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Letter to Editor

Initial experience of using the Invengenx® bovine pericardial tissue patch for common arterial trunk repair

Sir,

Engineered heterografts like bovine pericardial tissue patches are often fashioned into conduits for repairs of complex congenital cardiac defects such as truncus arteriosus (BPTP). Choosing the right graft that has suitable mechanical properties, durability, antigenicity and availability in the right size and shape is a difficult task. We report our initial experience with the new Invengenx® BPTP that is crosslinked using proprietary fixation methodology called elixP™ in a 6-month-old patient with a type 2 TA on whom we performed a truncus repair, closure of ventricular septal defect (VSD) and right ventricular outflow tract (RVOT) reconstruction. A size XM-12 (2×9 cm) Invengenx® BPTP was hand-sewn to prepare a conduit. Distal anastomosis was done between the conduit and the PA confluence. The conduit could be hand-sewn with ease, had optimal thickness and strength and showed good performance as seen on post-operative echocardiography.

Surgery for the repair of common arterial trunk (CAT) is performed using a homograft or a bovine pericardial tissue patch (BPTP) during infancy or early childhood.[1] Homografts are often insufficient and a tissue-engineered graft that has minimal tendency to get calcified, thrombosed, rejected, infected or later fibrosed, may need to be chosen.[2,3] The new Invengenx® BPTP crosslinked using proprietary fixation methodology called elixP™ has shown good performance in a previous study for right ventricular outflow tract reconstruction.[4]

A 6-month old female baby with a history of congenital heart disease born to non-consanguineous parents was brought to us with a history of breathing difficulty and cyanotic spells requiring frequent hospital admissions. She was malnourished and cyanosed, with a heart rate of 123 beats/min, blood pressure 80/50 mmHg, oxygen saturation 72%, a soft S1 and an ejection systolic murmur. Transthoracic echocardiography (TTE) showed a type 2 truncus arteriosus (TA) with a bicuspid truncal valve and mild regurgitation, blind right ventricular outflow tract (RVOT), a large sub-truncal ventricular septal defect (VSD), a patent foramen ovale (PFO) with left to right shunt, left sided aortic arch, adequately large pulmonary arteries (PA) and good biventricular function.

Truncus repair, VSD closure and RVOT reconstruction were performed. After aorto-bicaval cannulation was done and cardiopulmonary bypass commenced, the branch PAs were dissected and looped. Under hypothermia, the aorta was cross clamped (ACC) and antegrade Del Nido cardioplegia was given, following which the aorta was transacted. A very short segment of the main pulmonary artery was noted arising posteriorly. The proximal and distal aorta were anastomosed with 6-0 prolene. The infundibulum was incised and the large truncal VSD was closed with 0.4 mm GoreTex patch. A size XM-12 (2×9 cm) Invengenx® BPTP was hand-sewn to prepare a conduit. The conduit was prepared with a bicuspid pulmonary valve created using 0.1mm polytetrafluoroethylene which was hand-sewn inside the conduit. Distal anastomosis was done between the conduit and the PA confluence using 6-0 prolene stitches. She received conventional and modified ultrafiltration. The CPB and ACC times were 145 min and 87 min, respectively.

The postoperative TTE showed a small residual VSD with a left to right shunt, inter-ventricular gradient of 30 mmHg, a small PFO with bidirectional shunt, turbulence in the distal part of the conduit near the PA confluence with a peak gradient of 30 mmHg (mild stenosis) and moderate pulmonary regurgitation and no pericardial or pleural effusion.[5] The conduit showed good functionality.

Postoperatively, low cardiac output syndrome, acute kidney injury that required peritoneal dialysis and severe pulmonary hypertension (that responded to sildenafil and bosentan) were managed in the intensive care unit and the child went home after 20 days of observation off- oxygen (oxygen saturation >85%), active and on full oral feeds.

We found the Invengenx® BPTP to be of good flexibility, suitable thickness, strength and suturability and had no rejection or infection for the repair of CAT in this case.

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