

## EDITORIAL COMMENT

# Valvular Heart Disease in China

## Opportunities for Progress\*



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Central to global public health, China remains the most populous country in the world, with approximately 1.4 billion inhabitants, more than 3.5 times the population of the United States as of 2021.<sup>1</sup> Despite this, Chinese population growth is expected to stagnate over the next 3 decades and remain roughly unchanged by 2050,<sup>2</sup> creating a shift toward an aging demographic.<sup>3</sup> This impending change may have seismic impacts on the culture, economics, and health of China—principal to this are the prevalence and prognosis of valvular heart disease (VHD).

It is with this recognition that the current paper published in this issue of *JACC: Asia* is of particular importance. Xu et al<sup>4</sup> report findings from the China-DVD (China Elderly Valve Disease) study—a large, prospective, nationwide cohort study describing older patients hospitalized for VHD in China between September and December 2016. The study included 8,929 patients aged  $\geq 60$  years hospitalized with moderate or severe VHD, infective endocarditis, or previous VHD intervention.

The study has similarities to earlier efforts to describe the prevalence of VHD in the United States and Europe, including the Euro Heart I and II surveys.<sup>5,6</sup> However, the relative distribution of VHD was unique in China-DVD compared to these Western studies. Although aortic stenosis (AS) is by far the most common VHD encountered in the United States

and Europe (reported in 41% of patients in the Euro Heart II Survey), mitral regurgitation (MR) was most common in this Chinese cohort.<sup>4,6</sup> Specifically, in China-DVD, MR was most frequent (26.9%), and aortic regurgitation and AS were much less frequent (16.5% and 5.1%, respectively).<sup>6</sup> Although this stark difference in the prevalence of AS may be truly caused by differences in the Chinese and Western populations, it may also be explained by methodologic differences between the studies.

To its credit, this is the only contemporary description of the prevalence and treatment patterns of VHD in China. This study is a good start, but it only goes part way to fill the gap in public health knowledge China faces on this topic. Although China-DVD is strengthened by its sample size and by a reasonable amount of granularity regarding diagnosis and treatment patterns, the relative prevalence reported may be inaccurate, and the study does not estimate the prevalence in the general Chinese population. Indeed, China-DVD captured only a fraction of the Chinese population hospitalized every year. Although the authors attempted a broad enactment of mainland China, selection bias toward the hospitals included is probable, and rural areas of China were likely underrepresented. Furthermore, estimates in this study reflect only patients treated with urgent intervention or scheduled for intervention as a result of hospitalization, not those with elective intervention. In addition, Kaplan-Meier estimates of survival of VHD without intervention may be overestimated, because follow-up was limited to only 76% of patients at 1 year.

Regardless, a key takeaway message from the data presented is that there are tremendous opportunities for progress in the treatment Chinese patients with VHD. Only 37.3% of patients underwent valvular intervention, opposed to 79.4% of patients with symptomatic VHD and a class I indication in the Euro Heart II Survey. As a partial explanation, severe VHD was the reason for hospitalization in only 39.1% of

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patients in China-DVD, suggesting that most VHD was discovered incidentally in the process of evaluating other medical conditions. However, it is equally reasonable to assume that many of these patients were not offered valvular intervention.

Speaking further to this point, among the 37.3% of patients who underwent intervention, the vast majority had surgery (93.7%) vs catheter-based intervention (6.7%). Intervention for patients with complex cardiac status was even less frequent; only 11% of patients with a left ventricular ejection fraction of <50% and 45.1% of patients with multiple VHD underwent intervention. The reasons stated for not performing an intervention were high operative risk in 33% of patients and patient refusal (because of advanced age, cultural reasons, or perceived difficulty in recovery) in 29%. Among patients who did undergo surgery, in-hospital mortality was higher than in most industrialized nations, at 3.3%. This subset of patients not offered surgery, with a personal aversion to surgery, or with poor surgical outcomes may be particularly well suited for catheter-based interventions.

Looking at these data, the opportunity for transcatheter interventions in suboptimal surgical candidates is obvious, but China-DVD indicates that transcatheter aortic valve replacement was performed in only 7.5% of patients with isolated AS, and only 2 individuals received mitral valve transcatheter edge-to-edge repair. Although these data are from 2016, this in contrast to recent U.S. data<sup>7</sup> and the Euro Heart II Survey, which was conducted across a similar time period in 2017, where 38.7% of patients with AS and 16.7% of those with MR received catheter-based therapy. Furthermore, in China-DVD, the rate of valve surgery was low, at 23.7% for symptomatic degenerative mitral regurgitation and left ventricular ejection fraction of <60%, a key demographic at higher surgical risk that may benefit from transcatheter edge-to-edge repair.

This study also sheds light on the apparent inconsistency of the essential diagnostic testing patients with VHD were offered in China in 2016. Although imaging to define aortic dimensions and plan for catheter-based procedures is now considered the standard of care, computerized tomography was performed in only 16.5% of AS and 8.2% of aortic regurgitation patients. The use of cardiac magnetic resonance was not reported, although it is presumably small. Furthermore, only 66.9% of patients who underwent VHD intervention had coronary angiography before. This suggests that coronary artery anatomy may not have been defined in many patients

before surgery, which could lead to suboptimal decision making because it may not have been known if concomitant CABG could be indicated. This information is of paramount importance when deciding between surgical and catheter-based approaches for isolated VHD.<sup>7</sup>

Building on the opportunities identified in China-DVD, as the Chinese population ages and VHD becomes more prevalent in the general population, the cost of treating patients with VHD will be amplified and even more paramount. Studies such as China-DVD are important to both define the problems facing the health of the general Chinese population and also identify knowledge gaps where they exist. This information is of the vital importance to policy makers as they face the difficult job of placing emphasis on resource use and prioritizing cost-effective interventions to ensure equity across the Chinese population. Along those lines, as catheter-based interventions grow in use, the decision to offer surgery or catheter-based interventions should carefully consider the true benefits and costs to the individual patients and society as a whole. Effort should be taken to ensure that the technology is disseminated not just in urban and suburban areas but also into rural ones.

Because of study limitations, the China-DVD study may misrepresent the relative prevalence and overestimate the prognosis of the burden of VHD in the Chinese population. However, it is an important step toward defining the tremendous public health burden of VHD facing China as the population ages. China has an opportunity to get ahead of this problem before it magnifies itself in future years. This will require consistency in offering contemporary diagnostic testing and widespread dissemination of catheter-based therapies to higher-risk patients. Future, larger studies with longer-term follow-up are needed to define and track the true prevalence of VHD in the Chinese population, with the ultimate goals of extending the longevity and quality of Chinese life and using resources most effectively.

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