infrastructure. Although this model is intriguing, it is complicated by both a low incidence of the problem (compared with myocardial infarction) and difficulty of the onsite diagnosis (requiring imaging).⁴ The future direction of travel would be an undelayed diagnosis on site followed by swift transport 24/7 to a specialist aortic team in a high-volume center. This type of centralization of care has been demonstrated in the United Kingdom to be associated with reduction in 30-day mortality and improved long-term survival.³

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Commentary: Swift and safe

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In this edition of the *Journal*, Izumisawa and colleagues¹ present Japan's nationwide experience with transfer distance and surgical mortality in emergency thoracic aortic surgery. Over a 2-year period, 12,004 patients underwent emergent aortic surgery at 495 centers, with an acceptable mortality of 13.8%. The mean transfer distance was 12.8 km, with one quarter of the study population traveling less than 3 km and one half less than 7 km. The authors did not find a significant association between transfer distance and surgical mortality, suggesting that regionalization of care for patients with acute aortic syndromes (AAS) may be safe.

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CENTRAL MESSAGE

A study showing no difference in emergent aortic surgery outcomes by travel distance is encouraging for care regionalization but limited by survivorship bias and exclusion of inter-hospital transfers.

Without treatment, the reported mortality of acute aortic dissection is 1% to 2% per hour.^{2,3} Accordingly, reduction in presurgical delays is one avenue to improve outcomes.⁴ Not unlike ST-elevation myocardial infarction (STEMI) and acute cerebral vascular accident (CVA), there are data to support timely intervention for AAS. What may differ is a universally accepted time frame for intervention.

Although STEMI and CVA metrics incorporate pre-hospital and hospital times, such as door-to-balloon time and door-to-needle time,^{5,6} there is no currently proposed system for quantifying these factors in AAS. In their manuscript, Izumisawa and colleagues argue that when AAS is suspected at the site of ambulance call, the emergency medical system may safely transfer patients to greater case volume centers.¹ The scrutiny of metrics for STEMI and CVA has led to improved outcomes for those disease processes,^{5,6} but the practicality of this for AAS is uncertain. Although trained emergency medical system and emergency medicine providers are able to make presumptive diagnoses of STEMI and CVA from clinical examination and straightforward tests such as electrocardiograms, the diagnosis is not as clear-cut in patients with AAS, who often present with a myriad of signs and symptoms. Further, the diagnosis requires use of imaging that is not available in the field.

Although this manuscript strengthens our understanding of presurgical care of patients with AAS, there are a few limitations. Japan is a densely populated country with a small geographic footprint. Not surprisingly, most patients did not require a long transfer distance. Moreover, distance and time are not necessarily interchangeable. Patients traveling >100 km or who crossed the sea were eliminated. Although the authors argue that air transportation was presumably used, the excluded patients may have represented a cohort that is more applicable to larger countries, where travel distance to a tertiary care center may be significantly longer. Further, inter-hospital transfers were not analyzed, limiting the generalizability to field-to-center distances only. Finally, although the authors found no mortality difference between those presenting with and without coma, shock, and cardiac arrest, patients who died or became

inoperable during transfer were not included in the study. With reported pre-hospital mortality rates of approximately 20%,^{2,7} this raises the significant concern of survivorship bias within the study, particularly if en-route mortality were associated with transport distance.

Izumisawa and colleagues are to be congratulated on this study, which portrays the national experience of emergency thoracic aortic surgery at tertiary referral centers. Although the Japanese experience may not be universally applied to every country, their data support increasing regionalization of complex thoracic operations even in emergent settings. Increasing recognition of modifiable pre-hospital factors will lend itself to more swift and safe care for patients with AAS.

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