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CASE REPORT | LIVER

# Budd-Chiari Syndrome in a Patient With Simultaneous Diagnosis of Hepatic Sarcoidosis and Nodular Regenerative Hyperplasia

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## ABSTRACT

Budd-Chiari syndrome (BCS) is a rare vascular disorder characterized by an obstruction of the hepatic venous outflow. Nodular regenerative hyperplasia (NRH) may develop as a result of an underlying autoimmune disease such as hepatic sarcoidosis. Only a few case reports have described cases with either NRH or hepatic sarcoidosis associated with BCS. We present a 42-year-old man presenting with BCS and signs of portal hypertension who was found to have an underlying pathological diagnosis of both hepatic sarcoidosis and NRH and who was successfully treated with a transjugular intrahepatic portosystemic shunt.

## INTRODUCTION

Budd-Chiari syndrome (BCS) is a rare vascular disorder characterized by an obstruction of the hepatic venous outflow.[1] BCS is mainly classified into primary, referring to a venous process such as thrombosis or phlebitis, and secondary in external compression or vascular infiltration. The association between BCS and hepatic sarcoidosis was described in a few case reports, the first of which was published in 1978.[2] An association between nodular regenerative hyperplasia (NRH) and BCS has also been previously described in a few reports.[3–5] We present a patient who was found to have a triad of hepatic sarcoidosis, NRH, and BCS and who was successfully treated with a transjugular intrahepatic portosystemic shunt (TIPS).

## CASE REPORT

A 42-year-old white man with no medical history presented with 4 weeks of abdominal distention. On admission, his vital signs were stable and his abdominal examination was significant for a distended abdomen with shifting dullness. Blood tests including complete blood count, comprehensive metabolic panel, and coagulation profile were unremarkable except for mild leukocytosis of 10.9 K/μL, INR of 1.5, and mildly elevated alkaline phosphatase of 144 IU/L. Abdominal ultrasound was performed, which showed a diffusely heterogeneous liver, not well-visualized intrahepatic inferior vena cava, large-volume ascites, and mild splenomegaly. Diagnostic abdominal paracentesis showed culture-negative neutrocytic ascites with a serum-ascites albumin gradient of 1.0. An echocardiogram was performed, which was unremarkable. The initial clinical and radiological findings were highly suggestive of BCS, and the patient was empirically started on a heparin infusion.

Abdominal/pelvic computed tomography with contrast showed a markedly attenuated yet patent middle hepatic vein, while the right and left hepatic veins were not visualized and likely occluded (Figure 1). Esophagogastroduodenoscopy showed grade I varices in the distal esophagus. Hypercoagulability workup showed a mildly decreased functional protein C percentage of 53% and a decreased antithrombin percentage of 53%. Hepatic venography showed the occlusion of the middle and left hepatic vein and a portal pressure gradient of 17 mm Hg. A transvenous liver biopsy showed a central vein with a fibrin

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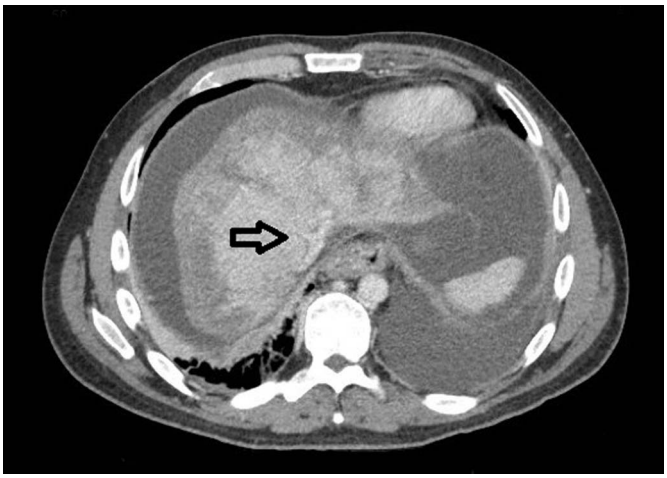

**Figure 1.** Abdominal computed tomography with contrast showing a markedly attenuated yet patent middle hepatic vein (arrow). The right and left hepatic vein are not visualized and are likely occluded.

thrombus, focal sinusoidal congestion, and hemorrhage as well as multiple lobular non-necrotizing granulomas and NRH (Figure 2).

Given the diagnosis of BCS, a TIPS procedure was performed with a resultant decrease of portal pressure gradient from 17 to 4 mm Hg. The patient's postprocedural hospital stay was uneventful, and he was eventually discharged on lifelong anticoagulation.

