## Could Surgical Pulmonary Embolectomy Be Performed With Acceptable Outcomes Without a Pulmonary Embolism Response Team?

*To the Editor:*

We read the article by Keeling and colleagues [1] with great interest. Patients with pulmonary emboli (PE) continue to be treated conservatively, and this has prompted alternative therapies. This study suggested that the embolectomy procedure should be included in the treatment of PE.

Given the difficulties in treating patients with PE, multiple centers have formed multidisciplinary pulmonary embolism response teams (PERT) to discuss treatment algorithms. In this study, we could not realize the surgical embolectomy option and indications for treatment of acute pulmonary emboli. We assume that some points should be clarified. (1) What was the time interval between diagnosis and operation? (2) Before operation, did the PE patients receive anticoagulant agents, thrombolytic agents, or both; and what were the indications for operation and contraindications to the other treatment options? (3) What were the reasons for the concomitant valve procedures and coronary artery bypass grafting at the time of surgical pulmonary embolectomy? (4) Were any paradoxical emboli or patent foramen ovale detected and treated? [2].

In this study, postprocedural data about the hemodynamics of right ventricular function and pulmonary artery pressure are missing. The authors described using extracorporeal membrane oxygenation (ECMO) as circulatory support for patients with massive PE. However, in their study, only 9 patients (4.2%) underwent ıntra-arterial balloon pump insertion, and there was no ECMO support. Recent studies have investigated the effectiveness of a therapeutic algorithm including ECMO in high-risk patients with PE treated by pulmonary embolectomy [3]. As the authors expressed, the PERT teams suggest the use of pulmonary embolectomy in patients with significant right ventricular dysfunction even in the absence of shock with detailed preoperative evaluation including pulmonary artery occlusion index.

We assume that a detailed therapeutic plan is still necessary to help PE patients toward a full recovery. ECMO may be useful in improving the postoperative outcomes and reducing mortality in this group of patients.

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### References

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## Reply

*To the Editor:*

We thank Drs Ozcinar and colleagues [1] for their interest in our article "Outcomes after surgical pulmonary embolectomy for acute pulmonary embolus: a multi-institutional study" [2]. They pose many interesting points in their correspondence, and we aim to clarify some issues as possible. Given that this was a retrospective, multiinstitutional study using prospectively maintained databases, individual chart review was not possible. For instance, the duration from diagnosis to treatment of life-threatening pulmonary emboli is not usually captured in most databases, and it was a variable not available to us in this study. One of the noted limitations (but also one of the strengths) of this study is that it was a multiinstitutional one, and different clinical scenarios are handled in different manners across the four institutions that participated.

This study was designed only to prove that surgical pulmonary embolectomy was safe in multiple institutions, and we believe that it did. It was not designed to evaluate right ventricular hemodynamics as measured by echocardiography, and that is certainly an area for future study. We certainly agree that the use of extracorporeal membrane oxygenation will help bridge patients in a hemodynamically unstable condition who experience massive pulmonary emboli to the correct treatment algorithm. This technology should no doubt be increasingly used.

Last, algorithmic treatment of all patients who experience life-threatening pulmonary emboli is a lofty goal. Too often, these patients present with other medical problems (ie, terminal cancer, pregnancy, chronic pulmonary thromboembolic disease) that significantly complicate care and limit the therapeutic options, thus rendering many algorithms useless. Surgeons must be increasingly involved at the local level in the care of these patients. Without increased involvement, surgical pulmonary embolectomy will be used sparingly and only on moribund patients. As our data demonstrated, surgical pulmonary embolectomy is safe for the treatment of life-threatening pulmonary emboli and, given the poor short-term outcomes of other therapies, should likely be increasingly used.

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