

**Spontaneous Bacterial Empyema:
Not Your Average Empyema***To the Editor:*

An 83-year-old man with a medical history of cirrhosis and hepatic hydrothorax presented with 2 weeks of progressive dyspnea, abdominal pain, and distension. Admission examination revealed a temperature of 37.8°C, icteric sclera, decreased right-sided breath sounds, and a diffusely tender, distended abdomen without a fluid wave, rebound, or guarding. Laboratory studies were significant for an acute kidney injury. Computed tomography scan showed a large right-sided pleural effusion without evidence of pneumonia. Abdominal ultrasound did not reveal any ascitic fluid amenable to paracentesis. A thoracentesis revealed a transudate, with 1158 white blood cells and 1007 polymorphonuclear leukocytes. The pleural fluid culture later grew pan-sensitive *Escherichia coli*. A presumptive diagnosis of spontaneous bacterial empyema was made, and the patient was treated with intravenous (IV) ceftriaxone, 1 g daily for 7 days, and IV albumin, 1.5 g/kg on day 1 and 1.0 g/kg on day 3. The patient was discharged to home after 1 week with improved dyspnea and resolved pain.

Spontaneous bacterial empyema is an underrecognized complication of cirrhosis, with similar pathogenesis to spontaneous bacterial peritonitis, in that transient bacteremia leads to infection of the pleural fluid as the result of impaired reticuloendothelial phagocytic activity.¹ In up to 40% of cases, spontaneous bacterial empyema can occur in the absence of spontaneous bacterial peritonitis and even in the absence of ascites.² The incidence of spontaneous bacterial empyema in patients with hepatic hydrothorax is 13% to 16%, similar to the incidence of spontaneous bacterial peritonitis in cirrhotic patients with ascites.¹ Despite adequate treatment, the mortality rate remains high at 20%.³ The diagnostic criteria for spontaneous bacterial empyema are similar to those for spontaneous bacterial peritonitis, requiring a serum/pleural fluid albumin gradient >1.1, a polymorphonuclear leukocyte count >250 cells/mm³, and a positive culture or polymorphonuclear leukocyte count

>500 cells/mm³ with negative cultures and exclusion of contiguous infections.⁴ Patients with known hepatic hydrothorax who require repeat thoracenteses may receive therapeutic thoracentesis without diagnostic studies, and spontaneous bacterial empyema may be missed. In patients with pleuritic chest pain, fever, encephalopathy, and declining renal function, diagnostic thoracentesis is recommended.⁵ Identified risk factors for the development of spontaneous bacterial empyema include high Child-Pugh score, low serum albumin, low pleural fluid protein, low pleural fluid C3 levels, and concomitant spontaneous bacterial peritonitis.^{1,5} The recommended treatment is an IV third-generation cephalosporin given for 7 to 10 days. Given the high mortality rate and its proven benefit in spontaneous bacterial peritonitis, IV albumin also is recommended, although albumin use has not been specifically studied in spontaneous bacterial empyema.² A distinction between spontaneous bacterial empyema and empyema secondary to pneumonia should be made, as highlighted in **Table 1**, given the difference in treatment. Although the primary treatment of empyema secondary to pneumonia includes chest tube placement, this is generally not recommended in spontaneous bacterial empyema, because it can lead to life-threatening fluid depletion, protein loss, and electrolyte imbalance.⁵ A high index of suspicion must be maintained to diagnose spontaneous bacterial empyema because it can be insidious and is a significant source of morbidity and mortality in cirrhotic patients. Spontaneous bacterial empyema should be distinguished from empyema secondary to pneumonia, because the treatments differ in key aspects. Internists will encounter the diagnosis most commonly

Table 1 Comparison Between Spontaneous Bacterial Empyema and Empyema Secondary to Pneumonia

	Spontaneous Bacterial Empyema	Empyema Associated with Pneumonia
Type of effusion	Transudate	Exudate
Pleural pH	>7.4	<7.2
Pleural fluid glucose	Approximate level in serum	<60
Infecting organisms	<i>Escherichia coli</i> , <i>Klebsiella</i> , <i>Enterococcus</i> , <i>Streptococcus</i>	<i>Streptococcus pneumoniae</i> , <i>Legionella</i> , <i>Mycoplasma</i>
Treatment	IV antibiotics ± albumin	IV antibiotics, chest tube

IV = intravenous.

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and are in important positions to rapidly diagnose and treat the disease.

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