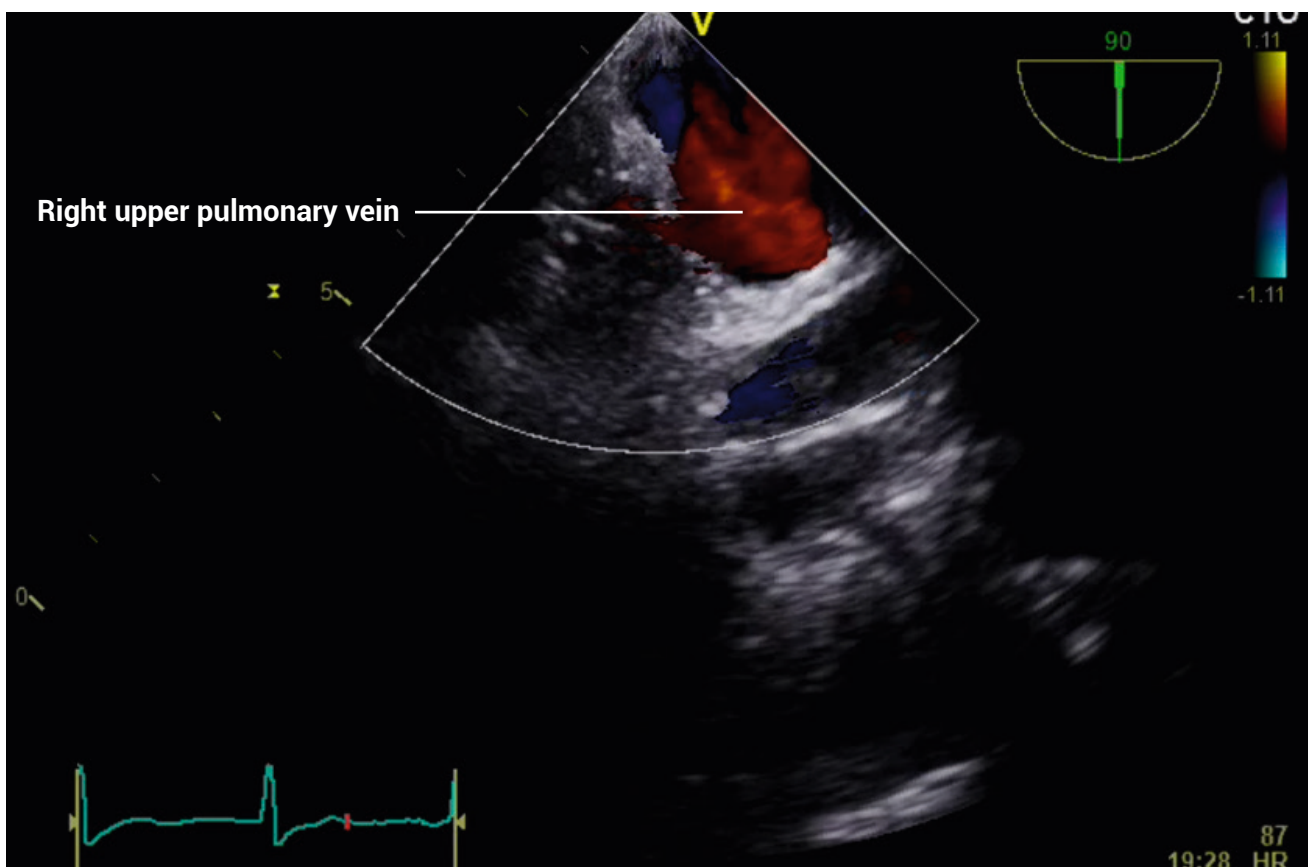


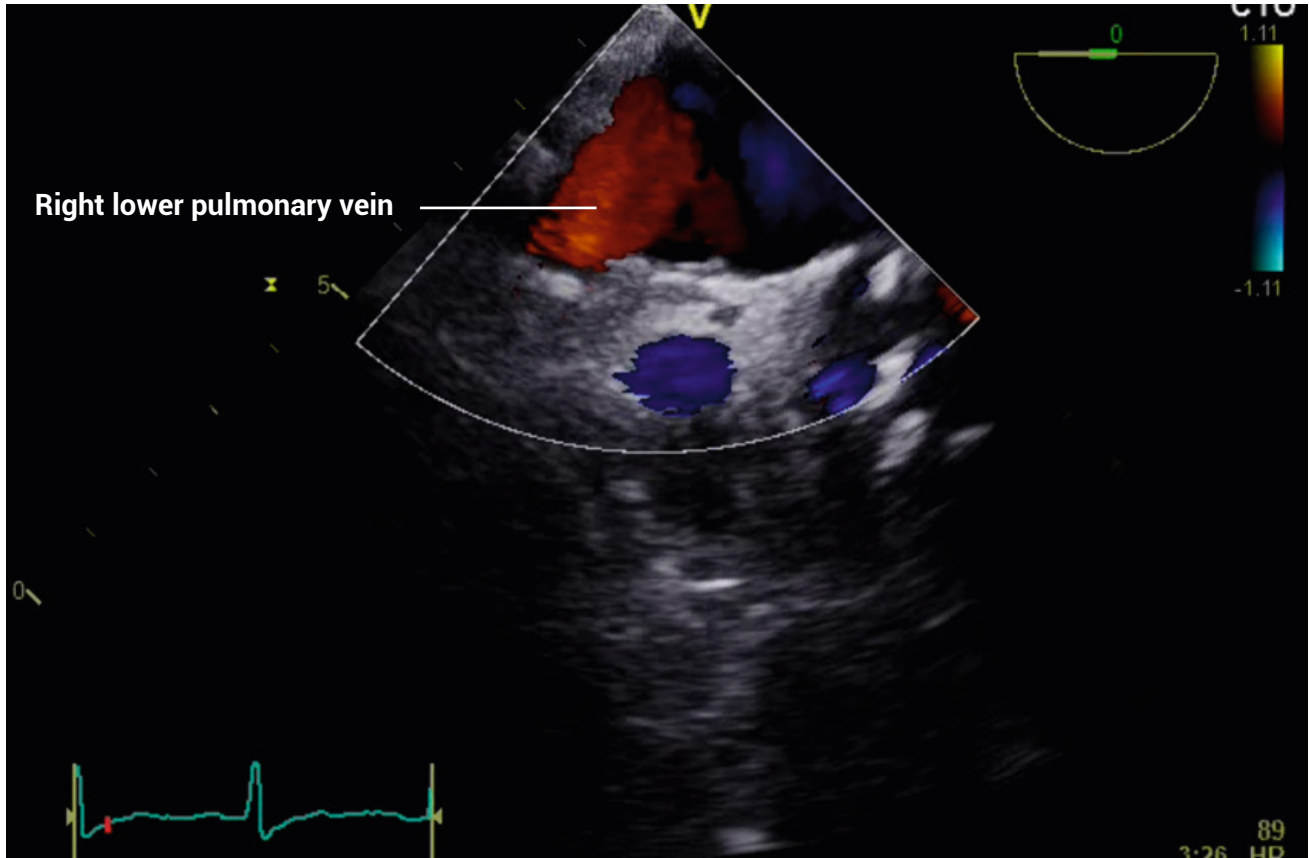
TEE ESSENTIALS

Assessment of the pulmonary veins: The right-sided pulmonary veins

To locate the right upper pulmonary vein (RUPV), start with a mid-esophageal bicaval view with a transducer angle of 90–110°. Focus on the superior vena cava, and turn the probe to the patient's right. It can be helpful to have color Doppler switched on from the outset, to make identification of the RUPV easier from its flow pattern. The RUPV inserts relatively vertically into the left atrium (compared to the right lower pulmonary vein, which inserts more horizontally). Once you have located the RUPV, adjust the transducer angle as necessary to show it clearly with no foreshortening.



To locate the right lower pulmonary vein (RLPV), start with a mid-esophageal four-chamber view with a transducer angle of 0–20°. Advance the probe slightly, and turn the probe to the patient's right. It can be helpful to have color Doppler switched on from the outset, to make identification of the RLPV easier from its flow pattern. The RLPV inserts relatively horizontally into the left atrium (compared to the RUPV, which inserts more vertically). Again, you may need to adjust the transducer angle to optimize the image.



Use color Doppler to visualize flow in both the RUPV and RLPV, and perform pulsed wave Doppler 1 cm into the mouth of any two pulmonary veins (right- or left-sided) to assess flow patterns. Systolic flow reversal (i.e., a retrograde rather than antegrade S wave flow pattern) in a pulmonary vein is a specific indicator of severe mitral regurgitation.

Further reading

Hahn RT, Abraham T, Adams MS, et al. 2013. Guidelines for performing a comprehensive transesophageal echocardiographic examination: Recommendations from the American Society of Echocardiography and the Society of Cardiovascular Anesthesiologists. *J Am Soc Echocardiogr.* **26**: 921–964.