19 TRICUSPID VALVE IN VALVE IMPLANTS IN CONGENITAL HEART DISEASE PATIENTS

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Patients with congenital tricuspid valve problems or post surgical complications often need biological vale implants quite early on in child hood with risk of size/growth mismatch, valve degeneration and severe stenosis or mixed disease, which expose them to the high risk of multiple redo surgeries.

We report 3 cases of transcatheter tricuspid valve in valve implants in the last 18 months, additionally one of them had a percutaneous pulmonary valve implantation (PPVI) at the same procedure after ensuring a widely patent tricuspid valve. Patient ages 19, 11, 26 yrs.

The failing valves in all 3 were a perimount valves, sizes 23 to 31mm.

The inserted valves were Sapien Edwards valves 20 to 29 mm, we used the ViV surgically oriented app which guides the best size, the wire park in the on of the branch pulmonary artery over which the valve mounted onto a balloon within the IVC then manipulated into position within the old valve. Rapid LV pacing would reduce the cardiac output to ensure minimal valve movements during implantation. The valve is deployed with fluoroscopy and TOE guidance, excellent final result with Drop of the mean PG across the valve from 9 to 1 mmHg with no valvar or paravalvar leak,

Conclusion Percutaneous Tricuspid valve implant is a save procedure in patients with failed surgical biological tricuspid valves, and seems to be the logical way forward to avoid redo surgical procedures and more scarring of the right atrium and right ventricle, heart block and arrhythmias.

20 MULTIMODALITY 4D IMAGING AND MODELLING FOR COMPLEX DOUBLE OUTLET RIGHT VENTRICLES

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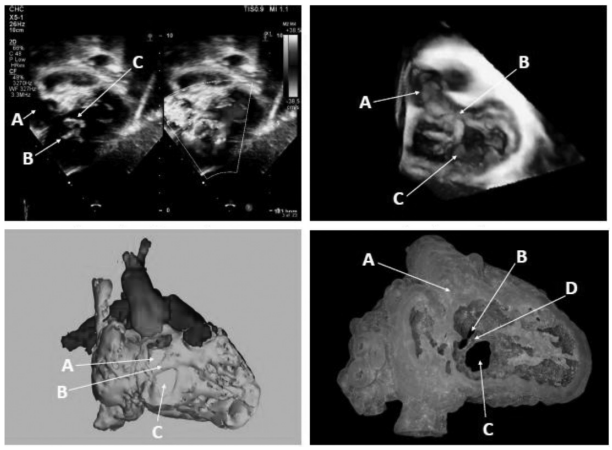
Double outlet right ventricle can have multilevel complexity some with normal situs, levocardia and non-committed ventricular septal defect (DORV-NCVSD), and some with Dextrocardia, or abnormal situs, borderline right or left ventricles and juxtaposed atrial appendages.

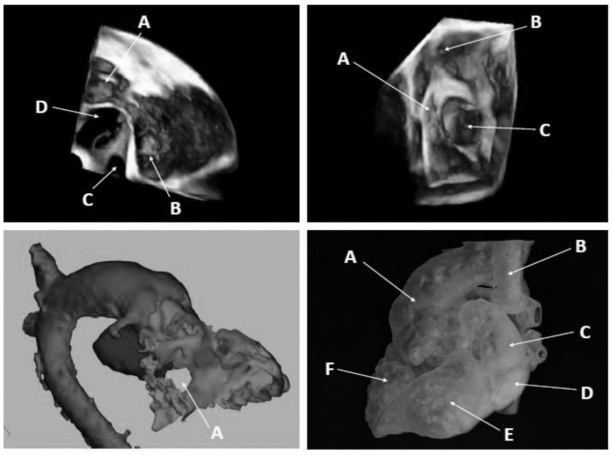
Decision-making can be extremely difficult due to the complex 3-dimensional spatial relationships of the atrial communication, the ventricular septal defect (VSD), the semilunar valves and the atrioventricular valves; along with the size of the ventricular cavities. Understanding of these relationships can determine whether the patient is suitable for a biventricular repair or not.

