Cite this as: Zongye CAI, Xinrui QI, Dao ZHOU, Hanyi DAI, Abuduwufuer YIDILISI, Ming ZHONG, Lin DENG, Yuchao GUO, Jiaqi FAN, Qifeng ZHU, Yuxin HE, Cheng LI, Xianbao LIU, Jian'an WANG, 2025. COMPERA 2.0 risk stratification in patients with severe aortic stenosis: implication for group 2 pulmonary hypertension. *Journal of Zhejiang University-SCIENCE B*, 26(11):1076-1085. https://doi.org/10.1631/jzus.B2400057

COMPERA 2.0 risk stratification in patients with severe aortic stenosis: implication for group 2 pulmonary hypertension

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Background and aims

- COMPERA 2.0 risk stratification has been demonstrated to be useful in patients with precapillary pulmonary hypertension (PH). However, its suitability for patients at a risk for post-capillary PH, or PH associated with left heart disease (PH-LHD), is unclear.
- To investigate the use of COMPERA 2.0 in patients with severe aortic stenosis (SAS) undergoing transcatheter aortic valve replacement (TAVR), which are at risk for post-capillary PH.

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Methods

- 327 eligible SAS patients undergoing TAVR between September 2015 to November 2020 in our institute were included.
- Patients before and after TAVR were classed into four strata using the COMPERA 2.0 risk score.
- The primary endpoint was all-cause mortality.
- Survival analysis was performed using Kaplan-Meier curves, log-rank test, and Cox proportional hazard models.

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Clinical characteristics based on COMPRERA 2.0 risk stratification.

	Low	Intermediate-low	Intermediate-high	High	P Value
N, No. (%)	14 (4%)	80 (25%)	148 (45%)	85 (26%)	
Age, y	69 (65, 74)	72 (67, 76)	76 (71, 80)	79 (74, 82)	<0.001
Female, No. (%)	6 (43)	37 (46)	61 (41)	38 (45)	0.894
BMI, kg/m²	23 (22, 26)	23 (21, 25)	23 (21, 26)	23 (19, 25)	0.222
eGFR, mL/min/1.73m²	85 (70, 93)	86 (74, 92)	78 (61, 88)	68 (53, 83)	<0.001
Haemoglobin, g/L	136 (131, 147)	127 (119, 135)	127 (115, 138)	121 (106, 131)	<0.001
Hypertension, No. (%)	8 (57)	49 (61)	84 (57)	50 (59)	0.930
Diabetes, No. (%)	3 (21)	11 (14)	28 (19)	24 (28)	0.131
Prior AF or AFL, No. (%)	1 (7)	9 (11)	31 (21)	17 (20)	0.193
Moderate-severe MR, No. (%)	1 (7)	10 (13)	23 (16)	31 (37)	<0.001
Moderate-severe TR, No. (%)	1 (7)	3 (4)	19 (13)	19 (22)	0.004
Mean PG, mmHg	48 (37, 55)	45 (39, 59)	53 (43, 66)	52 (41, 66)	0.060

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*Data was presented as number (percentage) or median (interquartile range). 3 patients without Valve area data, 42 patients had no tricuspid regurgitation that PASP were reported as normal without an absolute value, 66 patients were adjudicated with 6MWD less than 165m without an exact value, 8 patients with BNP measurement. BMI: body mass index, eGFR: estimated glomerular filtration rate, AF: atrial fibrillation, ALF: atrial flutter, PG: aortic pressure gradient, TV: aortic transvalvular velocity, BAV: bicuspid aortic valve, TAV: tricuspid aortic valve, VIV: valve in valve, STS: Society of Thoracic Surgeons, LVEF: left ventricular ejection fraction, PASP: pulmonary artery systolic pressure, 6MWD: 6-minute walking distance, NT-ProBNP: N-terminal of pro-B type natriuretic peptide.

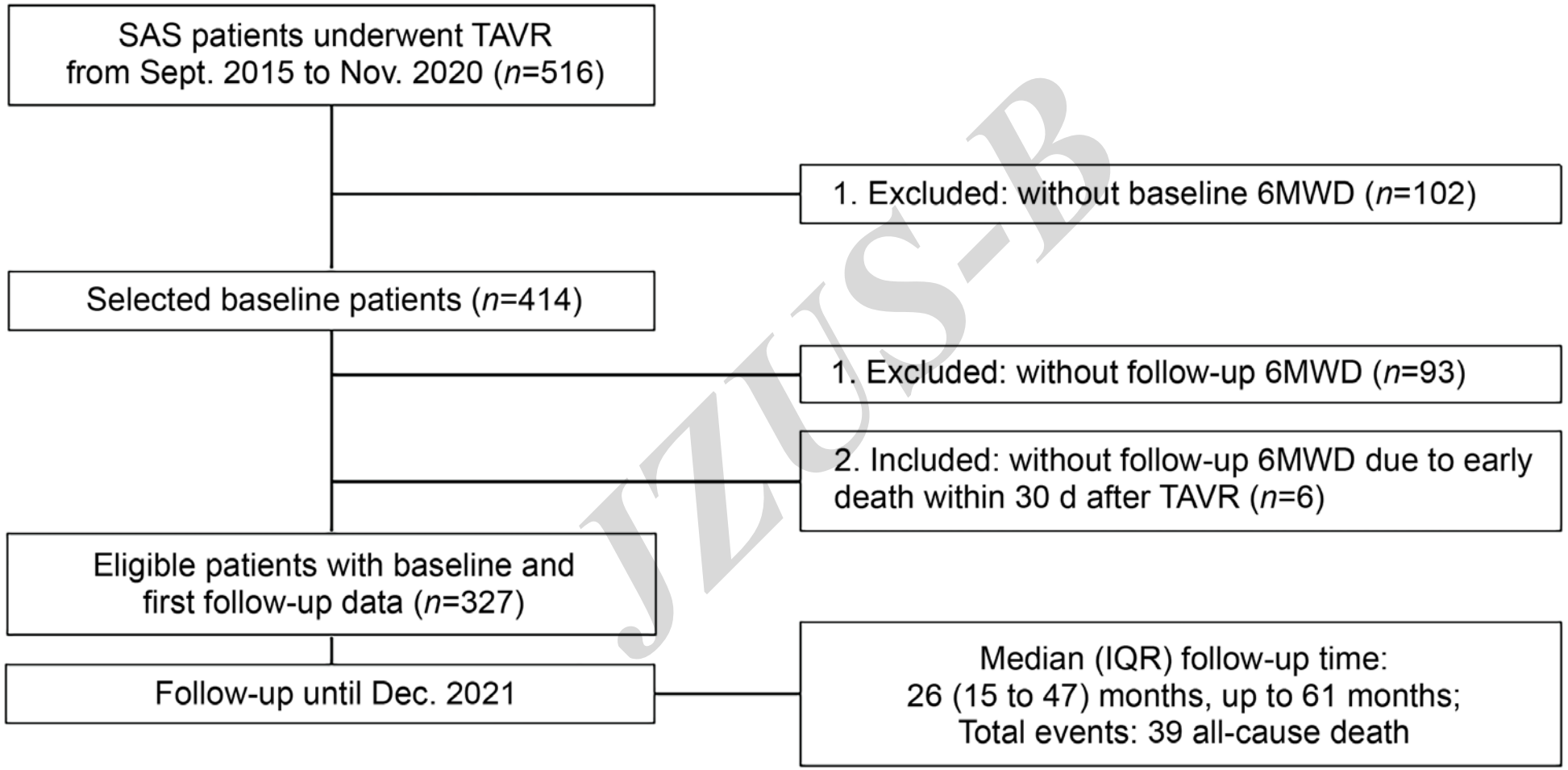
Clinical characteristics based on COMPRERA 2.0 risk stratification.

	Low	Intermediate-low	Intermediate-high	High	P Value
N, No. (%)	14 (4%)	80 (25%)	148 (45%)	85 (26%)	
Peak TV, cm/s	4.7 (4.3, 5.1)	4.4 (4.1, 5.1)	4.8 (4.4, 5.4)	4.7 (4.2, 5.3)	0.063
Valve area*, cm^2	0.6 (0.5, 0.8)	0.7 (0.6, 0.9)	0.6 (0.5, 0.8)	0.5 (0.4, 0.7)	<0.001
Valve types, BAV/TAV/VIV	8/5/1	45/34/1	73/74/2	38/47/0	0.223
STS score, % (%)	2.2 (1.6, 3.4)	3.3 (2.1, 5.1)	4.9 (3.5, 8.5)	8.7 (5.2, 11.0)	<0.001
STS risk, low/interm/high	13/1/0	48/25/7	45/60/43	7/31/47	<0.001
Transfemoral, No. (%)	14 (100)	75 (94)	145 (98)	80 (94)	0.267
LVEF, %	63 (61, 69)	62 (58, 68)	61 (52, 66)	47 (35, 60)	<0.001
PASP*, mmHg	28 (24, 33)	32 (27, 37)	34 (28, 42)	38 (27, 54)	0.002
Functional class, (I/II)/III/IV	14/0/0	33/39/8	9/97/42	0/22/63	<0.001
6MWD*, m	427 (389, 501)	399 (335, 445)	340 (276, 377)	222 (160, 293)	0.000
NT-ProBNP*, ng/L	191 (102, 250)	357 (128, 828)	2200 (921, 3782)	5581 (2559, 15582)	0.000

