

Table 1

Variable	MVR (n=55)	First-time MVR (n=37)	Redo MVR (n=18)	P value	Age ≥80 (n=10)	Age <80 (n=45)	P value
Mean age (years ± SD)	70.7±11.3	71.8±10.1	68.4±14.6	0.31	82.4±2.2	68.1±11.4	< 0.01
Female, n (%)	36 (65)	27 (73)	9 (50)	0.09	8 (80)	28 (62)	0.28
Hypertension, n (%)	26 (47)	16 (43)	10 (56)	0.39	7 (70)	19 (42)	0.11
Congestive heart failure, n (%)	15 (27)	10 (27)	5 (31)	0.95	5 (50)	10 (22)	0.07
NYHA class III or IV	18 (33)	11 (30)	7 (39)	0.50	5 (50)	13 (29)	0.20
Diabetes (insulin user), n (%)	10 (18)	9 (24)	1 (6)	0.09	4 (40)	6 (13)	0.048
COPD, n (%)	3 (5)	2 (5)	1 (6)	0.98	1 (10)	2 (5)	0.48
Atrial fibrillation, n (%)	20 (36)	13 (35)	7 (39)	0.79	4 (40)	16 (36)	0.18
Chronic renal failure, n (%)	13 (24)	9 (24)	4 (22)	0.86	4 (40)	9 (20)	0.17
Dialysis-dependent	1 (2)	1 (3)	0		0	1 (2)	
EuroSCORE II, % (mean ± SD)	5.49±5.4	4.37±4.7	7.79±6.2	0.03	7.95±6.7	4.94±5.0	0.11
LVEDD, mm (mean ± SD)	50.7±8.4	50.2±9.1	51.5±7.1	0.60	50.5±8.0	50.7±8.7	0.97
LVESD, mm (mean ± SD)	34.2±8.6	33.1±8.8	36.4±8.4	0.19	32.9±6.3	34.5±9.2	0.60
LVEF, % (mean ± SD)	60.6±11.7	62.8±11.5	56.2±11.5	0.05	63.4±9.2	60.0±12.4	0.41
LVEF <40%, n (%)	3 (5)	1 (3)	2 (11)	0.20	0	3 (7)	0.40
Pulmonary hypertension >45 mmHg (%)	23 (42)	15 (41)	8 (44)	0.78	7 (70)	16 (36)	0.046
Cause							
Degenerative, n (%)	10 (18)	2 (5)	8 (44)	–	2 (20)	8 (18)	
Rheumatic, n (%)	29 (52)	27 (73)	2 (11)	–	3 (30)	26 (58)	
Infective, n (%)	8 (15)	7 (19)	1 (6)	–	3 (30)	5 (11)	
Other, n (%)	8 (15)	1 (3)	7 (39)	–	2 (20)	6 (13)	
Previous cardiac surgery, n (%)	18 (33)						
Procedures at previous operation					3 (30)	15 (33)	0.84
Mitral valve (MVP/MVR/OMC)			(8/1/2)	–			
Aortic valve (AVR)			3	–			
Arch (TAR)			2	–			
Coronary (CABG)			1	–			
Other			2	–			
Time to re-operation, years ± SD			13.9±12.7	–			

Table 2

Variable	MVR (n=55)	First-time MVR (n=37)	Redo MVR (n=18)	P value	Age ≥80 (n=10)	Age <80 (n=45)	P value
Operative time, min (mean ± SD)	215±46.7	207±46.5	233±44.2	0.046	226±64.2	213±43.0	0.44
Cardiopulmonary bypass time, min (mean ± SD)	131±28.6	129±28.1	137±30.7	0.36	127±26.2	132±29.6	0.63
Cross-clamp time, min (mean ± SD)	98±26.8	100±24.4	96±32.4	0.62	92.1±12.1	99.7±29.2	0.42
Mechanical valve/bioprosthetic valve, n (%) / n (%)	7/48	3/34	4/14	–	0/10	7/38	–
Concomitant procedures	24 (44)	21 (57)	3 (17)	0.005	5(50)	19(42)	0.65
Tricuspid valve annuloplasty, n (%)	11 (20)	8 (22)	3 (17)	–	2(20)	9(20)	
Atrial fibrillation surgery, n (%)	17 (31)	17 (46)	0	–	3(30)	14(31)	
ASD closure, n (%)	2 (4)	1 (3)	1 (6)	–	1(10)	1(2)	
LAA closure, n (%)	15 (27)	14 (38)	1 (6)	–	3(30)	12(27)	
Conversion to sternotomy, n (%)	0	0	0	–	0	0	–
Arterial cannulation Femoral/Rt. axillary artery, n (%) / n (%)		26 (70) / 11(30)	7 (39) / 11 (61)	–	5 (50) / 5 (50)	32 (71) / 13 (29)	–
Venous cannulation Femoral/femoral+SVC, n (%) / n (%)		34 (92) / 3 (8)	14 (78) / 4 (22)	–	7 (70) / 3 (30)	41 (91) / 4 (9)	–