## DISCUSSION

BCS is a rare disease that is well described in patients with underlying myeloproliferative disease, malignancy, and hypercoagulable states. Our diagnosis of BCS was based on (i) clinical evidence of postsinusoidal portal hypertension in the absence of cardiac or pericardial disease, (ii) hepatic venography with an occlusion of the middle and left hepatic vein, and (iii) a liver biopsy showing central vein occlusion and sinusoidal congestion and hemorrhage. A diagnosis of hepatic sarcoidosis was established via non-necrotizing granulomas seen on the liver biopsy with negative periodic acid-Schiff, Grocott methenamine silver, and alpha-fetoprotein stains as well as an elevated angiotensin-converting enzyme level of 97 U/L that is described to have a specificity of almost 90%.[6] The proposed theory that associates BCS and hepatic sarcoidosis is that granulomas can lead to hepatic veins stenosis, resulting in venous stasis and extensive thrombotic occlusion.[7]

NRH may develop as a result of an underlying autoimmune disease such as hepatic sarcoidosis, and it was also described in few cases with BCS.[3–5,8] To our knowledge, our patient is the first documented case presenting with BCS with a simultaneous diagnosis of hepatic sarcoidosis and NRH. We hypothesize that in our case, sarcoidosis was the primary pathology that led to BCS and portal hypertension with NRH likely a pathological consequence of hepatic sarcoidosis. Another possible contributing factor is the hypercoagulable state because workup showed that our patient had a mildly low functional protein C and antithrombin level although the levels of antithrombin are

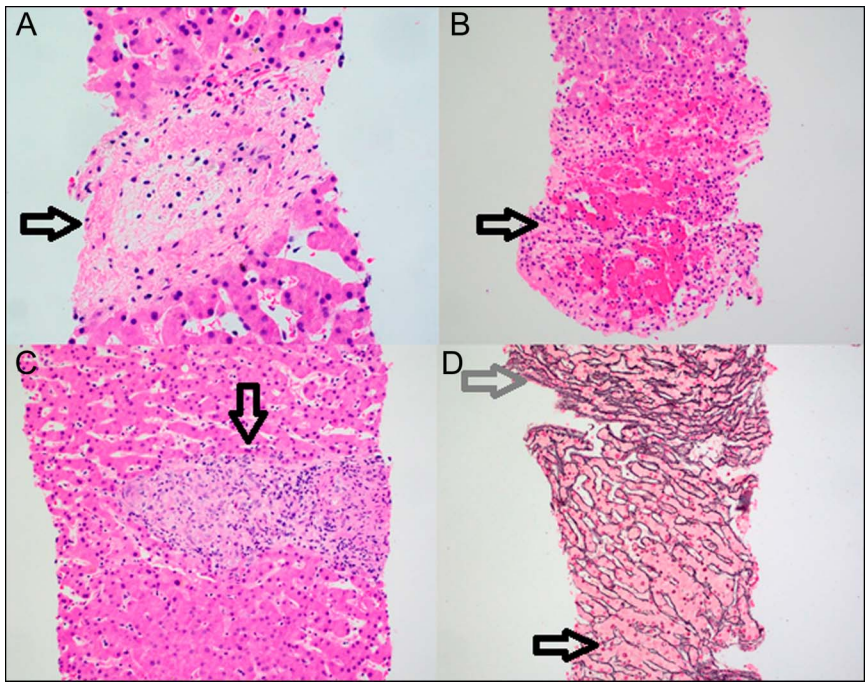


**Figure 2.** (A) Focal central vein fibrin thrombus (arrow). (B) Sinusoidal dilatation and congestion with hemorrhage (arrow). (C) Multiple lobular well-circumscribed non-necrotizing granulomas (arrow). Special stains for microorganisms, including acid-fast bacteria, are negative. (D) Nodular regenerative hyperplasia, demonstrated on reticulin stain, showing hyperplastic hepatocyte plate architecture (black arrow), with accompanying atrophic hepatocyte plate architecture (gray arrow).

likely falsely positive, given that this value was obtained while the patient was on heparin infusion.[9]

Reviewing the literature, there are 8 case reports of adult patients diagnosed with hepatic sarcoidosis who were complicated by BCS.[2,7,10–15] Of the 8 cases, 2 were treated surgically with a portosystemic shunt, 2 were treated with liver transplantation, 2 were treated with steroids and anticoagulation, 1 was treated with steroids alone, and 1 with an unstated course of treatment.[2,7,10-15] Our case is the first documented case of an adult with BCS associated with hepatic sarcoidosis that was treated with a TIPS. Furthermore, 2 pediatric cases of BCS were described to be associated with hepatic sarcoidosis; 1 was treated with corticosteroids, whereas the other was initially treated with a TIPS, complicated by recurrent thrombosis which eventually required liver transplantation.[16,17]

BCS is often managed by restoring hepatic venous drainage, anticoagulation, treatment of portal hypertension complications, and treatment of the predisposing condition. If all fails, then liver transplantation is the last resort.[1] On the other hand, hepatic sarcoidosis often does not require treatment except if symptomatic. Treatment usually consists of steroids, ursodeoxycholic acid, or immunosuppressive agents, and in rare cases, liver transplantation is warranted.[18] To conclude, to our knowledge, we present the first case of BCS to be dually associated with hepatic sarcoidosis and NRH, which was successfully managed with a TIPS. Our case highlights the utility of the TIPS procedure in treating patients with BCS in general and those with a simultaneous diagnosis of sarcoidosis in particular.

