Aortic insufficiency (AI) or Aortic regurgitation is abnormal retrograde blood flow due to an incompetent aortic valve (AV) in the heart.

Causes of Aortic Insufficiency include:
- enlargement of the aortic root (aortic aneurysm, Marfan syndrome, aortic dissection etc.)
- abnormalities of the valve leaflets (bicuspid valve, degenerative, rheumatic) [1].

As a result of a chronic increase in regurgitant blood flow, the left ventricle (LV), which is responsible for pumping blood to the systemic circulation, undergoes compensatory remodeling. This adaptation includes:
- left ventricular hypertrophy
- enlargement of the chamber
- increased wall thickness (eccentric hypertrophy) [2].

Patients may be asymptomatic for some time owing to this chronic compensatory phase, however they are monitored with serial echocardiograms as ensuing LV dysfunction and dilatation can indicate poor surgical outcome [2, 3].

Surgical Correction:
AV replacement with a prosthetic valve is an established surgical option, however it has inherent limitations and complications:
- the requirement of lifelong anticoagulation
- durability of the valve
- risks of endocarditis [4]

A reconstructive surgical approach, namely AV repair has recently gained increasing interest as an alternative to AV replacement.

Postoperative LV echocardiographic changes following AVR

Preoperatively, there was no statistically significant difference in LVEDD or LV Mass between patient groups (p > 0.05). There was however a statistically significant difference in preoperative LVESD and FS for patients undergoing AV replacement vs. AV repair (paired t-test, p = 0.0129 and p = 0.0126 respectively).

- Postoperative left ventricular echocardiographic parameters were compared to their respective preoperative value for each patient. Mean % difference is depicted for each parameter.
- Error bars represent standard error of the mean (SEM). There was a statistically significant difference in % change in Left Ventricular Mass (LV Mass) for patients who underwent AV Replacement compared to AV Repair (t-test, p < 0.05).

Results

Discussion

- There was a statistically significant reduction in LV Mass in patients who underwent AV replacement compared to AV repair (t-test, p < 0.05)
- This data should be analyzed in light of loss of echocardiographic follow-up in patients and should be correlated with follow-up in months, in future studies
- There was a greater degree of improvement in all echocardiographic parameters following AV replacement when compared to AV repair
- However it is not clear whether this degree of improvement reflects a poorer preoperative status in AV replacement patients

Conclusion

- This preliminary study has identified characteristics of LV recovery in patients who have undergone AV repair or replacement at the University of Ottawa Heart Institute
- There are however some important limitations. In particular, this project has identified potential future avenues of research that may include expanding the patient sample, clinical correlation, identification of preoperative predictors of outcome, and analysis of left ventricular recovery over a longer follow-up time course

References & Acknowledgements

Works Cited: