Hepatic Hydrothorax: The Conundrum and the Oxymoron

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Abstract

Hepatic hydrothorax (HH) is an infrequent but a well-known complication of portal hypertension. Medical management of this condition often fails, and there are no large randomized-controlled trials establishing the best treatment strategies. HH thus represents a formidable entity in the management of end-stage liver disease, and the only definitive treatment is liver transplantation. Despite documented ominous outcome, tube thoracostomy (TT) is still a widely practiced approach to HH mostly by the unaware primary care physician. This communication reports the occurrence of pleurosubcutaneous fistula as a presenting complication of TT in a patient with HH. TT should thus be avoided at all costs in this subset of patients because it is fraught with multiple complications. This report reinforces the importance of clinical education and awareness of these complications and outcomes of TT in a cirrhotic patient with HH.

Keywords
- hepatic hydrothorax
- chest tube removal
- fistula
- cirrhosis

Introduction

Hepatic hydrothorax (HH) is defined as a transudative pleural effusion, usually more than 500 mL, in a cirrhotic patient without an underlying cardiopulmonary or pleural disease.[1] The estimated prevalence of HH is approximately 4 to 6% in cirrhotics. The only definitive treatment of HH is liver transplantation. Other management strategies include sodium restriction, diuretics, thoracentesis, transjugular intrahepatic portosystemic shunt (TIPS), pleurodesis, and video-assisted thoracic surgery. However, their role is limited to alleviate symptoms and prevent complications of HH in patients awaiting transplant, or to palliate those who are not transplant candidates.[2]

Tube thoracostomy (TT) in patients with HH should be avoided at all costs because it is fraught with multiple complications such as massive fluid loss with secondary acute kidney injury, electrolyte and protein depletion, pneumothorax, hemothorax, empyema, and secondary infection that can eventually be fatal.[2,3] Nevertheless, this procedure is still performed with the temptation to relieve breathlessness and to avoid repeated therapeutic thoracentesis in a patient with refractory HH.

This report describes a hitherto unreported complication of TT for HH presenting as a reducible thoracic wall lump.

Case Report

A 41-year-old man with a background of cryptogenic cirrhosis presented with a 1-month history of progressive breathlessness. He was initially evaluated at a primary care center, where initial chest radiography showed a massive right-sided pleural effusion with contralateral mediastinal shift. Pleural fluid aspiration revealed straw-colored transudative fluid. However, a 24-Fr chest tube was inserted in the midaxillary line by the treating unit to alleviate the symptomatic patient. One and half liter of fluid was drained and he was referred to our hospital after chest tube removal for further management.

At the time of presentation, the patient was slightly breathless. His physical examination was remarkable for the presence of a lump over the right lateral chest wall. The lump had soft fluidlike fluctuant consistency and its

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dimensions were variable according to inspiration and expiration phases of respiration.

Chest X-ray showed gross right pleural effusion, and chest ultrasound revealed communication between the pleural cavity and chest wall characteristic of pleurosubcutaneous fistula (PSF) in the background of the cirrhotic liver (►**Fig. 1**). Noncontrast chest computed tomography also demonstrated gross right pleural effusion, and fluid collection was seen beyond the rib margin deep to the right lateral chest wall muscle.

The final diagnosis of a PSF secondary to TT for HH was made. The patient was put on a sodium-restricted diet, and maximal tolerable doses of diuretics were started. He eventually underwent TIPS for his refractory hydrothorax. Gradually, the size of lump decreased and pleural effusion also decreased considerably with good symptom control. Currently, he is listed for liver transplantation at our center.

Discussion

Pleurosubcutaneous fistula is defined as a pathological communication between the pleural space and the subcutaneous tissues. It can occur as a complication of an infectious process, neoplasm, foreign body aspiration, or iatrogenic procedures.[4] Although, isolated case reports of PSF secondary to TT have been reported with malignant and tubercular pleural effusion.[4,5] it has not been described in patients with pleural effusion of other benign etiologies as HH.

