TABLE 1 Imaging for DMD Cardiomyopathy

	Yes	No
All age groups		
EF < 50% (n = 108)	7 (7/108)	93 (101/108)
STE (n = 101)	57 (58/101)	43 (43/101)
CMR (n = 16)	63 (10/16)	37 (6/16)
Age < 5 y		
EF < 50% (n = 8)	0 (0/8)	100 (8/8)
STE (n = 7)	86 (6/7)	14 (1/7)
CMR (n = 0)	–	–
Age ≥ 5 y		
EF < 50% (n = 100)	7 (7/100)	93 (93/100)
STE (n = 94)	55 (52/94)	45 (42/94)
CMR (n = 16)	63 (10/16)	37 (6/16)
Age ≤ 10 y		
EF < 50% (n = 35)	1 (1/73)	99 (72/73)
STE (n = 72)	47 (34/72)	53 (38/72)
CMR (n = 3)	33 (1/3)	67 (2/3)
Age > 10 y		
EF < 50% (n = 35)	17 (6/35)	83 (29/35)
STE (n = 29)	83 (24/29)	17 (5/29)
CMR (n = 13)	69 (9/13)	31 (4/13)

Values are % (n/N).
CMR = cardiac magnetic resonance; DMD = Duchenne muscular dystrophy; EF = ejection fraction; STE = speckle tracking echocardiography.

all—except 1 patient—with abnormal EF were older than 10 years of age, indicating that an abnormal EF is a late finding and that by using this criterion, we tend to miss early features of DMD-CM.

All patients were considered for CMR but, because of issues such as young age of patients and cost concerns, we focused on CMR for patients with abnormal GLS. Thus, 16 of 65 patients had CMR, of whom 10 showed evidence of fibrosis.

Our data also suggest that genetic sequence variant patterns of gene deletion and duplication might be associated with greater risk of developing DMD-CM at an earlier age, but there was no relationship between the location or length of exon deletion and onset or severity of DMD-CM.

In our series, 64 of 65 patients with evidence of DMD-CM were on an ACEI inhibitor/ARB, indicating an early and proactive approach to the use of ACE inhibitor/ARB, in keeping with other similar reports.[6,7]

In this series, we report that myocardial injury occurs quite early in life and that genetic sequence variant, such as deletions and duplications, might predispose to such early onset. We also report that the early identification of such injury is feasible by estimating the GLS with STE. This led to use of ACE inhibitor/ARB early in the course of illness, which is thought to confer benefit by delaying the onset of overt heart failure and by slowing the progression of myocardial injury. This also facilitated focused use of CMR in a resource-poor setting.

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RESEARCH LETTER

Transcatheter Aortic Valve Replacement in Low-Risk Patients With Severe Aortic Valve Stenosis in Chinese Patients

Randomized controlled trials have demonstrated the safety, feasibility, and efficacy of transcatheter aortic valve replacement (TAVR), first in inoperable patients

and then in high-risk, intermediate-risk, and, most recently, low-risk patients.[1-4] Compared with Western countries, Chinese patients with aortic stenosis (AS) have a high proportion of bicuspid aortic valves (BAVs) and a high calcium burden.[5] Even in tricuspid aortic valve (TAV) disease, there are clear differences from Western patients, with a high calcium burden, and this issue presents challenges for TAVR in Chinese patients.[5] On the basis of the differences of these anatomical characteristics between Western and Chinese populations, the safety and efficacy of TAVR in low-risk Chinese patients with severe AS remain unclear.

In this study, we identified Chinese patients with a low Society of Thoracic Surgeons (STS) score (<4%) who underwent TAVR, compared these patients with intermediate- to high-risk patients (STS score ≥4%), and followed them up using clinical and echocardiographic parameters for a mean of 30 days. The study was conducted in accordance with the Declaration of Helsinki, and the protocol was approved by Ethics Committee of Zhongshan Hospital, Fudan University, Shanghai, China. All valves implanted were Venus A (Venus MedTech), VitaFlow (MicroPort), or SAPIEN 3 (Edwards Lifesciences) valves. Venus A and VitaFlow were the first-generation self-expanding transcatheter heart valves (THVs) used in China.[6] Finally, a total of 320 consecutive patients who underwent TAVR with commercially available THVs between June 2015 and February 2021 were identified in our database. Of these 320 patients, 198 (61.9%) were low-risk (STS score <4%) patients. The proportion of patients with BAVs in the low-risk group was 60.1%, and it was 63.9% in the intermediate- to high-risk group. BAV accounted for 61.3% of all TAVR-treated patients in our database, a percentage similar to those reported by other centers in China,[7] but significantly higher than in Western countries.[8]

The rates of procedure-related complications were low and are summarized in **Table 1**. The in-hospital all-cause mortality of the low-risk group was significantly lower than that of the intermediate- to high-risk group (0.5% vs 4.9%; $P = 0.026$). However, there was no significant difference in mortality between the 2 groups at 30 days (1.0% vs 4.9%; $P = 0.071$). There were no major bleeding events or disabling strokes in either the low-risk group or the intermediate- to high-risk group at 30 days. The overall rate of new permanent pacemaker (PPM) implantation at 30 days in the low-risk group was 17 of 198 (8.6%), compared with 14 of 122 (11.5%) in the intermediate-to high-risk group. Moreover, we also evaluated the TAVR outcomes in low-risk patients with BAVs, and the rates of procedural complications in low-risk patients with BAVs were comparable to those in low-risk patients with tricuspid aortic valves (TAVs), albeit with a higher new PPM implantation rate.