Recently, advances in 3D printing have been made allowing models to be made from cross-sectional imaging (usually CT or MRI images). These can be very useful; however, they are still subject to the limitations of the chosen imaging modality.

We present a case series of 4 cases of complex DORVs; 2 with NCVSD, and 2 with Dextrocardia borderline ventricles and Juxtaposed atrial appendages where we used a combination of 4D echocardiographic, CT and angiographic



Abstract 20 Figure 1 (A) Subcostal TTE image showing short axis view across the ventricles. VSD is divided by a band of tissue close to the tricuspid value. A – Aorta; B – Tricuspid valve; C – Dividing band, (B) 3D TTE showing similar view as Fig la. This allows better appreciation of the small size of the superior VSD and its relationship to the aorta, A – Aorta; B – Superior VSD; C – inferior VSD. (C) Segmented 3D model from CT scan showing the VSD and its relationship to the outflows. Beige – Atria and ventricles; Red – Aorta; Blue–PAs;A – Superior VSD; B – Dividing band;C – Inferior VSD. (D) 3D printed model from segmented CT scan. View of the RV aspect of the interventricular septum (RV free wall removed) demonstrating the divided VSD. A – Aorta; B – Superior VSD; C – Inferior VSD; D – Dividing band.



Abstract 20 Figure 2 (A) 3D TTE view from posterior aspect (posterior RV and RA walls removed) demonstrating complex atrial anatomy. A – Aorta; B – Tricuspid value; C – Ostium of left atrial appendage; D – Ostium of right atrial appendage; Red arrows – blood flow through ASD and TV. (B) Further view of atrial anatomy, seen for base of heart (posterior atrial wall removed). A – Tip of left atrial appendage; B – tip of right atrial appendage; C – ASD. (C) Segmented 3D model from 3D whole heart navigator sequence MRI scan, showing relationship of the VSD to the outflows. Posterior view with posterior wall of RV removed. Orange – ventricles; Red – Aorta; Blue PAs; A – VSD. (D) 3D printed model from 3D whole heart navigator sequence MRI scan, viewed from anterior aspect to demonstrate gross anatomy. A – Aorta; B – Left SVC / Glenn shunt; C –Right atrial appendage; D – left atrial appendage; E – LV; F – RV.

information fed into the materialise software to create as detailed as possible picture of all the anatomic features. This enabled detailed surgical plans to be made. Anatomical details

at the time of surgery were entirely consistent with the information given by all of the various imaging modalities, allowing confidence in the planning process.
Conclusion These cases demonstrate the value of using a variety of imaging modalities for complex DORV cases, ensuring that important details are not missed.

21 DECISION-MAKING USING MULTIMODALITY IMAGING IN COMPLEX MUSCULAR VENTRICULAR SEPTAL DEFECTS POST PULMONARY ARTERY BANDING

