OUTCOMES OF DIFFERENT CONTEGRA CONDUIT TECHNIQUES IN THE COMPLETE REPAIR OF TETRALOGY OF FALLOT: A SINGLE-CENTER EXPERIENCE

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Objective: This study evaluates the outcomes of Contegra conduit–based techniques in the complete repair of Tetralogy of Fallot in patients in whom preservation of the pulmonary valve annulus was not feasible.

Methods: This retrospective study included 96 patients: 61 patients underwent surgery via median sternotomy (group 1) and 18 patients underwent a minimally invasive right axillary approach (group 2); both groups received fully valved Contegra conduits to replace the native pulmonary valve. Seventeen patients received a Contegra conduit fashioned with a single leaflet (monocusp) to augment the native pulmonary annulus (group 3). All patients underwent transatrial–transpulmonary total repair of Tetralogy of Fallot with Contegra conduit implantation between 2016 and 2025.

Results: The mean follow-up duration was 68.55 ± 16.38 months. Mean age and mean body weight were 7.33 ± 3.06 months and 7.24 ± 2.96 kg, respectively. Preoperative peripheral oxygen saturation (SpO_2) and the pressure gradient across the right ventricular outflow tract and the pulmonary valve were 76.7 ± 6.54% and 96.5 ± 7.43 mmHg, respectively. The incidence of coronary artery anomalies was 7%. The mean Nakata index was 179.84 ± 34.68. The mean preoperative pulmonary valve annulus Z-score was −3.22 ± 0.35. After surgical

enlargement of the pulmonary annulus, postoperative Z-scores ranged from +1 to +3. Aortic cross-clamp time, cardiopulmonary bypass (CPB) time, and duration of postoperative mechanical ventilation did not differ between groups 1 and 2; however, these durations were significantly shorter in group 3 than in groups 1 and 2. Six patients developed low cardiac output syndrome. There were four early deaths, all in group 1, corresponding to an early mortality rate of 4%. No late cardiovascular deaths were observed. During follow-up, eight patients required reoperation. Fourteen cases required catheter intervention (balloon angioplasty) of the main pulmonary artery or branch pulmonary arteries; all of these belonged to groups 1 and 2. There were three cases requiring embolization of collateral vessels. We observed a very low rate of balloon angioplasty of the main or branch pulmonary arteries in group 3, attributable to maximal preservation of the native pulmonary artery. The cumulative freedom-from-reoperation at 102 months for groups 1 and 2 was 84% (95% CI, 78.4–88.3). At 18-month follow-up, all patients in group 3 demonstrated good pulmonary valve function, with no cases of moderate or greater stenosis or regurgitation.

Conclusion: The use of Contegra conduits in total repair of tetralogy of Fallot provides favorable and safe outcomes. Among these, the approach employing a single leaflet harvested from the Contegra conduit while preserving the native pulmonary valve leaflets yielded particularly promising results.