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Midodrine for Hepatic Hydrothorax.

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Letter to the editor: We read with interest the article by Banini et al.¹ They have succinctly described the pathophysiology and management of hepatic hydrothorax. We would like to share a few thoughts on the management of hepatic hydrothorax.

Hydrothorax is usually associated with ascites.² Midodrine, an $\alpha 1$ agonist, increases systemic vascular resistance, mean arterial pressure (MAP), and renal blood flow.³ Midodrine for three months has been shown to be effective in improving hemodynamics and ascites control.³ Oral midodrine is economical and also effective in preventing paracentesis-induced circulatory dysfunction in patients undergoing large-volume paracentesis.⁴ The increase in urine sodium, urine volume, and control of ascites may also aid hydrothorax control. **(Figure 1a)** However, the duration of therapy required for hydrothorax with vasoconstrictors is unknown.¹ We eagerly await the results of midodrine therapy for hepatic hydrothorax (NCT03645642).

Alfa pump is a useful measure in controlling ascites and improving the quality of life of cirrhotic patients with refractory ascites.⁵ Extensive trials with an alfa pump should be evaluated in patients with ascites and hydrothorax. Percutaneous drainage of pleural effusion, although effective, is associated with infectious complications; hence should be preferred as a palliative option or as a bridge for liver transplant only. The step-up approach for patients with hydrothorax is depicted in **figure 1b**. The definitive therapy would be a liver transplant for hepatic hydrothorax.

Figure 1a: Sheer stress in the liver causes increased production of splanchnic nitric oxide (NO), leading to splanchnic vasodilation and reduction in effective circulating blood flow (ECBF) and decreased renal blood flow (RBF). This leads to the activation of RAAS and sodium retention and

the formation of ascites. (Red lines). Besides, the transmission of NO through portosystemic shunts into systemic circulation leads to systemic vasodilation and a decrease in mean arterial pressure (MAP). Midodrine an- α -1 agonist can improve systemic vasodilation and MAP, thereby increasing renal blood flow and urinary sodium excretion. This, in turn, can control ascites and hepatic hydrothorax (blue lines).

Footnotes: MAP: Mean arterial pressure, EBF: Effective circulating blood volume, RAAS: Renin-angiotensin-aldosterone system; RBF: Renal blood flow; NO: Nitric oxide; PSS: Porto-systemic shunts

Figure 1b: Step-up approach for hepatic hydrothorax.

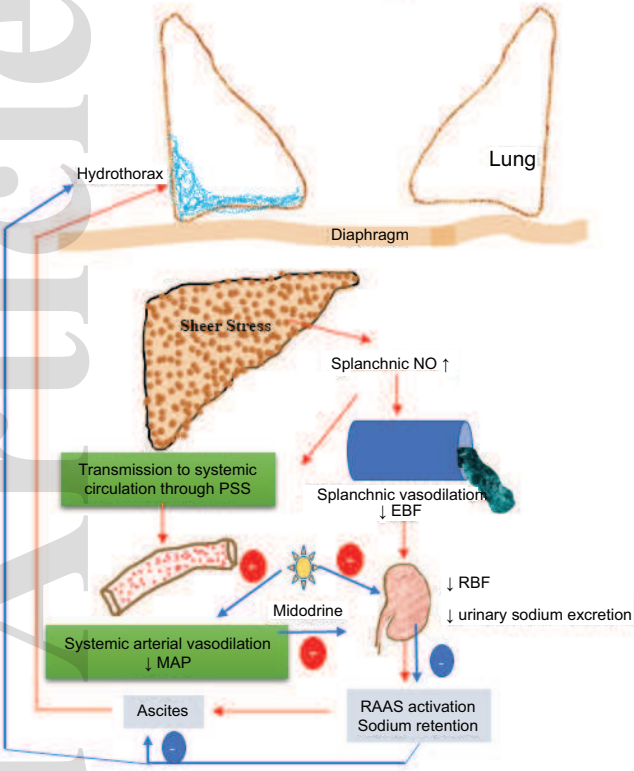
IV-intravenous; TIPS-transjugular intrahepatic portosystemic shunt; CPAP-continous positive airway pressure.

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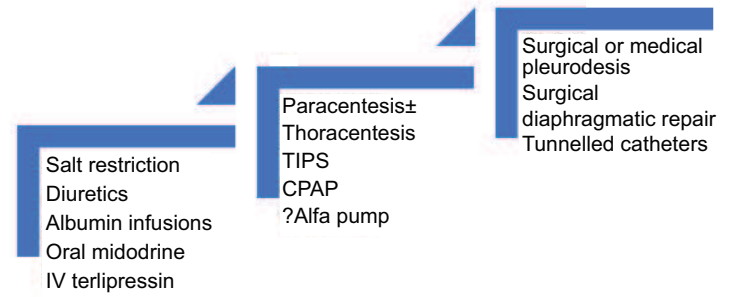
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A: Midodrine in hydrothorax



B: Step-up approach



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