites to be a result in all reported cases of MAC-IRIS.¹⁰ This further supports the hypothesis of enhanced granuloma formation in the setting of immune reconstitution and the idea that perhaps chylous ascites should be expected as a late complication of intraabdominal MAC infections. The long-term prognosis of this condition is generally thought to be favorable with the adherence to HAART.^{6,11}

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