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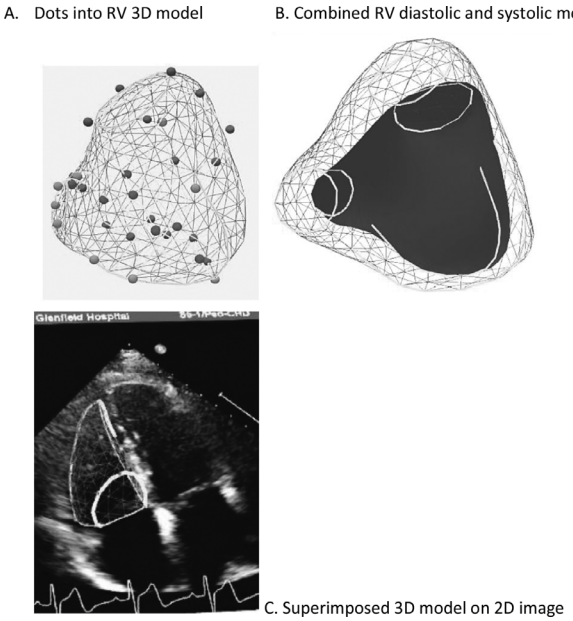
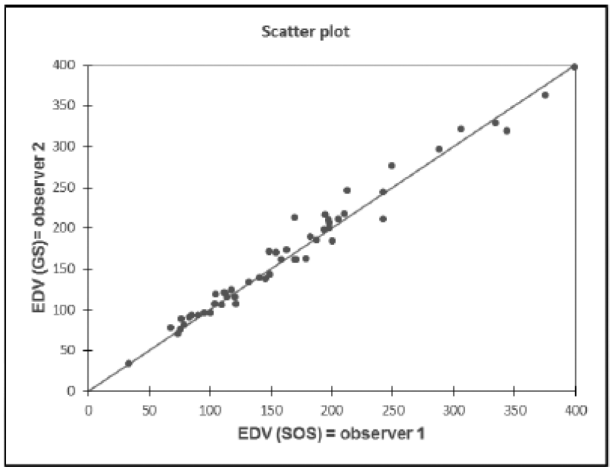
Large muscular ventricular septal defects below the moderator band are an interesting entity as these lesions can be surgical challenging. The conventional approach is to do pulmonary artery banding to control heart failure and allow child to grow with view to close later using interventional approach if the lesion remains significant. Hybrid approach with pulmonary artery debanding and per-ventricular VSD closure has been attempted in few centres.

Current advances in multimodality imaging helps us to understand the anatomy better and help us to plan the interventional and surgical procedure well.

We present 3 cases of muscular ventricular septal defects post pulmonary artery banding. The VSDs in these patients had multiple exits in right ventricle aspect extending above and below the moderator band. Assessment of ventricular septal defect using transthoracic echocardiography, 3D echocardiography, conventional angiogram and CT angiogram added more information. However along with 3D modelling and printing in these selected cases helped to preempt challenges and plan according to avoid complications. We demonstrate the use of multimodality imaging and 3D modelling in these case series.



Abstract 22 Figure 1 A,B,C



Abstract 22 Figure 2 Our institute inter-observational variability

22 SINGLE CENTRE EXPERIENCE OF INCORPORATING KNOWLEDGE-BASED RECONSTRUCTION FOR RIGHT VENTRICULAR VOLUMETRY INTO CLINICAL PRACTICE

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Knowledge-based reconstruction (KBR) is a new technique for calculating the volume of cardiac chambers accurately. The technique can be applied to 3D datasets (eg, MRI scans), but can also be used with conventional 2D echocardiography by tracking the probe position and orientation in 3D space. It is particularly useful for assessing the volume of the right ventricle without having to undergo an MRI scan.

We acquired a KBR system in March 2015, and have been putting it into practice. We have performed 69 studies in 45 patients over an 18 month period, ages between 5 and 70 years average 18.9 years, 28 patients (62%) were between 5–12 years and 37 patients (82%) were below 18 years of age. Indications mainly for post surgical Tetralogy of Fallot variants or post pulmonary valve dilation resulting in free pulmonary regurgitation or mixed valve disease with resulting significant right ventricular volume loading . In a subset we have performed analysis on 13 patients who underwent pulmonary valve replacement, giving pre- and post- surgical RV volume and function analysis, all 13 patients had Cardiac MRI pre surgery, that was comparable to the pre-surgical KBR analysis.
Conclusion Knowledge based reconstruction of right and left ventricle volumetric data can be preformed with good reliability and good alternative to MRI.

23 RIGHT VENTRICULAR OUTFLOW TRACT ELAN CONDUIT: THE FIVE YEAR SCOTLAND EXPERIENCE

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