## DISCLOSURES

Author contributions: T. Odah wrote the manuscript and is the article guarantor. A. Al-Khazraji and R. Idriss edited the manuscript. M. Morrow provided the pathological images and wrote the captions. M. Curry approved the final version.

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Informed consent was obtained for this case report.

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## REFERENCES

1. DeLeve LD, Valla DC, Garcia-Tsao G; American Association for the Study Liver Diseases. Vascular disorders of the liver. *Hepatology.* 2009; 49(5):1729–64.
2. Natalino MR, Goyette RE, Owensby LC, Rubin RN. The budd-chiari syndrome in sarcoidosis. *JAMA.* 1978;239(25):2657–8.
3. Rha SE, Lee MG, Lee YS, et al. Nodular regenerative hyperplasia of the liver in Budd-Chiari syndrome: CT and MR features. *Abdom Imaging.* 2000; 25(3):255–8.
4. de Sousa JM, Portmann B, Williams R. Nodular regenerative hyperplasia of the liver and the Budd-Chiari syndrome. Case report, review of the literature and reappraisal of pathogenesis. *J Hepatol.* 1991;12(1): 28–35.
5. Castellano G, Canga F, Solis-Herruzo JA, Colina F, Martinez-Montiel MP, Morillas JD. Budd-Chiari syndrome associated with nodular regenerative hyperplasia of the liver. *J Clin Gastroenterol.* 1989;11(6): 698–702.
6. Ungprasert P, Carmona EM, Crowson CS, Matteson EL. Diagnostic utility of angiotensin-converting enzyme in sarcoidosis: A population-based study. *Lung.* 2016;194(1):91–5.
7. Delfosse V, de Leval L, De Roover A, et al. Budd-Chiari syndrome complicating hepatic sarcoidosis: Definitive treatment by liver transplantation: A case report. *Transpl Proc.* 2009;41(8):3432–4.
8. Hartleb M, Gutkowski K, Milkiewicz P. Nodular regenerative hyperplasia: Evolving concepts on underdiagnosed cause of portal hypertension. *World J Gastroenterol.* 2011;17(11):1400–9.
9. Marciniak E, Gockerman JP. Heparin-induced decrease in circulating antithrombin-III. *Lancet.* 1977;2(8038):581–4.
10. Russi EW, Bansky G, Pfaltz M, Spinas G, Hammer B, Senning A. Budd-Chiari syndrome in sarcoidosis. *Am J Gastroenterol.* 1986;81(1):71–5.
11. Deniz K, Ward SC, Rosen A, Grewal P, Xu R. Budd-Chiari syndrome in sarcoidosis involving liver. *Liver Int.* 2008;28(4):580–1.
12. Maàmouri N, Ketari S, Habessi H, et al. Budd-Chiari syndrome in sarcoidosis. *Gastroenterol Clin Biol.* 2009;33(2):147–8. [French.]
13. Efe C, Shorbagi A, Ozseker B, et al. Budd-Chiari syndrome as a rare complication of sarcoidosis. *Rheumatol Int.* 2012;32(10):3319–20.
14. Ennaifer R, Bacha D, Romdhane H, Cheikh M, Nejma HB, BelHadj N. Budd-Chiari syndrome: An unusual presentation of multisystemic sarcoidosis. *Clin Pract.* 2015;5(3):768.
15. Sghier IA, Billah NM. Budd-Chiari syndrome: A rare complication of hepatic sarcoidosis (about one case). *Pan Afr Med J.* 2016;23:4. [French.]
16. Krishnamoorthy G, Ray G, Agarwal I, Kumar S. Unusual presentation of sarcoidosis in a child. *Rheumatol Int.* 2012;32(5):1453–5.
17. Van Brusselen D, Janssen CE, Scott C, et al. Budd-Chiari syndrome as presenting symptom of hepatic sarcoidosis in a child, with recurrence after liver transplantation. *Pediatr Transpl.* 2012;16(2):E58–62.
18. Tadros M, Forouhar F, Wu GY. Hepatic sarcoidosis. *J Clin Transl Hepatol.* 2013;1(2):87–93.

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