Extracorporeal Membrane Oxygenation Support for Acute Pulmonary Embolism

To the Editor:

We read with great interest a review paper titled “Acute Pulmonary Embolism, Part II: Risk Stratification, Treatment, and Prevention” by Goldhaber and associates in the December 2003 issue of the journal. The strategies for acute pulmonary embolism in their review are anticoagulation, inferior vena caval filters, thrombolysis, and embolectomy. They mention that for patients with contraindications to thrombolysis, catheter-based or surgical embolectomy should be considered if risk stratification indicates a high likelihood of an adverse outcome, and that a successful outcome hinges on an interdisciplinary team with round-the-clock availability.

We have also experienced hemodynamically deteriorating patients with acute pulmonary embolism. A prompt and definite treatment is required for cases with life-threatening circulatory collapse. Immediate circulatory support by extracorporeal membrane oxygenation (ECMO) is our treatment strategy for such patients. In 2 cases, we found that ECMO helped to maintain hemodynamic stability during thrombolytic therapy. Case 1 was that of a 76-year-old woman who experienced sudden chest pain and respiratory distress after radiation therapy and intravenous hyperalimentation for lung cancer. An echocardiogram confirmed the diagnosis of pulmonary embolism. Immediately after circulatory collapse, ECMO was started at a flow of 2.5 L/min, followed by successful 25-hour support. Case 2 was that of a 43-year-old housewife who exhibited sudden respiratory distress and cardiac arrest 2 days after gastrectomy. A pulmonary artery perfusion scintigram under cardiopulmonary resuscitation showed a massive pulmonary embolus. Thrombolytic therapy with 240 000 U of urokinase brought about no clinical improvement. After a 4-hour cardiopulmonary resuscitation, ECOM was instituted; her subsequent hemodynamic condition remained stable at a flow of 1.5 to 3 L/min. However, after weaning from 5-day ECOM support, she died from severe brain damage.

Pulmonary embolism often progresses rapidly to circulatory collapse with respiratory distress and lethal arrhythmias. An interdisciplinary team with round-the-clock availability might lead to successful clinical results in such cases. However, the deterioration can be too rapid to lead to an embolectomy. Not only as an adjuvant of thrombolytic therapy, but as a bridge to subsequent catheter-based or surgical embolectomy, ECMO can play an important role in the treatment of acute pulmonary embolism with circulatory collapse. We use a percutaneous cardiopulmonary support system (Capiox EBS, Terumo Ltd, Tokyo, Japan) for ECMO. The Capiox EBS can be percutaneously installed via the peripheral artery and vein in the groin. We recommend ECMO support as a strategy for a patient in circulatory collapse from pulmonary embolism.

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