

## LETTERS TO THE EDITOR

### Identification of Patent Foramen Ovale Permitting Paradoxical Embolism

In a recent issue of the Journal, Hausmann et al. (1) reported that severe contrast shunting and wide opening of the patent foramen ovale revealed a high sensitivity and high specificity for identification of patients with ischemic arterial events considered due to paradoxical embolism.

In my view, a weakness of this study lies in the composition of the control group (patients with no history of arterial ischemic events and a patent foramen ovale as only an incidental finding during transesophageal echocardiography). Given the high prevalence of patent foramen ovale, it is not conceivable that only 27 patients with these characteristics underwent transesophageal echocardiography during a time period of almost 5 years in such a large hospital as the Hannover Medical School. Therefore, some unspecified criteria might have influenced the selection of this "control" group (i.e., the method of selecting 27 subjects from a presumably much larger pool of patients). This classic pitfall (2,3) may render comparison between the different groups valueless and cast doubt on the excellent specificity reported for identification of a patent foramen ovale that had probably allowed paradoxical embolism. This test should therefore be challenged for its specificity in a much broader range of patients without arterial ischemic events before its optimistic introduction into medical practice.

JOHANN REISINGER, MD  
Department of Internal Medicine  
Krankenhaus Barmherzige Schwestern  
A-4010 Linz, Austria

#### References

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#### Reply

Transesophageal echocardiography is a semi-invasive technique associated with some discomfort for the patient and a minor but definite risk (1). Transesophageal echocardiography should therefore be restricted to patients with a clinical indication for performance of this test (2). Establishing a control group of patients undergoing a semi-invasive diagnostic procedure in the absence of significant heart disease represents a challenge.

To establish a control group for the present study (3), several strict exclusion criteria had to be fulfilled: 1) Only patients undergoing transesophageal echocardiography with normal hearts (or minimal abnormalities) were selected. 2) Patients with a history of arterial ischemic events had to be excluded. However, these patients represent the majority of subjects referred for transesophageal echocardiography. 3) Only patients who were able to perform respiratory maneuvers (e.g., no artificial ventilation, no intraoperative examination) and who also agreed to the contrast studies could be included. 4) Only the

subgroup of patients with a patent foramen ovale could be included as the control group. Thus, 27 patients fulfilled all criteria for the control group; these patients represent ~1% of all patients studied by transesophageal echocardiography during this time period at our institution.

We therefore do not agree with Reisinger that there must have been other selection criteria than those mentioned to explain the small size of the control group. Finally, we think that the selection of the control patients had no influence on the findings of our study.

DIRK HAUSMANN, MD  
Department of Cardiology  
Hannover Medical School  
30625 Hannover, Germany

#### References

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### Transesophageal Echocardiography: Additional Diagnostic and Therapeutic Role in Critically Ill Patients?

In a recent issue of the Journal, Heidenreich et al. (1) emphasized the clinically significant contribution of transesophageal echocardiography to the diagnosis and subsequent management of hypotension in critically ill patients. The question remains as to whether echocardiography offers additional information leading to changes in therapy and outcome with respect to the existent and commonly used invasive pressure monitoring and cardiac output measurements. Relevant data relating hemodynamic variables obtained by classical pulmonary artery catheterization were lacking in the study by Heidenreich et al. (1). Recently, we described a retrospective analysis of transesophageal echocardiographic investigations during a limited period in 108 critical care patients in a general intensive care unit (2). The same findings as those reported by Heidenreich et al. were found in our study, with a 44% change in therapy after transesophageal echocardiography was performed in patients with a pulmonary artery catheter. Therapy changes varied in both cardiac and septic patients, from additional colloid filling to adjustment of inodilatory therapy.

With respect to these data, one could speculate on the place of (trans)thoracic and transesophageal echocardiography in the management of critically ill, most often ventilated, patients. The primary cause of hypotension, whether cardiac or noncardiac, should be determined in the first place. We suggested that (transesophageal) echocardiography—the least invasive technique—be performed before introduction of the pulmonary artery catheter to obtain a rapid, bedside analysis of filling status, ventricular systolic function and valvular morphology and function. Only by performing comparative studies between invasive