

Supplementary Material

Clinical outcomes following balloon aortic valvuloplasty

Anda Bularga MD¹, Rong Bing MBBS^{1,2}, Anoop S. V. Shah MD^{1,2}, Philip D. Adamson MBBS^{2,3}, Miles Behan MD², David E. Newby MD^{1,2}, Andrew D. Flapan MD², Neal Uren MD², Nick Cruden MD²

¹ BHF Centre for Cardiovascular Science, University of Edinburgh, Edinburgh, UK.

² Edinburgh Heart Centre, Royal Infirmary of Edinburgh, Edinburgh, UK

³ Christchurch Heart Institute, University of Otago, New Zealand

All authors take responsibility for all aspects of the reliability and freedom from bias of the data presented and their discussed interpretation.

Appendix 1: ICD-10 codes for secondary outcomes at 30 days and 1 year

Myocardial Infarction: I210, I2100, I2101, I2109, I211, I2110, I2111, I2119, I212, I2120, I2121, I2129, I213, I2130, I2131, I2139, I214, I2140, I2141, I2149, I219, I2190, I2191, I2199, I220, I2200, I2201, I2209, I221, I2210, I2211, I2219, I228, I2280, I2281, I2289, I229, I2290, I2291, I2299

Stroke: I609, I602, I638 D, I614, I600, I631 D, I63, I631, I632, I607, I616, I633, I6390, I64X, I603, I632 D, I635, I608, I618, I634, I606, I639 D, I630, I64X D, I613, I612, I619, I620, I615, I610

Heart failure: I509, I500, I500 D, I501, I5009, I501 D, I426, I5010, I5090, I110, I5000, I5019, I5099, I5091, I5001, I5001D, I509 D, I5011, I5009D, I130, I132, I5000D, I5010D, I5091D, I5019D, I5099D, I1329, I5090D, I1109, I1101, I1100, I5011D, I1320, I1321, I1300, I1309

Acute Renal Failure: N17

Bleeding: H431, K920, K264, R042, K922, I601, I609, K921, I620, K625, K260, I629, K226, N938, S066, O041, I608, N939, T810, S0650, K250, I607, S065, I602, K290, I850, K266, S0660, K254, I603, H450 A, I604, I621, I606, K291, S0640, O722, O209, I230, I605, K262, R048, K284, K276, S0641, K256, H356, K274, O071, S064, O208, O036, S0651, O721, K252, R041, K286, S0661, K270, I312, N837, O081, O031, K280, O046, O720, O469, R049, O902, I690, K272, I609 D, O076, I692, P261, O061, O051, K282, O066, O460, P269, O717, I607D

Year	Number of index BAV procedures per year	Number of patients undergoing repeat intervention
2010	3	0
2011	5	2
2012	13	8
2013	26	9
2014	34	17
2015	27	9
2016	32	12
2017	22	9
2018	5	1

BAV=balloon aortic valvuloplasty

Supplementary table 2 – Univariable Cox model for all-cause mortality		
	Hazard ratio	p-value
Age	0.92 (0.75-1.13)	0.404
Sex (male)	1.50 (1.03-2.19)	0.034
Hypertension	1.10 (0.75-1.61)	0.617
Ischaemic heart disease	1.40 (0.96-2.03)	0.083
Atrial fibrillation	1.10 (0.75-1.60)	0.628
Chronic Kidney Disease	1.46 (0.91-2.37)	0.12
Diabetes	1.07 (0.70-1.63)	0.762
Pulmonary disease	1.01 (0.67-1.52)	0.959
Cerebrovascular disease	1.32 (0.76-2.27)	0.323
Priority - Elective	Reference	
Urgent	1.55 (1.04-2.30)	0.03
Emergency	2.08 (1.10-3.92)	0.024
LVEF category >50%	Reference	
30-50%	1.82 (1.14-2.89)	0.012
<30%	2.06 (1.31-3.25)	0.002
(LVEF=left ventricular ejection fraction)		

Supplementary table 3 – Thirty-day morbidity post index BAV	
	Events
MI (%)	8 (4.8)
Stroke (%)	2 (1.2)
Heart Failure (%)	9 (5.4)
Acute Renal Failure (%)	14 (8.4)
Bleeding (%)	1 (0.6)
All-cause mortality (%)	18 (10.8)
(N=number, MI=myocardial infarction, ARF=acute renal failure)	

