Aortic valve phenotype prevalence and outcomes from a large aortic valve repair experience

Objectives: Aortic valve repair has evolved to an excellent treatment, for mainly aortic valve regurgitation, with overall outstanding long-term results. The prevalence of different valve phenotypes that present for aortic valve repair, however, is largely unknown. We therefore sought to analyze phenotype prevalence and outcomes from a large aortic valve repair experience.

Methods: We queried a prospectively collected database for aortic valve repair from March 1998 to July 2022. The primary endpoint of the analysis was to elucidate the prevalence of different aortic valve phenotypes. Only adult patients (>=18years), and only patients who presented with a repairable aortic valve were included. We excluded patients with acute aortic dissections and endocarditis. Secondary endpoint of the investigation was freedom from reoperation & long-term outcomes of the respective phenotypes via Kaplan-Meier survival analyses.

Results: The entire cohort of patients consisted of 1175 patients, with 81.4% males, 6% had connective tissue disorders, and 13.3% had previous cardiac surgeries. The phenotype distribution among these patients was tricuspid aortic valves(TAV) 61.5% (n=723); bicuspid aortic valves(BAV) 35.7% (n=420); unicuspid aortic valves(UAV) 1.9% (N=22); quadricuspid aortic valves(QAV) 0.9% (n=10). Mean age of respective phenotypes was UAV 24.5years (SD10); BAV 43.3years (SD12.7); TAV 56.6years (SD15.7); QAV 48.3years (SD16.9). Kaplan-Meier analysis demonstrated a 10-year survival of 100% for UAV; 95.4% for BAV; 76.4% for TAV & 62.5% for QAV. Overall, 10-year freedom from reoperation was 67.6%, 85%, 90.3% & 100%, respectively.

Conclusion: Aortic valve repair is feasible in all phenotypes with good outcomes. TAV represent the oldest patient population, possibly highlighting that normal valve phenotypes are less prone to dysfunction, and thus present later in life. UAVs presented the earliest, but also have the best long-term survival of 100%, likely related to their young age. With an overall prevalence of up to 2% in the general population however, BAVs are disproportionally over-represented with 35.7%, possibly indicating that these valves are particularly prone to dysfunction.
Limitations of this study are the overall relatively low number of UAV and QAV, and that this experience also entails our early learning curve. With modifications of our technique and better understanding of valve morphologies, outcomes have overall improved with time.

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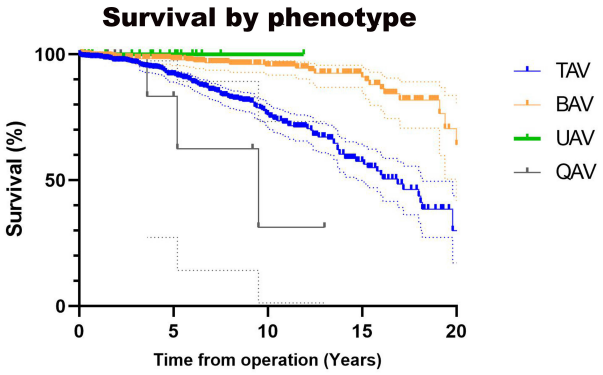
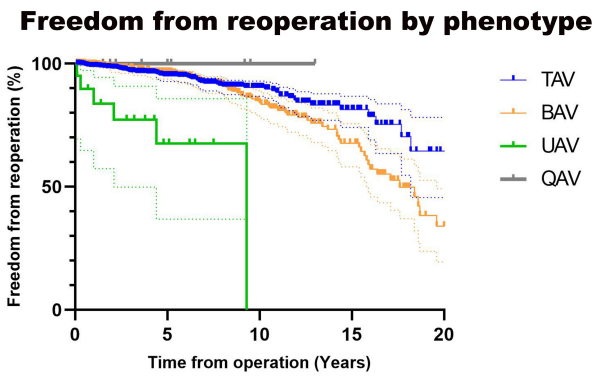

Survival by phenotype
Survival (%)
100
50
0
0
5
10
15
20
Time from operation (Years)
TAV
BAV
UAV
QAV


Freedom from reoperation by phenotype
Freedom from reoperation (%)
100
50
0
0
5
10
15
20
Time from operation (Years)
TAV
BAV
UAV
QAV