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Authors

Olaes, Karen
Mailhot, Thomas
Perera, Phillips

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Pulmonary Hypertension, Hemoptysis and an Echocardiographic Finding of a Ventricular Septal Defect

Karen Olaes, MD
Thomas Mailhot, MD
Phillips Perera, MD

Los Angeles County+USC Medical Center, Department of Emergency Medicine,
Los Angeles, California

Supervising Section Editor: Sean O. Henderson, MD

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A 63-year-old female with pulmonary hypertension presented to the emergency department (ED) with hemoptysis. Vital signs were significant for tachypnea, with respirations of 30 per minute, and hypoxia, with an oxygen saturation of 88%. Physical examination revealed a systolic cardiac murmur. Bedside emergency ultrasound (EUS) demonstrated a right ventricle that appeared to be enlarged in relation to the left ventricle, consistent with a diagnosis of pulmonary hypertension. In addition, a ventricular septal defect (VSD) was present. Color flow doppler showed a left to right shunt through the VSD (Video).

VSDs are the most common cardiac congenital defect at birth and account for 40% of all cardiac anomalies.¹ The normal directionality of blood flow across a VSD is left to right, due to the relatively higher pressure in the left ventricle. Eisenmenger syndrome is defined by the presence of systemic-to-pulmonary cardiovascular circulation, progressive pulmonary hypertension and increased right ventricular pressure. This leads to reversal of normal shunt flow with formation of a right-to-left shunt and resultant hypoxemia and cyanosis. Eisenmenger syndrome in association with VSD is often referred to as Eisenmenger complex.² Patients with Eisenmenger complex generally have poor outcomes due to increased strain on the heart, with shunting of oxygenated blood away from the core organs.^{3,4}

This case details how EUS can aid the emergency physician in further evaluating the patient presenting to the ED with shortness of breath, hemoptysis and a cardiac murmur. In this case, a VSD with left-to-right shunt was diagnosed on EUS, simultaneously with right ventricular

strain, underscoring the need for aggressive treatment of the patient's pulmonary disease due to the ominous possibility for the future development of Eisenmenger complex.

Video: Parasternal long axis view of the heart.

Address for Correspondence: Phillips Perera, MD. Department of Emergency Medicine, LAC+USC Medical Center, 1200 N. State Street, Los Angeles, CA 90033. Email: pperera1@mac.com.

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