

CASE REPORT

Sarcoidosis with secondary recurrent right-sided chylothorax and chylous ascites in a Caucasian male patient

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Abstract

Sarcoidosis is a rare multisystem autoimmune disease characterized by the presence of non-caseating granulomas in involved organs. We report a novel case of a 61-year-old Caucasian male with sarcoidosis presenting with recurrent chylothorax and chylous ascites. Pleural and ascitic fluid analysis revealed high triglyceride levels, consistent with chylothorax and chylous ascites, respectively. Common etiologies of chylous fluid such as thoracic duct surgical trauma, malignancy and infection were all excluded. Sarcoidosis was confirmed by the presence of non-caseating granulomas on a mediastinal lymph node biopsy. Conservative treatment with low-fat diet, prednisone, octreotide and multiple thoracenteses failed to effectively resolve the chylothorax. Surgical interventions with pleurodesis and thoracic duct ligation were performed, leading to the complete resolution of the chylous effusion and ascites.

INTRODUCTION

Sarcoidosis is a multisystem autoimmune disease characterized by non-caseating granulomas. It typically presents as interstitial lung disease with lymphadenopathy, primarily affecting African American women 20–40 years old. Our patient is an older Caucasian male with sarcoidosis who presented with rare complications of recurrent chylothorax and chylous ascites that failed conservative therapy.

CASE REPORT

A 61-year-old Caucasian male presented to the hospital for acutely worsening shortness of breath with chest tightness,

productive cough and wheezing. His medical history includes sarcoidosis, COPD and a prior pleural effusion. The effusion was not investigated further due to its small size. He is a former smoker with a 32 pack-year smoking history. His vitals were as follows: temperature: 38.2°C; heart rate: 122 beats/min; respiratory rate: 28 breaths/min; oxygen saturation: 94% (on 2 l of oxygen). He had Type 1 respiratory failure with PaO₂ of 57 mmHg (normal: 75–100 mmHg) and PaCO₂ of 29 mmHg (normal: 35–45 mmHg). Procalcitonin level was 6.75 µg/l (normal: <0.5 µg/l). Sputum culture, coronavirus disease 2019 testing and urine antigen testing for *Streptococcus pneumoniae* and *Legionella pneumophila* were all negative. A chest radiograph demonstrated interstitial pulmonary edema and right pleural effusion with compressive atelectasis. D-dimer was 2.2 µg/ml

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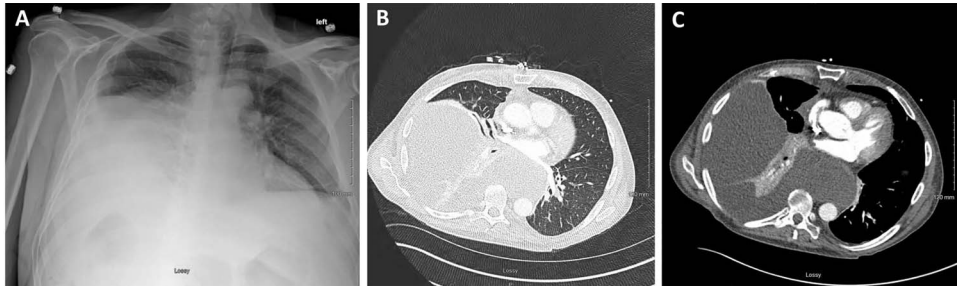


Figure 1: [Chest radiography and thoracic computed tomography of the patient with sarcoidosis and prior pleural effusions. (A) A chest radiograph revealed a right-sided pleural effusion with associated compressive atelectasis. Computed tomography of the lung in pulmonary window (B) and mediastinal window (C) that demonstrated a large right-sided loculated pleural effusion.]

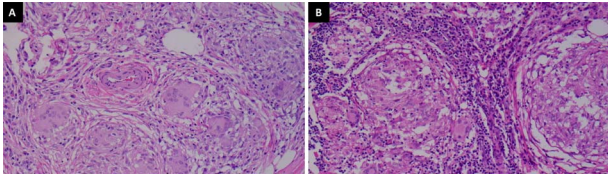


Figure 2: (A and B) Histopathological biopsy of a mediastinal lymph node within the pericardial fat pad revealed non-caseating granulomas.

(normal: $<0.5 \mu\text{g/ml}$). A chest computed tomography (CT) pulmonary angiogram ruled out pulmonary embolism, and a standard chest CT confirmed a large right-sided loculated pleural effusion (Fig. 1).