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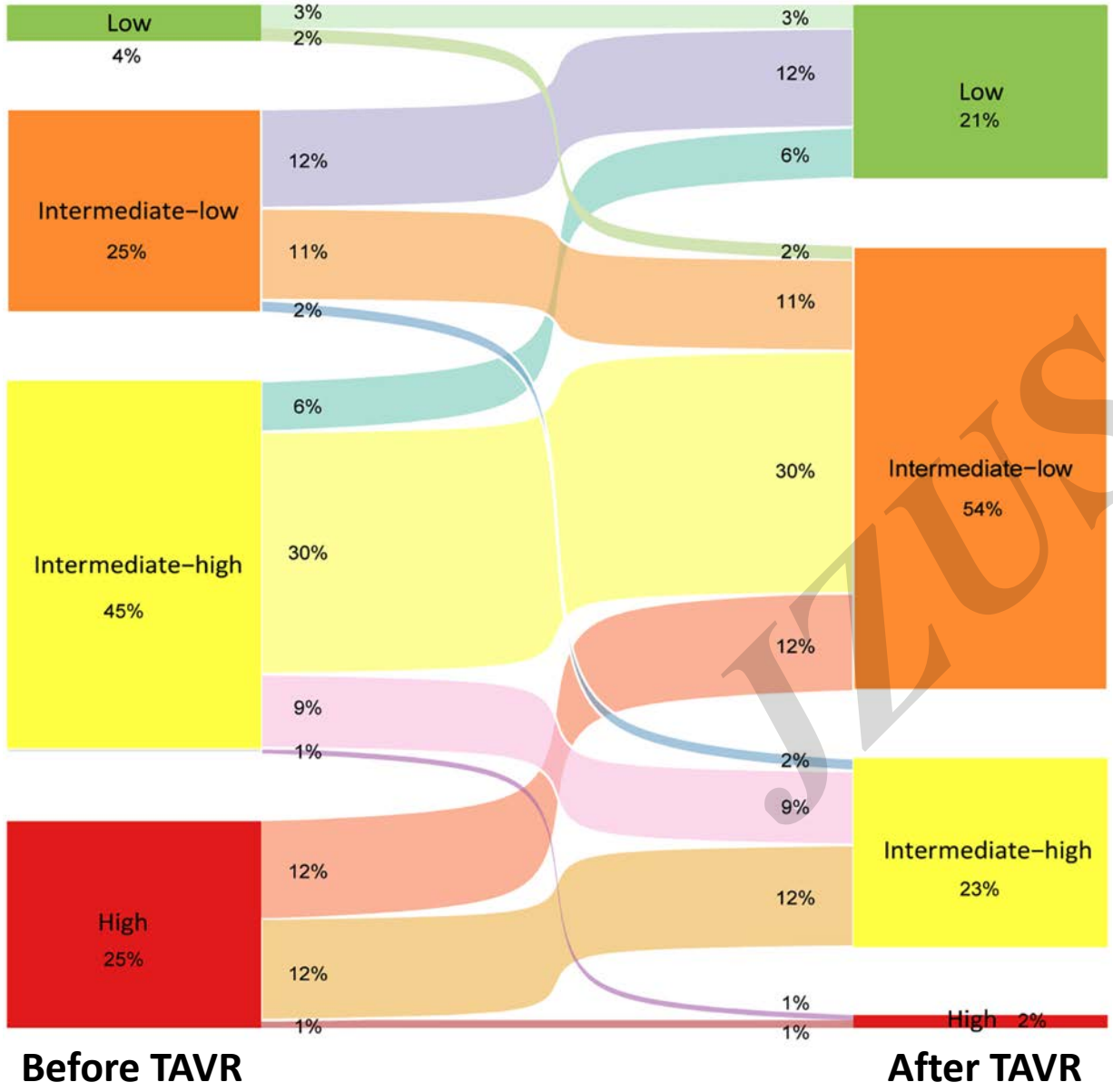
Figure 1. Study flow diagram.