Supplementary table 4: Baseline characteristics according to repeat intervention type					
	Overall	BAV	TAVI	SAVR	p-value
N	167	9	42	16	
Age [IQR]	80.0 [73.0, 86.0]	74.0 [65.0, 78.0]	84.0 [73.2, 89.5]	74.0 [71.0, 78.2]	0.001
Male (%)	87 (52.1)	5 (55.6)	21 (50.0)	8 (50.0)	0.981
Hypertension (%)	100 (59.9)	6 (66.7)	23 (54.8)	9 (56.2)	0.824
Ischaemic heart disease (%)	67 (40.1)	5 (55.6)	17 (40.5)	6 (37.5)	0.803
Previous MI (%)	38 (22.8)	2 (22.2)	8 (19.0)	2 (12.5)	0.596
Previous PCI (%)	22 (13.2)	2 (22.2)	4 (9.5)	1 (6.2)	0.553
Previous CABG (%)	31 (18.6)	3 (33.3)	12 (28.6)	2 (12.5)	0.119
Cerebrovascular disease (%)	20 (12.0)	0 (0.0)	1 (2.4)	3 (18.8)	0.068
eGFR (ml/min/1.73m²)					0.315
>60 (%)	88 (52.7)	4 (44.4)	27 (64.3)	7 (43.8)	
30-59 (%)	55 (32.9)	4 (44.4)	14 (33.3)	4 (25.0)	
<30 (%)	20 (12.0)	1 (11.1)	1 (2.4)	4 (25.0)	
Haemodialysis (%)	4 (2.4)	0 (0.0)	0 (0.0)	1 (6.2)	
Diabetes (%)	43 (25.7)	3 (33.3)	10 (23.8)	2 (12.5)	0.554
Pulmonary disease (%)	47 (28.1)	2 (22.2)	14 (33.3)	4 (25.0)	0.835
Peripheral vascular disease (%)	22 (13.2)	0 (0.0)	10 (23.8)	0 (0.0)	0.045
Pacemaker (%)	9 (5.4)	0 (0.0)	1 (2.4)	0 (0.0)	0.320
Smoking history					0.728
No (%)	101 (68.2)	6 (66.7)	27 (69.2)	12 (85.7)	
Ex (%)	38 (25.7)	3 (33.3)	9 (23.1)	2 (14.3)	

Yes (%)	9 (6.1)	0 (0.0)	3 (7.7)	0 (0.0)	
Priority of index BAV					<0.001
Elective (%)	79 (47)	3 (33.3)	27 (64.3)	4 (25.0)	
Urgent (%)	72 (43.4)	5 (55.6)	15 (35.7)	4 (25.0)	
Emergency (%)	16 (9.6)	1 (11.1)	0 (0.0)	8 (50.0)	
LVEF					0.394
>50%	64 (38.8)	4 (44.4)	21 (51.2)	7 (43.8)	
30-50%	47 (28.5)	2 (22.2)	12 (29.3)	4 (25.0)	
<30%	54 (32.7)	3 (33.3)	8 (19.5)	5 (31.2)	
Peak gradient (mmHg) [IQR]	70.0 [57.0, 80.0]	68.0 [55.0, 76.5]	64.0 [53.5, 78.5]	75.0 [64.5, 90.0]	0.065
Mean gradient (mmHg) [IQR]	42.0 [30.0, 50.0]	40.0 [30.0, 48.0]	36.0 [29.0, 52.0]	49.0 [42.5, 55.0]	0.005
(IQR=interquartile range, MI=myocardial infarction, PCI=percutaneous coronary intervention, CABG=coronary artery bypass surgery, eGFR=estimated glomerular filtration rate, LVEF=left ventricular ejection fraction, NYHA=New York Heart Association)					

Supplementary table 5 – All-cause mortality stratified by repeat intervention					
	Overall	None	Repeat BAV	TAVI	SAVR
N	167	100	9	42	16
Mortality at 30 days (%)	18 (11%)	16 (16%)	3 (33%)	3 (7%)	1 (6%)
Mortality at 12 months (%)	72 (43%)	60 (60%)	8 (89%)	6 (14%)	3 (19%)

(N=number, BAV=balloon aortic valvuloplasty, TAVI= transcatheter aortic valve implantation, SAVR=surgical aortic valve replacement)

Supplementary figure 1: Multivariable Cox proportional hazard survival stratified by baseline ejection fraction.

