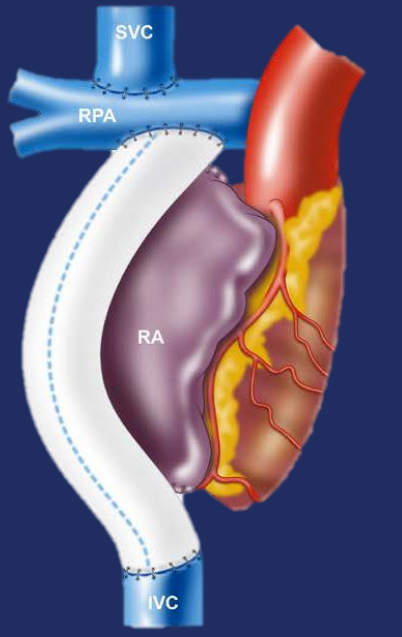




Semilunar valve replacement with Fontan circulation: The Mayo Clinic Experience



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Background

- The impact of atrioventricular valve failure and subaortic stenosis in patients with Fontan circulation has been recognized, but there is a paucity of information regarding semilunar valve dysfunction.
- We sought to evaluate risk factors and outcomes for aortic/neo-aortic valve replacement (AVR) in patients with Fontan circulation.

Methods

- IRB approved retrospective cohort study.
- Patients with Fontan operation or revision at Mayo Clinic from 1973 to 2020. (N = 1176)

Results

Case Number	Status	Pacemaker	Indication for PPM	Reoperation	Post-AVR systemic valve insufficiency	Perioperative complications	Survival after AVR (years)
1	Alive	-	-	-	-	-	-
2	Alive	Ventricular epicardial (7.8 years before AVR)	Complete heart block	-	NA	-	-
3	Deceased	-	-	-	Trivial AV insufficiency, trace neo-aortic regurgitation	-	8.8
4	Alive	Dual chamber, (6.5 years before AVR)	Sinus node dysfunction	Aortic root replacement (9 years after AVR)	Trivial prosthetic valve regurgitation	-	-
5	Deceased	Yes, type NA (during AVR)	NA	-	NA	NA	4
6	Deceased	Dual chamber (4 days after AVR)	Third-degree AV block	Attempt to close atrial communication (2.5 years after AVR)	-	Third-degree heart block, LV dysfunction necessitating LVAD insertion	19.3
7	Alive	Dual chamber (2 months before AVR)	Bradycardia	LPA stent placement (2 years after AVR), pacemaker pack change and lead revision	-	-	-
8	Deceased	-	-	Closure of LV to PA shunt (5 years after AVR)	Periprosthetic AR, trivial prosthetic regurgitation	-	5.8
9	Alive	Dual chamber (during AVR)	Bradycardia	-	-	Sinus bradycardia with an accelerated junctional rhythm requiring PPM	-
10	Alive	Dual chamber (6 years after AVR)	Atrial fibrillation	Fontan conversion, pacemaker ventricular lead, battery and generator replacements	Trivial prosthetic regurgitation	-	-
11	Deceased	-	-	Repair of mycotic aneurysm in LV outflow tract (10 days after AVR), Fontan conversion (AP to intra-atrial) and ASD recreation (11 years after AVR)	-	-	10.7
12	Alive	Atrial (during AVR)	Bradycardia	-	Mild prosthetic regurgitation, mild to moderate perivalvular regurgitation	-	-

Results

- 12 (1%) pts had AVR after Fontan. None had AVR before or during Fontan.
- Mean age at time of Fontan was 7.2 ± 6.7 years (median 4 years). AVR occurred from 14 days to 29 years following the Fontan (mean 13.5 ± 8.7 years, median 17 years).
- Indication for AVR was moderate or severe regurgitation in all
- Median survival after AVR was 7.3 years
- Mean age of the 7 living pts at time of review was 33.4 ± 7.3 years

Conclusions

- The need for aortic or neo-aortic valve replacements (AVR) in pts with Fontan circulation is a relatively rare issue, but increasing survival of Fontan patients may cause more patients to eventually require intervention for AR.
- Pts were not free from Fontan failure, reoperation, or need for PPM.
- Male sex, LV dominant morphology, atriopulmonary (AP) Fontan connection, and TGA should be further investigated as risk factors for AVR in pts with Fontan circulation.

Characteristic	AVR cohort (n=12)	Mayo Fontan database (n=1,176)	p value (α=0.05)
Male sex	12 (100%)	707 (60%)	0.00496
LV dominant	9 (75%)	788 (67%)	0.5552
AP Fontan connection	9 (75%)	623 (53%)	0.12852
TGA (total)	9 (75%)	707 (60%)	0.29372
d-TGA	5 (42%)	306 (26%)	0.2187
L-TGA	3 (25%)	352 (30%)	0.71138
Other TGA	1 (8%)	47 (4%)	0.44726