HH is an infrequent but a well-known complication of portal hypertension in patients with end-stage liver disease. Most of the studies have suggested the pathological transdiaphragmatic passage of ascitic fluid from the peritoneal to the pleural cavity through numerous diaphragmatic defects to be the predominant mechanism in the formation of HH.[6,7] Medical management often fails, and there is no large randomized-controlled trials establishing the best treatment options and other management strategies. HH thus represents a formidable entity in the management of end-stage liver disease.

Chest tubes are sometimes used as treatment for HH, although patients with cirrhosis may have increased morbidity with TT, with difficulty in removing the tube without correction of the underlying liver disease or portal hypertension.[3]

Apart from single-case reports, the existing literature on the outcomes of cirrhotic patients who had chest tubes placed is limited to two large series.[2,3] All except 1 patient in the first series of 17 patients suffered a complication related to TT for HH, and overall 3-month mortality was 35%. A study by Liu et

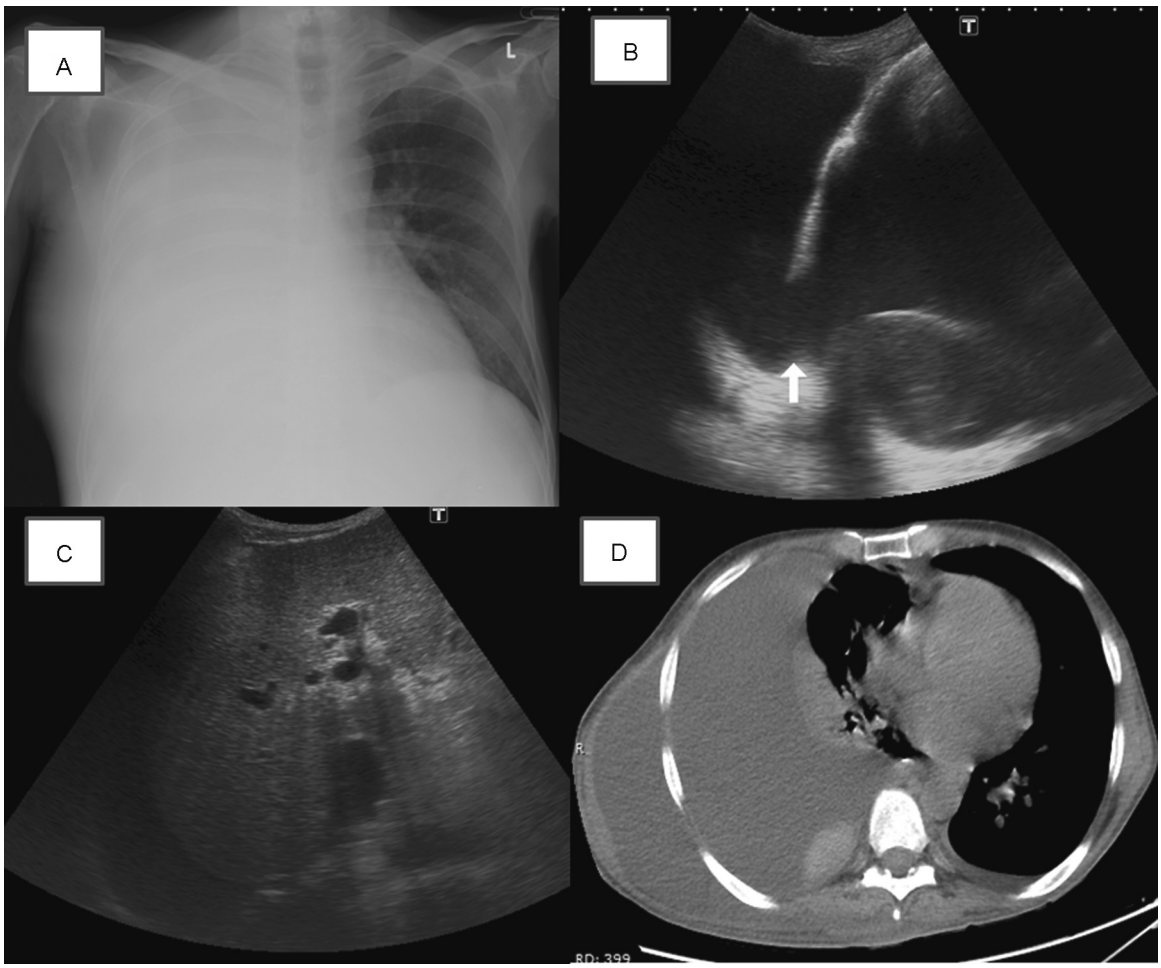

Fig. 1 (**A**) Chest X-ray showed gross right pleural effusion with soft tissue opacity along the right lateral chest wall. Chest ultrasound revealed communication between the pleural cavity and chest wall characteristic of pleurosubcutaneous fistula (**B**) and underlying cirrhotic liver (**C**). Axial image from the noncontrast chest computed tomography also demonstrated gross right pleural effusion, and fluid collection was seen beyond the rib margin deep to right lateral chest wall muscle (**D**).

Table 1 Outcome of TT in cirrhotic

Study	*N*	HH	TIPS	Complications	Incidence	Mortality
Orman and Lok[2]	17	17(100)	7 (41.2)	AKI Hemodialysis (% of AKI) Pneumothorax Empyema Encephalopathy	11(64.7) 1 (9.1) 7 (41.2) 5 (29.4) 3 (17.6)	6 (35.3)
Liu et al[3]	59	24 (42)	1 (2)	(in children B and C, $N = 56$) Renal failure Electrolyte imbalances Infection	30 (54) 32 (57) 27 (48)	15(27) after 1–39 d

Abbreviations: AKI, acute kidney injury; HH, hepatic hydrothorax; TIPS, transjugular intrahepatic portosystemic shunt; TT, tube thoracostomy.
Note: Values are expressed as number (%).

al reported an 80% overall complication rate and 27% mortality[2,3] (►**Table 1**). Taken together, the literature suggests that chest tubes should not be placed to relieve HH because of the significant morbidity and mortality associated with the procedure.