The patient received oxygen supplementation and was treated empirically for pneumonia with azithromycin and ceftriaxone. A CT-guided thoracentesis and subsequent chest tube thoracostomy drained the pleural effusion, revealing white, cloudy fluid. Pleural fluid analysis revealed an elevated triglyceride level of 217 mg/dl, indicating chylothorax (diagnostic: $>110 \text{ mg/dl}$). Pleural fluid cytology was negative for malignancy. Pleural fluid gram stain, culture and acid-fast stain results were negative. A follow-up chest CT revealed hilar and mediastinal lymphadenopathy, multiple lung nodules and a dense right posteromedial hilar-pleural lung mass, suspicious for malignancy. Navigational bronchoscopy with transbronchial needle aspiration biopsies from the mass and multiple lymph nodes were all negative for malignancy, raising suspicion for autoimmune involvement.

For his recurrent chylothorax, a right video-assisted thoracoscopic surgery (VATS) was performed. Findings revealed extensive chyle seepage within the right anterior mediastinum near the pericardial fat pad, but no evidence of thoracic duct trauma. Suspected areas of chyle leakage from the thoracic duct and other lymphatic channels were ligated. Adjacent mediastinal lymph nodes were biopsied revealing non-caseating granulomas diagnostic for sarcoidosis (Fig. 2). Talc Pleurodesis was performed to reduce the pleural space. The patient was post-operatively managed with thoracostomy, octreotide, tapering prednisone and a low-fat diet. Chest tube drainage decreased, and he was discharged.

The patient required multiple follow-up outpatient visits for persistent shortness of breath and chronic cough. Multiple transthoracic ultrasounds revealed persistent right-sided pleural effusions. Routine thoracentesis drained chyle, and temporarily relieved symptomatology of recurrent chylothorax. He was continued on prednisone therapy. He later developed new-onset abdominal discomfort, and 10-pound weight gain.

Physical examination revealed significant abdominal distention and lower extremity edema. Abdominal ultrasound and a follow-up abdominal CT revealed moderate-to-large ascites. A paracentesis was performed. Peritoneal fluid appearance and analysis was consistent with chylous ascites (Fig. 3).

For his recurrent chylothorax, the patient was referred to a tertiary center, where he underwent another thoracic duct ligation and talc pleurodesis. The octreotide and prednisone regimen were restarted. The patient's shortness of breath and chronic cough improved. Imaging no longer reveals significant pleural effusions or ascites. He currently undergoes physical therapy.

DISCUSSION

Men are half as likely as women to have sarcoidosis [1]. Caucasian men were four times less likely to be affected compared with African American women (40.02 vs 178.47 per 100 000, respectively; [1]). Thus, this case of a Caucasian male with sarcoidosis is relatively rare.

Sarcoidosis commonly manifests in the lungs and lymph nodes, yet may affect multiple other organs [2]. However, pleuritic and peritoneal involvement is rare. Pleural effusions were reported in 1.1–3.0% of sarcoidosis cases [3, 4]. To date, very few cases of chylous ascites are documented in patients with sarcoidosis [5]. Furthermore, no other cases in available literature describe sarcoidosis with concurrent chylothorax and chylous ascites in a Caucasian male.

The exact pathophysiology of chylothorax and chylous ascites in sarcoidosis is unknown. However, few putative mechanisms have been proposed from related studies [5–7]. First, inflammation from sarcoidosis invades the thoracic duct and other smaller lymphatics, resulting in chyle leakage [6]. Second, bulky lymphadenopathy and intranodal fibrosis obstruct lymphatic flow through the thoracic duct and mesenteric lymphatics. The resulting congestion increases intraluminal pressure, resulting in chyle leakage into the pleural space and peritoneal cavity [5–7].

Sarcoidosis should be considered when investigating chyle leakage after more common etiologies are ruled out. In this patient, thoracic duct injury was ruled out by the lack of chest trauma and thoracic surgery history. Malignancy was excluded by negative lymph node and pleural biopsies and benign pleural fluid cytology. Tuberculosis was ruled out by negative sputum and pleural fluid cultures, and acid-fast staining. Sarcoidosis was confirmed by non-caseating granulomas in lymph node biopsies, and became the primary suspected cause of chyle leakage.

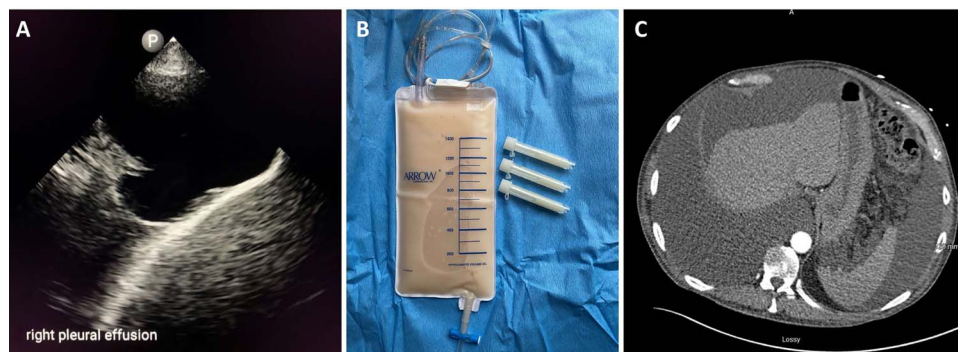


Figure 3: (A) Transthoracic ultrasound revealed a right-sided loculated pleural effusion. (B) Chylous fluid removed via thoracentesis from the right pleural space. (C) Computed tomography of the upper abdomen demonstrated moderate to large ascites.