TABLE 1 Clinical Outcomes After TAVR

	Low Risk	Intermediate to High Risk	*P* Value
In-hospital outcomes			
All-cause death	1/198 (0.5)	6/122 (4.9)	0.026
Life-threatening or major bleeding	0/198 (0.0)	0/122 (0.0)	–
Major vascular complications	2/198 (1.0)	1/122 (0.8)	1.00
Acute kidney injury	1/198 (0.5)	1/122 (0.8)	1.00
All stroke	2/198 (1.0)	1/122 (0.8)	1.00
Myocardial infarction	0/198 (0.0)	1/122 (0.8)	0.381
Endocarditis	0/198 (0.0)	0/122 (0.0)	–
New onset atrial fibrillation	3/198 (1.5)	2/122 (1.6)	1.00
New PPM implantation	15/198 (7.6)	14/122 (11.5)	0.238
Coronary artery obstruction	1/198 (0.5)	0/122 (0.0)	1.00
Moderate or severe PVL	4/198 (2.0)	8/122 (6.6)	0.076
30-d outcomes			
All-cause death	2/198 (1.0)	6/122 (4.%)	0.071
Life-threatening or major bleeding	0/198 (0.0)	0/122 (0.0)	–
Major vascular complications	2/198 (1.0)	1/122 (0.8)	1.00
Acute kidney injury	1/198 (0.5)	1/122 (0.8)	1.00
All stroke	3/198 (1.5)	1/122 (0.8)	0.979
Myocardial infarction	0/198 (0.0)	1/122 (0.8)	0.381
Endocarditis	0/198 (0.0)	0/122 (0.0)	–
New onset atrial fibrillation	4/198 (2.0)	3/122 (2.4)	1.00
New PPM implantation	17/198 (8.6)	14/122 (11.5)	0.396
Coronary artery obstruction	1/198 (0.5)	0/122 (0.0)	1.00

Values are n/N (%).
PPM = permanent pacemaker; PVL = paravalvular leak; TAVR = transcatheter aortic valve replacement.

TAVR in low-risk Chinese patients with severe symptomatic AS was safe, with 1.0% all-cause mortality and no disabling strokes at 30 days. The rates of procedural complications in the low-risk group were low and comparable to those of intermediate- to high-risk patients with AS. Commercially available TAVR devices widely used in North America and Europe, such as SAPIEN 3 and CoreValve (Medtronic), are not available in China for political reasons. In addition, the anatomical structure of aortic valves in the Chinese population is significantly different from the aortic valve structure in Western populations. Most of THVs used in our study were the first-generation, self-expanding, unretrievable THVs, including Venus A and VitaFlow, which were specially designed for Chinese patients and could mitigate or circumvent some of the challenges associated with heavily calcified valves and BAVs.[6] The safety, feasibility, and efficacy of these2 THVs were also verified in this study, and there were no significant differences in clinical prognosis between these THVs. As shown in most other studies evaluating TAVR in low-risk patients,[9] the low-risk patients in our study

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were young and had an overall low prevalence of comorbidities, the all-cause mortality was low, and the new PPM implantation rate was high. The high rate of new PPM implantation was a critical consideration in younger low-risk patients because long-term PPM dependence has adverse effects on quality of life.

Short-term prognosis analysis showed that TAVR in low-risk Chinese patients with severe symptomatic AS was safe, with 1.0% all-cause mortality and no disabling strokes at 30 days. Moreover, the rates of procedural complications in low-risk patients with BAVs were comparable to those in low-risk TAV patients. In the future, large sample randomized clinical trials are needed to verify this result in Chinese patients.

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The authors attest they are in compliance with human studies committees and animal welfare regulations of the authors' institutions and Food and Drug Administration guidelines, including patient consent where appropriate. For more information, visit the Author Center.

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TO THE EDITOR

Long-Term Survival and Adverse Events in Cardiac Sarcoidosis

The excellent paper by Kusano et al[1] recently published in *JACC: Asia* showed that, nationwide in Japan, cardiac sarcoidosis (CS) diagnosed clinically is less advanced and has better prognosis than CS diagnosed from endomyocardial biopsies. In the Discussion, the authors compare their mortality data with ours from the nationwide Finnish CS registry, ongoing since 2008.[2,3] However, the death rates cited from our reports are erroneously high, as they include nonfatal events[2] and cases diagnosed at autopsy.[3] For a more proper comparison, we present (**Table 1**) outcome data for patients included in our CS registry by the end of 2015 without cases diagnosed at autopsy or transplantation (n = 284, mean age 50 ± 10 years, 74% female).[3,4] Their presenting manifestations were nearly equal in type and frequency with the Japanese cohort; 95% were given corticosteroids and 73% received an implantable cardioverter-defibrillator. Compared with the data of Kusano et al, the outcomes shown in **Table 1** suggest differences between the 2 nationwide cohorts that, interestingly, are directionally opposite for fatal and nonfatal events The 5-year and 10-year all-cause mortalities were 5% and 15% in Finland vs 10% and 19% in Japan, while the corresponding rates of all adverse events were 32% and 47% in Finland vs 20% and 31% in Japan, respectively. The differences may relate to the disparities between the Finnish and Japanese CS cohorts in age (mean age 50 years vs 60 years), proportion of myocardial biopsy-based diagnoses (54% vs 18%), use of