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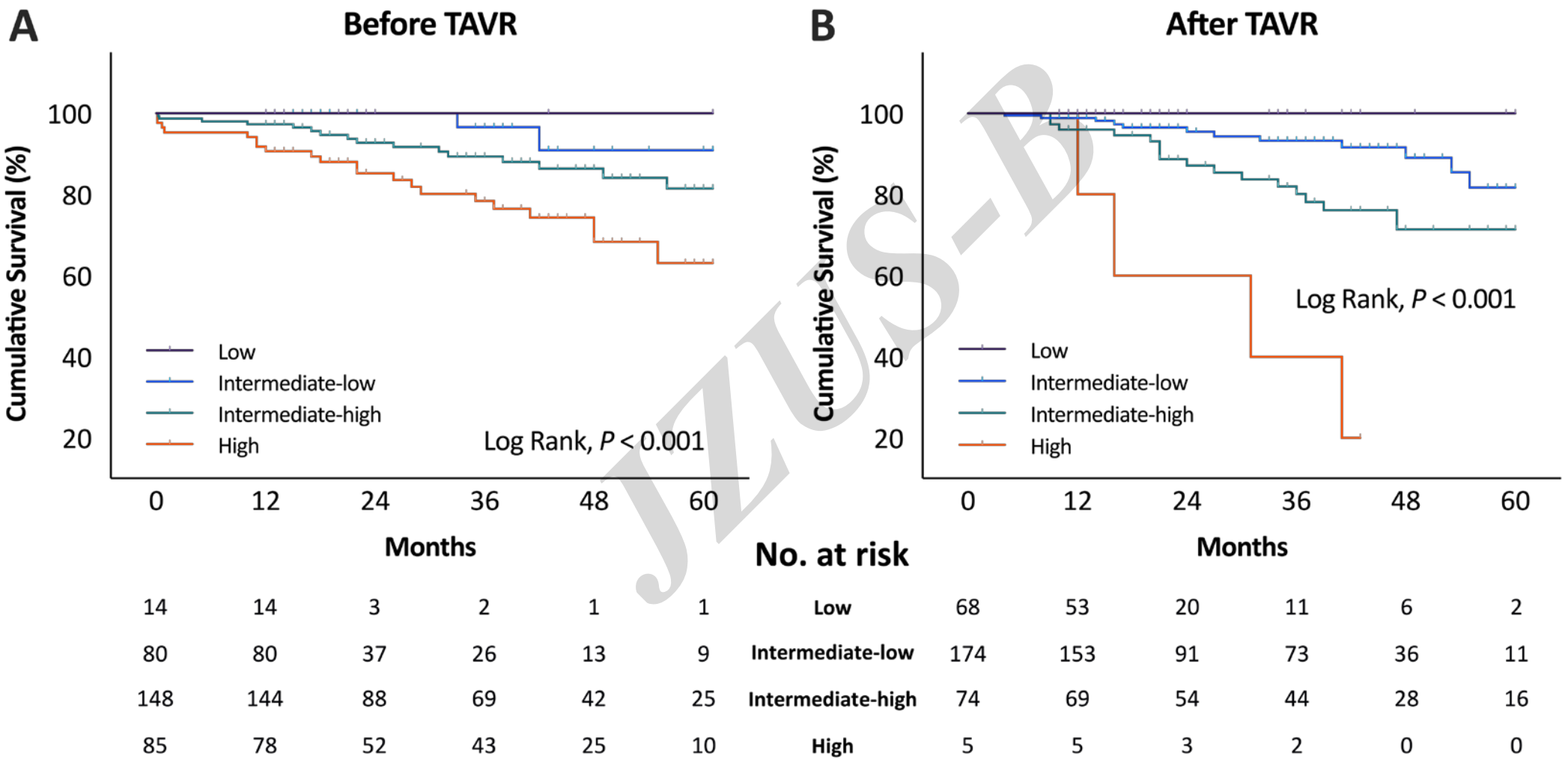
AS: aortic stenosis, TAVR: transcatheter aortic valve replacement, 6MWD: 6-minute walking distance, BNP: brain natriuretic peptide, NT-proBNP: N-terminal fragment of pro-BNP, IQR: interquartile range.

Figure 2. Risk stratification change before and after TAVR.



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Figure 3. Survival based on COMPRERA 2.0 risk stratification.



No. at risk						
Low	68	53	20	11	6	2
Intermediate-low	174	153	91	73	36	11
Intermediate-high	74	69	54	44	28	16
High	5	5	3	2	0	0

14	14	3	2	1	1
80	80	37	26	13	9
148	144	88	69	42	25
85	78	52	43	25	10

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Conclusions

- COMPERA 2.0 risk assessment was able to predict long-term all-cause mortality in patients with SAS undergoing TAVR.
- COMPERA 2.0 might be useful in patients at risk for PH associated with left heart disease or group 2 PH.
- Further validation study is needed in patients with confirmed post-capillary PH by catheterization.

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