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EDITORIAL COMMENT

Sex Differences in Acute Aortic Dissection

Time to Mind and to Bridge the Gap*

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Acute aortic dissection (AAD) is a life-threatening clinical condition requiring prompt diagnosis and timely therapeutic interventions.[1-3] As for other cardiovascular diseases, sex appears to be a major determinant of an appropriate diagnostic therapeutic pathway and related outcomes.[1-3] In a comprehensive meta-analysis of 16 studies showing type A AAD sex differences, Carbone et al[4] observed that women exhibit different clinical characteristics from men, including older age, smaller body surface area, and lower plasma creatinine levels. In addition, women had lower rates of bicuspid aortic valve, smoking, and prior heart surgery but a higher incidence of diabetes mellitus. Notably, women presented clinically with cardiac tamponades and pericardial effusions more frequently.[4] Interestingly, there was no sex difference in in-hospital surgical mortality (RR: 1.02; 95% CI: 0.53-1.99; $P = 0.95$), however men had higher rates of 5-year survival (RR: 0.94; 95% CI: 0.92-0.97; $P = 0.001$) and 10-year survival (RR: 0.82; 95% CI: 0.74-0.92; $P = 0.004$).[4] A descriptive analysis of in-hospital outcomes among medically treated type A AAD patients confirmed prohibitive high mortality for both sexes (men 58.6% vs women 53.8%, $P = 0.59$).[4]

In this issue of *JACC: Advances*, Takahashi et al[5] assessed the sex-related differences in clinical presentation and in-hospital outcomes, particularly mortality, in surgically or medically treated patients with DeBakey type I/II (Stanford type A) AAD using the Tokyo Acute Aortic Super-network multicenter registry data. They analyzed data from 3,089 consecutive patients (surgical group [n = 2,543] and medical [n = 546]) who were hospitalized for DeBakey type I/II AAD between January 2013 and December 2018. In the entire cohort, women were more likely to be medically managed than men (20.7% vs 14.9%; $P < 0.001$) yet there were no significant differences in in-hospital mortality (14.4% vs 14.4%; $P = 0.980$) and the 30-day mortality (13.1% vs 13.2%; $P = 0.942$). During hospitalization, women had higher frequencies of cardiac tamponade (20.6% vs 16.4%; $P = 0.003$) and cardiac rupture (5.5% vs 3.9%; $P = 0.036$) than men. In the surgical group, in-hospital and 30-day mortality were significantly higher in men than in women (11.6% vs 7.9%; $P = 0.002$ and 10.2% vs 6.7%, $P = 0.002$, respectively) although women had longer lengths of hospital stay. Preoperative cardiac tamponade occurred more frequently in women than in men (14.4% vs 11.6%; $P = 0.034$). Men had a higher frequency of preoperative end-organ malperfusion, including limb and renal ischemia, than women (12.0% vs 8.4%; $P = 0.003$ and 1.8% vs 0.7%, $P = 0.013$, respectively). Regarding the reasons for medical management, men were more likely to die before surgery and to receive an initial medical treatment strategy for intramural hematoma than women. In contrast, more women tended to refuse surgery than men. Among patients medically treated, in-hospital and 30-day mortality were significantly higher in women than in men (38.9% vs 30.5%; $P = 0.039$ and 39.6% vs 30.3%; $P = 0.025$). At multivariable logistic regression

