Thoracic endovascular aortic repair (TEVAR) for descending thoracic aortic aneurysms (DTAs) was first reported by Dake et al in 1994. The advent of TEVAR was clinically relevant because open DTA repair had long been associated with operative mortality rates ranging from $\approx 5\%$ to $7\%$ at centers of excellence $^{2,3}$ to as high as $20\%$ to $22\%$ in real-world practice. $^{4,5}$ The favorable results $^{6}$ of TEVAR with nearly $75\%$ reduction in operative mortality in early industry-sponsored device trials led to US Food and Drug Administration approval for first commercial use in 2005 and subsequent device approvals in 2008 - $^{7,8}$ The operative mortality and morbidity benefits of TEVAR highlighted by numerous single-center reports, $^{9-11}$ device registries, $^{12,13}$ and device trials $^{6-8}$ have led to widespread public and surgeon acceptance of this less invasive modality for the management of DTA in contemporary practice. As such, TEVAR has supplanted open surgical repair in the majority of patients with DTA. $^{14,15}$

**Article see p 2661**

In the current issue of *Circulation*, Goodney et al $^{16}$ reviewed the long-term survival of patients treated for DTA by the use of Medicare data from 1998 to 2007. They report that the postoperative mortality benefit afforded to patients undergoing TEVAR for intact DTA is lost within 2 years, thereby resulting in reduced long-term survival for patients treated with TEVAR ($72\%$ open versus $62\%$ TEVAR; $P=0.001$). These investigators concede that the reduced long-term survival likely results from the selection of higher-risk patients for TEVAR. In support of this finding, patients treated with TEVAR were older and more likely to have comorbidities such as diabetes mellitus, myocardial infarction, chronic obstructive pulmonary disease, and chronic renal failure, all of which increase mortality risk. To correct for baseline clinical and demographic differences in patients treated with TEVAR and open DTA repair, these investigators carefully evaluated long-term survival in risk-adjusted and propensity-matched cohorts. In both analyses, the long-term survival advantage afforded patients treated with open surgery persisted. This suggests that, in the lowest-risk patients, open surgery should be the primary treatment modality, because such patients have similar operative mortality for both procedures, and carefully selected patients treated with open repair can have outstanding long-term survival ($\approx 90\%$). Interestingly, they also noted a significant decrease in operative mortality and a modest 3-year survival benefit in patients treated with open repair in the years after US Food and Drug Administration approval of thoracic aortic stent grafts in comparison with those treated with open repair in the years before approval. Implicit in these findings is that higher-risk open patients were referred for TEVAR, which resulted in improved outcomes of open repair after widespread commercial availability of stent graft technology. Indeed, we documented this very finding in an analysis of practice patterns and patient outcomes following DTA repair by the use of a more limited cohort (2004 - 2007) of Medicare patients. $^{14}$ We reported an increase in the number of DTA repairs within 2 years after stent graft availability and a shift in practice from predominantly open repair of intact DTA in 2004 ($75\%$ open/$25\%$ TEVAR; $n=1400$) to a majority of patients being treated with TEVAR ($40\%$ open/$60\%$ TEVAR; $n=2032$) by 2007. This paradigm shift was also seen in patients with ruptured DTA, traumatic thoracic aortic injury, and aortic dissection; all are diagnoses for which TEVAR currently represents off-label use.

Several limitations of the Medicare data set need to be taken into consideration in light of these findings. Included data are unaudited and are based on hospital discharge and procedural billing claims. Diagnoses or comorbidities not likely to positively impact reimbursement may therefore not be included in the claims related to the index admission. The absence of such data decreases the ability to risk stratify patients or propensity match patients appropriately. In the article by Goodney and coworkers, this limitation was circumvented by only including patients with at least 1 year of Medicare eligibility to increase the capture of comorbidities. Despite this effort, the prevalence of comorbidities reported in their study are less than previously reported, suggesting at least some degree of selection bias. $^{6-13}$ These investigators have rightly noted that other relevant information regarding clinical presentation, urgency of operation, aneurysm anatomy, and procedural technical details that may have early and late clinical implications are not available in the data set. Long-term follow-up data with respect to reinterventions, additional aneurysm-related procedures, and cause of death are also unavailable.
Despite limitations inherent to existing administrative datasets, the use of the Medicare data in this study has several advantages. The large number of patients included ensures an adequately powered study, and available survival data are highly reproducible and reliable. Furthermore, the contemporary experience (1998–2007) representing outcomes on a national scale and across many demographic variables makes the findings of this study generalizable to most patients undergoing DTA repair in the United States today. Given the excellent long-term survival afforded low-risk patients undergoing open DTA repair, such patients should be referred to centers with the best perioperative outcomes for management. TEVAR is increasingly applied to treat patients with DTA on a national scale, and is increasingly applied in the management of higher-risk patients not likely to have been candidates for open repair in the past. Despite the use in higher-risk patients, these investigators report a 5-year all-cause mortality of 38%, which is comparable to that of patients undergoing abdominal aortic aneurysm repair in contemporary practice.17,18 In the setting of expanding use, these investigators have aptly pointed out that further analysis to define a truly high-risk cohort of patients for which no treatment is beneficial is important and necessary for the management DTA. Perhaps we can look to regional19 or national quality initiatives,20 now in their infancy, to answer such questions in the near future.

Disclosures

None.

References


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