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Case Report
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Indeginous RV-PA Conduit –Future for Intracardia repair of Tetraology of Fallot with Pulmonary Atresia

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Abstract

RV-PA conduit like contegra which is a xenograft from bovine IJV, has varied indications from TOF to complex congenital cardiac procedures like noorwood, Ross etc. RV-PA conduit has limited availability also the sizes available are limited. So we used indigenous made RV-PA conduit created from a polyester graft and a biocore valve in a 16 year old male for intracardiac repair of tetralogy of fallot [ICR TOF] with pulmonary atresia post BT shunt. Patient tolerated procedure well and is in regular follow up with RVOT gradient of 10 mm of HG. Indigenous made RV-PA conduit have longer shelf life and can be easily available but minimum size of bioprosthetic valve available was 21 mm hence limitation for use in children and infants. It is better alternative in adults where availability and cost of contegra graft was problem.

Abbreviations

RVPA-Right Ventricle Pulmonary Artery; ICR: Intracardiac Repair; TOF: Tetralogy of Fallot

Introduction

RV-PA conduit like contegra which is a xenograft from bovine IJV, has varied indications from TOF to complex congenital cardiac procedures like noorwood, Ross etc. RV-PA conduit has limited availability also the sizes available are limited. So we used indigenous made RV-PA conduit created from a polyester graft and a biocore valve in an 18 year old male for ICR TOF with pulmonary atresia post BT shunt. Patient tolerated procedure well and is in regular follow up with RVOT gradient of 36 mm of HG. Much complex congenital heart disease requires a conduit with valve. They are available as CONTEGRA and others. But one can use a bioprosthetic valve with poleyster graft as conduit to overcome limitation of size and availability.

Case Presentation

Sixteen year old male patient admitted with symptoms of NYHA class two dyspnea. Patient was a known case of tetralogy of fallot with pulmonary atresia. Patient had history of left side modified BT shunt done 8 years back with 6 mm PTFE graft. 2D echo was done s/o of complex congenital heart disease with large subaortic vsd of 30 mm with overriding of aorta with pulmonary atresia. MPA 12 mm RPA 7 mm and LPA 9 mm. Bt shunt had flow with gradients of 24 mmhg. Cardiac catch done showed blocked BT shunt, no significant MAPCA and Magoon's index of 1.4. Patient planned for complete intracardiac repair. Patient body surface area of 1.4/m^2. Because of unavailability of Contegra RVPA conduit in India during this period, decision was taken to make artificial RV-PA conduit. Polyester graft of 24 mm and biocore mitral valve of size 21 mm was used. The polyester graft was inturned. The valve was sutured midway to the inturned graft using 2-0 prolene in continuous fashion (Figure 1). RVOT coring was done and VSD was closed with a DVD patch in semicontineous fashion using prolene 4-0 plegdetted suture on CPB. Indigenously prepared RVPA conduit was suture in direction of right ventricle to main pulmonary artery (Figure 2). Patient tolerated procedure well and come off bypass without any problem. Post-opt 2D echo showed good flow across graft with maximum gradient of 10 mm HG (Figure 3). Patient is in regular follow up on antiplatelets with anticoagulant was given initially for 3 months with maintenance of INR between 1 to 2. Then we stopped anticoagulant and continued with antiplatelets. Since one year patient is doing well.

Discussion

The homograft conduit, harvested from human pulmonary artery or aortic tissue, has been

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Figure 1: The Biocore valve size 21 mm was sutured midway between the inverted polyester grafts 24 mm using 2-0 prolene in continuous fashion.

Figure 2: Indigenously made RV-PA conduit first sutured distal end Main Pulmonary artery with prolene 4-0 continuous manner.

the gold standard in Right Ventricle Outflow Tract (RVOT) reconstruction ever since its inception in 1966 [1,2]. However, homografts in the pulmonary position suffer from early calcification, particularly in younger patients, resulting in unavoidable reintervention [3,4]. To address this problem, the Contegra Bovine Jugular Vein (BJV) conduit was developed by VenPro Corp. in 1999, and acquired by Medtronic Inc. in 2001, to supplant the homograft in RVOT reconstruction. Over the last decade, the Contegra conduit has gained acceptance from surgeons internationally because of the availability of an adequate range of sizes (12 mm to 22 mm), the relatively low cost, and the low reported incidence of calcification. Breymann et al. [5] reported a significantly lower conduit-related rate of reoperation after 4 years of follow-up in their Contegra recipients vs. their homograft patients. Brown et al. [6] declared the Contegra their 'conduit of choice' in RVOT reconstruction after reporting excellent early and midterm outcomes [7]. Despite these encouraging results, other centres have reported cases of Contegra recipients returning prematurely to the operating room (OR) due to distal conduit stenosis. Meyns et al. [8] observed severe distal stenosis in 51% of their Contegra recipients at 2 years' follow-up. Gober et al. [9] reported similar findings of supravalvular stenosis, necessitating reintervention in 6 of their 38 Contegra recipients after an average follow-up time of 18 months [10]. In addition, several other groups have identified proximal aneurysmal dilatation of Contegra conduits in the setting of distal stenosis-a novel mode of failure infrequently seen with the homograft or porcine xenografts [11,12]. Consequently, the debate on the Contegra as the long-term RVOT conduit of choice

Figure 3: Postopt 2 D Echo showed good flow across the indigenously made conduit with maximum gradient of 10 mm Hg.

has not ended. In our cardiovascular setup we usually use Contegra bovine valved conduit for surgical correction of severe pulmonic and infundibular stenosis/atresia. Contegra (Medtronic Inc, Minneapolis, MN), a biological valved conduit consisting of a zero-pressure glutaraldehyde preserved heterologous bovine jugular vein with a trileaflet venous valve with natural sinuses. The claimed advantages of this conduit are large variety of sizes available, easy tailoring and suturing, adequate hemodynamics thanks to a favourable effective orifice area, no need for proximal or distal extension.

The Contegra bovine jugular conduit marketed by Medtronic Inc. has now been commercially available for nearly a decade in sizes 12 mm to 22 mm, most commonly used only for a substitute for RVOT. But in year 2015-16 suddenly its importation to India stopped. We started facing difficult in managing the patients of pulmonary atresia. To overcome this difficulty we started making indeginous conduits using polyester graft and bioprosthetic valve. Here we discussed similar case with good early results. But for final conclusion we has to use this indigenously made conduit more frequently in more number of patients and follow the patients for longer duration.

Conclusion

Contegra conduits are costly and have propensity to shrinking and degenerate requiring reoperation sometimes. Indegeneously made RV-PA Conduit is good option in adults when there is unavailability of contegra. It also has longer shelf life and can be prepared from easily available biocore valve. But minimum size biocore valve available is 21mm hence limitation to use in children and infants. Further evaluation is needed in terms of long term results and number of patients. However recent studies in few centres have shown good long term outcome. Manually created RV-PA conduit using artificial grafts become a good alternative in future.

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