Role of Paradoxic Embolism in Patients With Acute Pulmonary Embolism and Right Ventricular Enlargement Who Are at Risk for Adverse Clinical Events

To the Editor:

The recent report by Quiroz et al\(^1\) that detection of right ventricular (RV) enlargement on chest computed tomography helped identify patients with acute pulmonary embolism (PE) for adverse clinical events has important prognostic and therapeutic implications, but the authors did not offer an explanation.

Besides such obvious consequences of RV enlargement as RV dysfunction, RV infarction, and decreased cardiac output, there is another explanation, namely, paradoxic embolism. The high frequency (35\%) of patent foramen ovale (PFO) in patients with major PE has been recently reported\(^2\) and is in accord with the autopsy findings from the Mayo Clinic.\(^3\) PFO is associated with a more than 10-fold increase in death risk and a 5-fold increase in the risk of major adverse events during the hospital stay of patients with acute PE.\(^2\)

Right-to-left shunting via a PFO does not occur under normal conditions unless the right atrial pressure exceeds that in the left atrium. With RV dilatation after PE, right atrial pressure rises and right-to-left shunt ensues via the PFO. Such a shunting not only causes arterial desaturation and thus systemic hypoxemia but also paradoxic embolism. The latter may take place in either the cerebral or the coronary circulation,\(^4\) either or both of which may result in serious consequences.

The presence of a PFO in acute PE also carries an important therapeutic implication. Because PE tends to recur, it is wise to close the PFO. Nowadays, the closure of a PFO can be carried out nonsurgically by percutaneous insertion of a closure device.\(^5\) As Bernhard Meier said recently (personal communication, June 1, 2004), the only good PFO is a closed PFO!

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