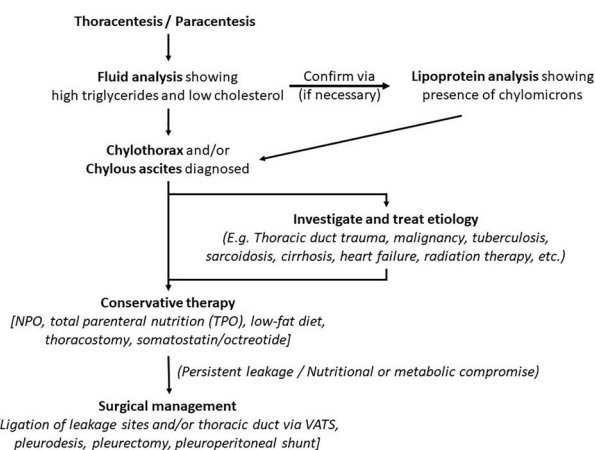


Figure 4: Diagnosis and treatment pathway for chylothorax and chylous ascites, adopted from McGrath et al. [8]

Conservative medical management with a low-fat diet, octreotide and prednisone initially helped manage this patient's chylothorax. Long-chain fatty acids get absorbed directly into the lymphatic system via lacteals, forming chyle. However, low-fat diets only contain medium-chain fatty acids that bypass the lymphatic system, reducing chyle generation [5]. The somatostatin analog, octreotide, decreases chyle production by reducing mesenteric blood flow [5]. Decreased chyle production causes less chyle leakage from lymphatic channels. Prednisone reduces inflammation by inhibiting cytokine release, reducing lymphadenopathy and improving lymphatic flow. Thoracic duct ligation and pleurodesis are indicated when these conservative therapies fail (Fig. 4).

In essence, this case is a novel presentation of sarcoidosis due to uncommon patient demographics and thoracic duct involvement, resulting in chylothorax and chylous ascites. This case illustrates that sarcoidosis may be important in the differential when investigating recurrent chyle leakage. Similar rare cases require individualized treatment plans and referrals to sarcoidosis experts.

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CONFLICT OF INTEREST STATEMENT

No conflicts of interest.

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ETHICAL APPROVAL

This study was approved by University of New England Office of Research Integrity (case # 011221-08).

CONSENT

Verbal and written informed consent were obtained from the patient for publication of this case report.

GUARANTOR

Dr Carol Brenner.

REFERENCES

- Baughman RP, Field S, Costabel U, Crystal RG, Culver DA, Drent M et al. Sarcoidosis in America. Analysis based on health care use. *Ann Am Thorac Soc* 2016;13:1244–52. <https://doi.org/10.1513/AnnalsATS.201511-760OC>.
- Ungrprasert P, Ryu JH, Matteson EL. Clinical manifestations, diagnosis, and treatment of sarcoidosis. *Mayo Clinic Proc: Innovations, Qual Outcomes* 2019;3:358–75. <https://doi.org/10.1016/j.mayocpiqo.2019.04.006>.
- Huggins JT, Doelken P, Sahn SA, King L, Judson MA. Pleural effusions in a series of 181 outpatients with sarcoidosis. *Chest* 2006;129:1599–604. <https://doi.org/10.1378/chest.129.6.1599>.
- Riley LE, Ataya A. Clinical approach and review of causes of a chylothorax. *Respir Med* 2019;157:7–13. <https://doi.org/10.1016/j.rmed.2019.08.014>.
- Mannam P, Boselli JM, Schulman ES. Successful treatment of chylous ascites secondary to sarcoidosis

- with methotrexate. *Hosp Pract* 2009;37:144–6. <https://doi.org/10.3810/hp.2009.12.268>.
6. Bhattarai BC, Schmidt FR, Devkota A, Policard G, Manhas S, Oke V et al. A case of chylothorax in a patient with sarcoidosis: a rare and potentially fatal complication. *J Commun Hosp Internal Med Perspect* 2015;5:28300. <https://doi.org/10.3402/jchimp.v5.28300>.
 7. Lizaola B, Bonder A, Trivedi HD, Tapper EB, Cardenas A. Review article: the diagnostic approach and current management of chylous ascites. *Aliment Pharmacol Ther* 2017;46:816–24. <https://doi.org/10.1111/apt.14284>.
 8. Mcgrath EE, Blades Z, Anderson PB. Chylothorax: aetiology, diagnosis and therapeutic options. *Respir Med* 2010;104:1–8. <https://doi.org/10.1016/j.rmed.2009.08.010>.