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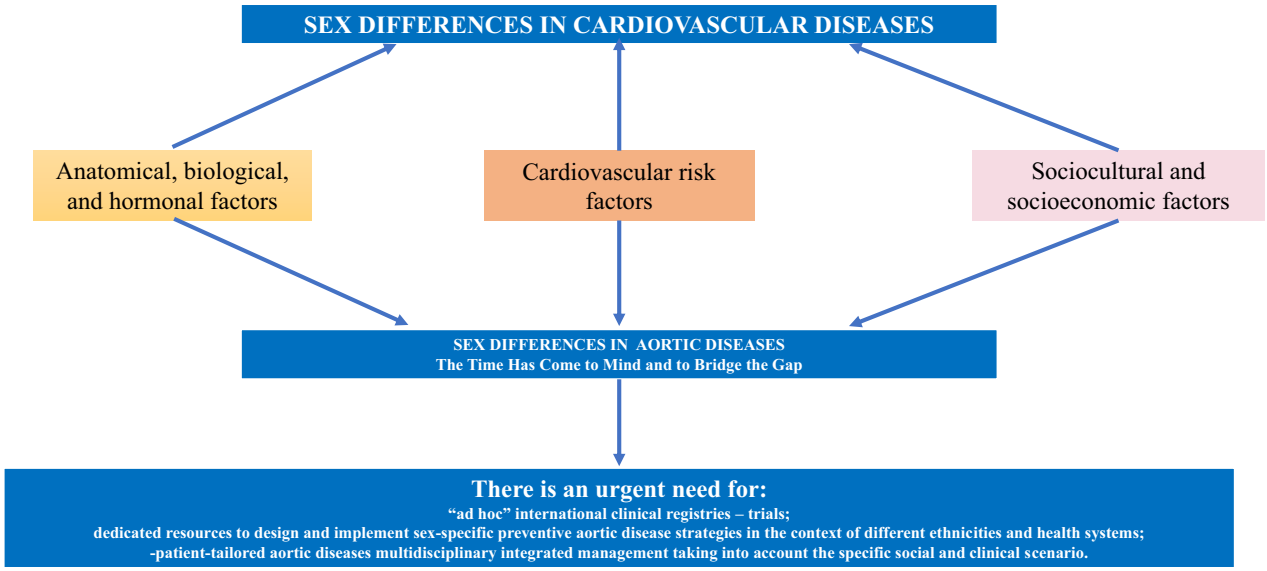
FIGURE 1 Sex Differences in Acute Aortic Dissection: The Time Has Come to Mind and to Bridge the Gap



analysis, male sex was associated with higher in-hospital mortality in the surgical group (OR: 1.71; 95% CI: 1.24-2.35; $P < 0.001$) but not in the medical group (OR: 0.95; 95% CI: 0.56-1.59; $P = 0.832$).

The above results should be interpreted taking inherent limitations into account. First, included study population consisted of AAD patients from a distinct urban Tokyo metropolitan area, characterized by Asiatic ethnicity and advanced aging (median age of the patients was 70 [IQR: 58-79] years). Second, no specific data on the different surgical techniques are reported and, which could have affected "de facto" clinical outcomes. In this regard, previous studies showed higher operative mortality in men than in women mainly associated with more extensive surgical procedures. Third, long-term outcomes were not assessed. Fourth, information provided, although interesting, cannot be applied "sic et simpliciter" to other world regions.

Overall, it is evident that the data pertaining to sex differences in AAD are somewhat conflicting, calling for "ad hoc" international clinical registries and trials. In addition, there is an urgent need to allocate dedicated resources to design and implement sex-specific preventive (primordial, primary, and secondary) aortic disease strategies in the context of different ethnicities and health systems. In the near future, we expect patient-tailored aortic diseases multidisciplinary integrated management taking into account the specific social and clinical scenario (Figure 1). The time has come to mind and bridge the gap.

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REFERENCES

1. Vogel B, Acevedo M, Appelman Y, et al. The Lancet Women and Cardiovascular Disease Commission: reducing the global burden by 2030. *Lancet*. 2021;397(10292):2385-2438.

2. Bossone E, Eagle KA. Epidemiology and management of aortic disease: aortic aneurysms and acute aortic syndromes. *Nat Rev Cardiol*. 2021;18(5):331-348.

3. Isselbacher EM, Preventza O, Hamilton Black J 3rd, et al. 2022 ACC/AHA guideline for the diagnosis and management of aortic disease: a report of the American Heart Association/American College of Cardiology Joint Committee on Clinical Practice Guidelines. *J Am Coll Cardiol*. 2022;80(24):e223-e393.

4. Carbone A, Ranieri B, Castaldo R, et al. Sex differences in type A acute aortic dissection: a Systematic review and meta-analysis. *Eur J Prev Cardiol*. 2023;30(11):1074-1089.

5. Takahashi T, Yoshino H, Shimokawa T, et al, on behalf of the Tokyo CCU Network Scientific Committee. Sex differences in DeBakey type I/II acute aortic dissection outcomes: the Tokyo acute aortic Super-network. *JACC: Adv*. 2023;2:100661.

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