Impending Paradoxical Embolism
To the Editor:
The echocardiogram on the cover of the June 1, 1999, issue of Circulation is a beautiful illustration of an impending paradoxical embolism. Unfortunately, neither the text nor the key words of the article made any mention of this condition.

Impending paradoxical embolism is a surgical emergency. This diagnosis would not have been possible before the advent of echocardiography. However, to diagnose paradoxical embolism, contrast echocardiography should be performed during and after a Valsalva maneuver. The mere establishment of the presence of a patent foramen ovale by either transthoracic or transesophageal echocardiography does not diagnose paradoxical embolism.

A patent foramen ovale is a frequent finding in normal subjects—27.3% in a large autopsy series. Normally, a positive left-to-right atrium pressure gradient exists and, therefore, no interatrial shunt exists in either direction. It is only during a Valsalva maneuver or any condition that raises right atrial pressure such as in acute pulmonary embolism that a right-to-left shunt across the patent foramen ovale may result. That is the reason why, when requesting an echocardiogram to “rule out cardiogenic origin of systemic embolism,” one should specifically mention paradoxical embolism, which would not be detected by routine echocardiography without the use of contrast and the Valsalva maneuver.

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Response
We thank Dr Cheng for his interest in our article. As he points out, the figure illustrates an impending paradoxical embolism. We agree that echocardiography is extremely helpful in the investigation of cerebral and peripheral embolic events. A transthoracic approach may be sufficient in some cases, but the superioriority of the transesophageal approach in detecting cardiac sources of embolism is proven. When a foramen ovale is visualized, the use of contrast echocardiography during and after a Valsalva maneuver is mandatory, as Dr Cheng states.

In our published series of 38 patients with floating right heart thrombi and 3 additional patients since 1998, echography displayed a thrombus protruding into a foramen ovale in 5 cases. Clearly, these patients were at risk for impending paradoxical embolism. The best therapy for this is not well established. However, thrombolysis is contraindicated because the clot may be fragmented and a systemic arterial embolism may result. The most appropriate treatment seems to be surgical removal. Three of 4 patients who underwent emergency surgery were discharged well; one died from a massive pulmonary embolism on the way to the operating theater. One was treated with heparin alone because of contraindications to surgery; he survived and was discharged well.

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