Bubbles in the Heart

To the Editor:

The image by Catapano et al gives misleading information concerning bubbles in the heart in patients with prosthetic valves. They speculated that “bright particles” seen in the left ventricular cavity are consistent with gas bubbles that occur in scuba divers after hypobaric decompression. We disagree with this speculation, because this phenomenon is well documented in patients with prosthetic valves. In their large series, Gencbay et al found a strong correlation between serum lactic dehydrogenase levels and quantity of bubbles. They suggested hemolysis as a cause of bubble formation. Moreover, Kaymaz et al determined the prevalence of bubble formation in 279 patients with valve replacement and found that none of the patients with bioprosthetic valves demonstrated bubble formation. Bubbles were present, however, in 128 of 227 (56.4%) prosthetic mitral valves (P<0.0001). Bubbles were documented in 75.4% of the normal mitral valves compared with 38.5% of the tilting-disk valves in their cases (P<0.0001). Also in their study, the bubble intensity score was also significantly higher in the bileaflet valves. The passage of bubbles in the aortic root was not documented in any cases in their study. They concluded that bubbles are normal echocardiographic findings depending on the type and function of the mechanical prosthetic mitral valve.

Vedat Davutoglu, MD
Serdar Soydinc, MD
Ilyas Akdemir, MD
Gaziantep University
School of Medicine
Department of Cardiology
Sahinbay Medical Center
Gaziantep, Turkey
davutoglu@gantep.edu.tr


Response

Davutoglu et al argue that in our case bubbles may reflect hemolysis rather than a cavitation process. Indeed, hemolysis has been shown to be an effect rather than the cause of bubble formation.1 Surprisingly, the idea that cavitation is the mechanism triggering bubble formation is even supported by one of the authors to which Davutoglu et al refer. More specifically, Kaymaz et al state “The microbubbles occur at the inflow zone of the valve when flow velocity and pressure drop suddenly at the time of valve closing. The cavitation potential was correlated...” Furthermore, if hemolysis were an invariable effect of cavitation, the prevalence of hemolytic anemia in patients with prosthetic valves would be expected to be much higher than currently reported. To our knowledge, the highest prevalence documented is 30% in patients with double mechanical prostheses.3 In the case of our patient, then, hemoglobin was 14.7 g/dL, and LDH and bilirubin serum concentrations were within the normal range.

Second, Davutoglu et al point out that specific types of valve prosthesis vary substantially in their likelihood of being associated with bubbles in ventricular cavities. We were unable to discuss this issue in detail in our article, but our patient had a Carbomedics (No. 26) prosthesis.

Finally, in contrast to the assertion by Davutoglu et al, there have been several reports documenting the concomitant presence of cerebral gaseous emboli and bubbles in the left ventricle of patients with mechanical heart valves.4 Indeed, the elegant work by Lin et al documents that intracavitary bubbles can be sufficiently stable to reach the aortic root.

Girolamo Catapano, MD
Ospedale Principale Marina Militare
Taranto, Italy

Giovanni Gambassi, MD
Raffaele Antonelli-Incalzi, MD
Centro di Medicina dell’Invecchiamento
Dipartimento di Scienze Gerontologiche, Geriatriche e Fisiatriche
Università Cattolica del Sacro Cuore
Rome, Italy

Bubbles in the Heart
Vedat Davutoglu, Serdar Soydinc and Ilyas Akdemir

Circulation. 2004;110:e51
doi: 10.1161/01.CIR.0000141258.69121.7E
Circulation is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231
Copyright © 2004 American Heart Association, Inc. All rights reserved.
Print ISSN: 0009-7322. Online ISSN: 1524-4539

The online version of this article, along with updated information and services, is located on the
World Wide Web at:
http://circ.ahajournals.org/content/110/5/e51

Permissions: Requests for permissions to reproduce figures, tables, or portions of articles originally published in Circulation can be obtained via RightsLink, a service of the Copyright Clearance Center, not the Editorial Office. Once the online version of the published article for which permission is being requested is located, click Request Permissions in the middle column of the Web page under Services. Further information about this process is available in the Permissions and Rights Question and Answer document.

Reprints: Information about reprints can be found online at:
http://www.lww.com/reprints

Subscriptions: Information about subscribing to Circulation is online at:
http://circ.ahajournals.org//subscriptions/