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Title: Transesophageal echocardiographic study of decompression-induced venous gas emboli

Authors: Butler, BD
Morris, WP

Keywords: decompression
pulmonary
dog
animal
venous gas emboli

Issue Date: 1995

Abstract: Transesophageal echocardiography was used to evaluate venous bubbles produced in nine anesthetized dogs following decompression from 2.84 bar after 120 min at pressure. In five dogs a pulsed Doppler cuff probe was placed around the inferior vena cava for bubble grade determination. The transesophageal echo images demonstrated several novel or less defined events. In each case where the pulmonary artery was clearly visualized, the venous bubbles were seen to oscillate back and forth several times, bringing into question the effect of coincidental counting in routine bubble grade analysis using precordial Doppler. A second finding was that in all cases, extensive bubbling occurred in the portal veins with complete extraction by the liver sinusoids, with one exception where a portal-to-hepatic venous anastomosis was observed. Compression of the bowel released copious numbers of bubbles into the portal veins, sometimes more than were released into the inferior vena cava. Finally, large masses of foam were routinely observed in the non-dependent regions of the inferior vena cava that not only delayed the appearance of bubbles in the pulmonary artery but also allowed additional opportunity for further reaction with blood products and for coalescence to occur before reaching the pulmonary microcirculation. These novel observations are discussed in relation to the decompression process.

Description: Undersea and Hyperbaric Medical Society, Inc. (<http://www.uhms.org>)

URI: [PMID: 7633273](#)

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