The enemy of good is better

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Disclosures: Author has nothing to disclose with regard to commercial support.

Received for publication May 8, 2017; accepted for publication May 11, 2017; available ahead of print June 13, 2017.

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J Thorac Cardiovasc Surg 2017;154:1144

0022-5223/\$36.00

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<http://dx.doi.org/10.1016/j.jtcvs.2017.05.025>

In the era of minimal invasiveness, thoracic surgeons remain cognizant of the fine line between minimizing morbidity and compromising the effectiveness of care. The emergence of percutaneous transcatheter embolization (PTE) for pulmonary arteriovenous malformations (PAVMs) is a classic example of this concept. Initial reports on PTE were quite encouraging but were restricted to small single-institution series with short follow-up and without comparison to lung resection. As such, there remained some doubts as to whether morbidity is being reduced at the expense of definitive treatment of the PAVMs.

In this issue of the *Journal*, Nagano and colleagues have achieved the unprecedented feat of a large database study comparing PTE and surgery for PAVM.¹ In an analysis of a Japanese national database, the authors were able to collect data on 996 patients who underwent treatment for PAVM over a 5-year period. In a statistically robust propensity-matched analysis of 202 patients in each arm, powered to detect differences in the rate of reintervention, they were able to conclude that surgery is the more definitive treatment, with a 2.1% rate of reintervention at 24 months, compared with 8.3% for PTE. However, they pointed out that surgery carries higher risks of mortality (1.5% vs 0%) and composite complications (6.9% vs 2.0%) and is associated with longer hospital stay (6 days vs 2 days). In their conclusion, the authors recommend that surgery be considered as an alternative treatment in patients who are difficult to treat with PTE.

A closer look at the authors' analysis reveals several weaknesses that may preclude drawing such a drastic conclusion. Although the propensity score was built around patient baseline demographic data, comorbidities, and era of intervention, the regression analysis did not include any characteristics of the PAVMs, such as size, location, and vessel diameter. Thus, it is conceivable that although the patients in the 2 groups appeared to be comparable,

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Central Message

Percutaneous transcatheter embolization is a lower-risk treatment for pulmonary arteriovenous malformations, but surgery offers the highest rate of definitive cure.

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the lesions being treated were not. As such, the selection bias for treatment might not have been completely accounted for by matching the propensity scores. Moreover, by the authors' own acknowledgement, the hospital length of stay may have been artificially prolonged by the surgical culture in Japan.

Regardless of its limitations, this remains a strong analysis that has proven multiple hypotheses with certainty, including that surgery is a "good" treatment for PAVM by most standards. It carries a high likelihood of definitive success (97.9%), a low rate of complications (6.9%), and a very low rate of mortality (1.5%). PTE may be "better" because it drops the mortality rate to 0%, but the "better" comes at the expense of definitive treatment and a higher reintervention rate. I have never believed in the concept that the enemy of good is better; however, in this case I wonder whether it in fact holds true.

Reference

1. Nagano M, Ichinose J, Sasabuchi Y, Nakajima J, Yasunaga H. Surgery versus percutaneous transcatheter embolization for pulmonary arteriovenous malformation: Analysis of a national inpatient database in Japan. *J Thorac Cardiovasc Surg*. 2017;154:1137-43.