In our patient, cirrhosis itself being a malnourished state compounded by impaired wound healing might be the predisposing factor for PSF.[8,9] Significant residual pleural effusion after removal of the chest tube could also have contributed to the formation of PSF.

Although rare, this communications highlights the occurrence of hitherto unreported complication of TT in a cirrhotic patient with HH, which might manifest itself only when the tube is removed, much to the dismay of the treating physician and the patient. The fact that physicians continue to perform drainage of HH reinforces the importance of physician education and awareness of these complications and outcomes despite documented poor outcome.[2]

In conclusion, we describe a case of PSF after TT in a cirrhotic patient with HH. In a cirrhotic patient, drainage should be avoided as far as possible.

Learning Pearls

- HH is an infrequent but a well-known complication of portal hypertension in patients with end-stage liver disease.
- Management strategies include sodium restriction, diuretics, thoracentesis, TIPS, pleurodesis, and video-assisted thoracic surgery in selected patients. However, medical management of this condition often fails. HH thus represents a formidable entity in the management of end-stage liver disease, and liver transplantation remains the ultimate definitive management paradigm.
- Chest tube insertions should be avoided at all costs because they are fraught with multiple complications such as massive fluid loss with secondary acute kidney injury, electrolyte and protein depletion, hepatorenal syndrome, and secondary infection that can eventually be fatal.
- Despite documented poor outcome, primary care physicians still continue to perform tube drainage of HH. This communication reinforces the importance of physician education and awareness of these complications and outcomes.

Conflict of Interest

The authors declare that they have no conflicts of interest in relation to this article.

Author Contribution

Sachin Kumar and Rakhi Maiwall were involved in patient management, preparation of manuscript, and literature search. Yashwant Patidar was involved in diagnostic radiology, manuscript preparation, and literature search.

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