Table 3

Variable	MVR (n=55)	First-time MVR (n=37)	Redo MVR (n=18)	P value	Age ≥80 (n=10)	Age <80 (n=45)	P value
In-hospital mortality, n (%)	1 (2)	0	1 (6)	0.48	0	1 (2)	0.63
Intensive care unit stay, days (median, IQR)	3 (2-4)	3 (2-4)	3 (2-4.8)	0.66	3 (2.3-4)	3 (2-4)	0.61
Hospital stay, days (median, IQR)	11 (8.8-18)	10 (8-18)	11 (10-16)	0.69	16.5 (13-33)	10 (8-15.8)	0.01
Ventilation duration, hours (median ± SD)	9±15.8	8.3±5.2	11.5±5.6	0.25	16 (12.5-18)	8 (6-12)	0.003
Blood transfusion (intra or post op), n (%)	27 (49)	14 (38)	13 (72)	0.017	8 (80)	19 (42)	0.03
Left ventricle free wall rupture, n (%)	0	0	0	–	0	0	–
Low cardiac output syndrome, n (%)	0	0	0	–	0	0	–
Re-exploration, n (%)	1 (2)	0	1 (6)	0.48	0	1 (2)	0.63
Respiratory insufficiency, n (%)	2 (4)	1 (3)	1(6)	0.60	2 (20)	0	0.002
Gastrointestinal bleeding, n (%)	0	0	0	–	0	0	–
Temporary renal replacement therapy, n (%)	2 (4)	0	2 (11)	0.039	0	2 (4)	0.49
Cerebral vascular accident, n (%)	0	0	0	–	0	0	–
Wound complication, n (%)	2 (4)	1 (3)	1 (6)	0.60	0	2 (4)	0.49
Complete atrioventricular block, n (%)	0	0	0	–	0	0	–
New onset postoperative atrial fibrillation, n (%)	7 (13)	6 (16)	1 (6)	0.27	2 (20)	5 (11)	0.45

Table 4

Variable	Hospital mortality or prolonged hospital stay >30 days (n=8)		P value
	Yes (n=8)	No (n=47)	
Mean age, years ± SD	64.5±20.7	71.8±9.5	0.11
Age >80 years, n (%)	3 (63)	7 (15)	0.12
Female, n (%)	3 (38)	33 (70)	0.07
NYHA III or IV	4 (50)	12 (16)	0.16
Congestive heart failure, n (%)	4 (50)	11 (23)	0.12
Chronic kidney disease, n (%)	4 (50)	9 (19)	0.07
Atrial fibrillation, n (%)	1 (13)	19 (40)	0.13
Pre-operative LV EF, % (mean ± SD)	64.5±9.3	60.0±12.2	0.33
Pre-operative LV EF <40%, n (%)	0	3 (6)	0.46
EuroSCORE II, % (mean ± SD)	7.92±4.3	5.08±5.5	0.17
Infective endocarditis, n (%)	4 (50)	4 (9)	0.002
Previous cardiac surgery, n (%)	4 (50)	14 (30)	0.26
Concomitant procedure, n (%)	4(50)	21 (45)	0.78
Tricuspid valve procedure, n (%)	2 (25)	9 (19)	0.70
Mechanical valve replacement, n (%)	2 (25)	5 (11)	0.26

Table 5

Study	Country	Study period	Group (MT/ST)	Participants (male/female)	Age (years)	MVP/MVR (%)	Mortality events (%)	Stroke events (%)	RFB events (%)	CPB time (min)	Clamping time (min)	Conversion to sternotomy (no. of patients)
Bolotin et al. [15]	USA	January 1996–June 2003	MT	38 (-/-)	68±2	42/58	2 (5)	NA	NA	160±65	NA	0
			ST	33 (-/-)	63±2	9/91	2(6)	NA	NA	157±54	NA	
Hiraoka et al. [16]	Japan	January 2006–September 2011	MT	10 (5/5)	68±15	0/100	0 (0)	1 (10)	0 (0)	145±25	90±7 (VF-time)	NA
			ST	27 (18/9)	63±15	0/100	1 (4)	1 (4)	2 (7)	135±28	84±19	
Losenno et al. [17]	Canada	September 2000–August 2014	MT	40 (28/12)	68±14	20/80	2 (5)	2 (5)	1 (3)	201±63	123±37 (VF-time)	0
			ST	92 (38/54)	62±13	9/91	10 (11)	2 (2)	6 (7)	180±75	105±46	
Ricci et al. (12)	Italy	October 1997–January 2007	MT	241 (134/107)	65±11	23/66 (other 11%)	12 (4.9)	14 (5.8)	12 (4.9)	117±46	71±31	1
Sharony et al. (13)	USA	1995-2002	MT	100 (-/-)	NA	31/69	5 (5)	4 (2.5)	8 (5.0)	122±2.9	80±2.3	0
Thomson et al. (14)	UK	1985-2001	MT	125 (33/92)	63	0/100	8 (6.4)	2 (1.6)	4 (3.2)	83.6±43.1	NA	NA
Present study	Japan	May 2014–November 2020	MT	16 (8/8)	69.5±14	0/100	1 (6)	0 (0)	0 (0)	137±31.7	94±33.1	0
			ST	5 (4/1)	68.6±7.8	0/100	0 (0)	0 (0)	0 (0)	244±94.2	176±77.6	