Hepatopulmonary syndrome

Samir Gupta MD MSc, Michael J. Krowka MD

■ Cite as: *CMAJ* 2018 February 26;190:E223. doi: 10.1503/cmaj.170253

1 Hepatopulmonary syndrome is defined by liver disease, intrapulmonary vascular dilatation and abnormal oxygenation

Abnormal liver function is thought to result in a net vasodilatory stimulus entering the pulmonary circulation, which results in microscopic vascular dilatations. These dilatations, when extensive, impede oxygen uptake from the lungs, causing hypoxemia (Appendix 1, available at www.cmaj.ca/lookup/suppl/doi:10.1503/cmaj.170253/-/DC1).[1]

2 Hepatopulmonary syndrome is not uncommon among patients with liver disease

Hepatopulmonary syndrome occurs in 5% to 30% of adults with liver disease;[1] reported prevalence has varied across countries, among cohorts (pretransplant v. all patients with cirrhosis) and with differing criteria used to define abnormal oxygenation. Causes include any etiology of cirrhosis (e.g., viral or alcoholic hepatitis, nonalcoholic steatohepatitis, etc.), as well as noncirrhotic portal hypertension with preserved liver function (e.g., portal vein thrombosis). Even mild (e.g., Child–Pugh class A) and undiagnosed (i.e., asymptomatic or minimally symptomatic) cirrhosis can result in hepatopulmonary syndrome, and oxygenation can worsen despite stable liver function.[1]

3 Hepatopulmonary syndrome should be considered in patients with liver disease and an unexplained oxygen saturation of less than 96%, or any of platypnea, orthodeoxia, clubbing or cyanosis

Because dyspnea is common in liver disease, hepatopulmonary syndrome is often missed or diagnosed late. In the absence of an alternative explanation, a saturation of less than 96% is suggestive of the syndrome.[2] Worsening dyspnea in the upright compared with supine position (platypnea) and orthodeoxia (drop in partial pressure of oxygen [Pao_2] of more than 5% or 4 mm Hg in the upright position) occur in only 25% of patients,[1] but are highly specific for hepatopulmonary syndrome, as are clubbing or cyanosis in any patient with liver disease. Platypnea and orthodeoxia are thought to be from gravitational redistribution of blood flow to basilar parts of the lungs, where vascular dilatations are more severe.[3]

4 Liver transplantation is the only known cure for the syndrome

Hepatopulmonary syndrome is an indication for liver transplantation. Transplantation results in normalization of oxygenation over weeks to months, and transplant survival in experienced centres is similar to that in patients without hepatopulmonary syndrome.[4] However, it is important to recognize the syndrome early, because the disease markedly worsens survival[5] and can progress rapidly while the patient is awaiting liver transplantation.

5 Hepatopulmonary syndrome and portopulmonary hypertension are not the same disease

Hepatopulmonary syndrome is often confused with portopulmonary hypertension. Although both are abnormalities of the pulmonary vasculature that result from liver disease, hepatopulmonary syndrome is characterized by vasodilatation and hypoxemia, whereas portopulmonary hypertension is characterized by vascular obstruction and/or vasoconstriction with resulting pulmonary arterial hypertension (Appendix 1).[1]

References

1. Krowka MJ, Fallon MB, Kawut SM, et al. International Liver Transplant Society practice guidelines: diagnosis and management of hepatopulmonary syndrome and portopulmonary hypertension. *Transplantation* 2016; 100:1440-52.
2. Arguedas MR, Singh H, Faulk DK, et al. Utility of pulse oximetry screening for hepatopulmonary syndrome. *Clin Gastroenterol Hepatol* 2007; 5:749-54.
3. Martínez GP, Barberà JA, Visa J, et al. Hepatopulmonary syndrome in candidates for liver transplantation [see comment]. *J Hepatol* 2001; 34:651-7. Comment in: *J Hepatol* 2001;34:756-8.
4. Iyer VN, Swanson KL, Cartin-Ceba R, et al. Hepatopulmonary syndrome: favorable outcomes in the MELD exception era. *Hepatology* 2013;57:2427-35.
5. Fallon MB, Krowka MJ, Brown RS, et al. Impact of hepatopulmonary syndrome on quality of life and survival in liver transplant candidates. *Gastroenterology* 2008;135:1168-75.

Competing interests: None declared.

This article has been peer reviewed.

Affiliations: Department of Medicine (Gupta), University of Toronto; Division of Respirology (Gupta), St. Michael's Hospital; Keenan Research Centre for Biomedical Science (Gupta), Li Ka Shing Knowledge Institute, St. Michael's Hospital, Toronto, Ont.; Pulmonary and Gastroenterology/Hepatology Division (Krowka), Mayo Clinic, Rochester, Minn.

Funding: Samir Gupta is supported by the Michael Locke Chair in Knowledge Translation and Rare Lung Disease Research.

Correspondence to: Samir Gupta, GuptaS@smh.ca