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Commentary: The benefits of going big: Cost savings and reduced mortality in a national study of proximal aortic repair

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The National Inpatient Sample (NIS) serves as a valuable resource to identify trends for hospitalized patients within the United States with regard to access, cost, outcomes, and other factors; when weighted, this readily available federal data reflect more than 97% of US patients, and a wide variety of medical procedures are tracked using administrative codes from the *International Classification of Diseases* (most recently the *International Classification of Diseases Clinical Modification, 9th Revision*, and *International Classification of Diseases Clinical Modification, 10th Revision/Procedure Classification System*).¹ As pertains to aortic surgery, contemporary analyses have largely focused on use and outcome trends for technique-driven and other studies of the descending thoracic,²⁻⁴ thoracoabdominal,^{5,6} and abdominal aorta^{7,8} as well as studies on aortic dissection.⁹⁻¹¹ Although considerable effort has been made to better understand practice trends in repair of the distal aorta (ie, the descending thoracic, thoracoabdominal, and abdominal aorta), there are a lack of NIS-based studies that exclusively examine the proximal aorta, namely the aortic root, ascending aorta, and aortic arch.

Hirji and colleagues from Harvard Medical School¹² aim to improve our understanding of national trends as it pertains specifically to the proximal aorta. Based on an NIS sample of 53,657 adult patients undergoing open repair of the aortic root, ascending aorta or aortic arch between

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CENTRAL MESSAGE

For patients undergoing proximal aortic repair, national data indicate a trend toward improved outcomes and lower costs—changes driven by large hospitals.

2002 and 2014, the authors uncovered several notable findings. When analyzing operative mortality over time, there was more than a 50% reduction in death from 2002 to 2014, as rates dropped from 13.9% to 6.7%, respectively. During the same time period, there was a dramatic increase of nearly 40% in the sheer number of procedures performed. Of these procedures, the vast majority (>75%) were performed at large hospitals as compared with hospitals designated as small (6%) or medium (16%). When examining the role that hospital size played in patient outcomes, they found that larger hospitals tended to care for sicker and older patients but were able to achieve similar outcomes at a substantially lower cost (>15K) and with a shorter hospital stay than did smaller hospitals. Although part of this savings reflects a greater number of patients being discharged from large hospitals to rehabilitation facilities (3% more), even after factoring in these related costs, the savings are likely pronounced and may reflect the systemic advantages of larger hospitals as pertains to discharge pathways. Regarding predictors of operative mortality, it comes as no surprise that the presence of rupture is the greatest predictor of death (3.5 times enhanced risk); hospital size was not a factor. In this study, improvement appeared primarily driven by nondissection repairs conducted in large hospitals.

Analysis of NIS data is notoriously difficult and may be best used to capture trends. As a systemic evaluation by Khera and colleagues¹³ determined, although the

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availability of large data sets is undoubtedly attractive to researchers, it is difficult for most studies to be performed in accordance to conduct standards. Within the study by Hirji and coauthors, a propensity-matched study of 9242 pairs found few notable differences by hospital size; this may reflect the difficulty in truly matching patients when the primary type of aortic repair (ie, aortic root vs ascending aortic vs aortic arch repair) remains unknown. In addition, there are other curious findings in this study, including a relatively low rate of elective procedures, a pronounced rate of aortic dissection (as contrasted against an expected rate of aortic rupture), and a substantial difference in patient age across hospital size. However, any limitations of this study are muted by the pronounced drop in operative mortality within a relatively short time period; in an era of disruptive technology such as what endovascular aortic repair unleashed, it is good comfort to know that benchmark mortality rates for complex aortic repair are trending substantially lower. Go big or go home; large hospital systems show the way.

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