

ABSTRACT

Percutaneous Balloon Valvuloplasty for Critical Aortic Stenosis in a 3.9-kg Infant in Sabah

Ng Lily^{1*}, Rao Siva¹, Shazharn Mohd Zain¹, Ooi Melvin¹

¹ Department of Paediatric Cardiology and Anaesthesiology, Queen Elizabeth Hospital 2, Kota Kinabalu, Sabah, Malaysia

*Corresponding author's email: drlilyng@yahoo.co.uk

Keywords: critical aortic stenosis, ventricular outflow tract obstruction, balloon valvuloplasty

Introduction: Critical aortic stenosis (AS) is very severe narrowing at aortic valve in newborns, causing left ventricular outflow tract obstruction (LVOTO). It is lethal if not treated soon after birth. **Objective:** To determine whether percutaneous BAV is possible for urgent relief of critical AS in newborns with multiple high-risk conditions.

Case description: We report on a first case of transcatheter balloon aortic valvuloplasty (BAV) for critical AS and LVOTO in a 3-month old infant. Baby girl with left ventricular (LV) hypertrophy, severely stenosed bicuspid aortic valve and moderate ventricular septal defect was admitted for angioplasty. A 6-mm balloon was introduced via right femoral artery and hand inflation of balloon was repeated twice. Pre-ballooning LV pressure was 106 mmHg while end-diastolic pressure (EDP) was 7 mmHg, with gradient across aorta of 30 mmHg. Post ballooning LV pressure was 84 mmHg and EDP 7 mmHg, with gradient of 27 mmHg. Initial peak systolic gradient of 80 mmHg was reduced by as much as 50% to 40 mmHg. **Discussion:** Urgent intervention is recommended when LVOT gradient \geq 30 mmHg. There is controversy on the best approach to treat neonatal AS, either by surgery or BAV. The main goal is to preserve the native valve and LV function for as long as possible, before repair or replacement is necessary. Transcatheter BAV, as an initial treatment can reduce the degree of stenosis, and thus peak-to-peak systolic gradient by 50%. Improved catheter technology has reduced mortality.

Transarterial approach is technically easier but requires a larger catheter, complicated by a higher rate of thrombosis. Transvenous approach preserves the femoral arteries for later intervention, but can also be difficult and cause mitral valve injury. McCrindle et al. found that both BAV and surgical valvuloplasty achieved similar survival and re-intervention for restenosis outcomes. Restenosis, defined as peak-to-peak gradient ≥ 50 mmHg, may develop in nearly one quarter of patients. It can be rectified by repeat BAV or surgical valvotomy. Surgical replacement of aortic valve is reserved for severe stenosis in which BAV has

failed, or there is deterioration of LV systolic function. On follow up, baby was thriving well.

Conclusion: In Sabah, percutaneous BAV for urgent relief of critical AS in newborns with multiple high-risk conditions is possible. It is an excellent first line management, especially as surgery here is limited by resources for this young age group. Definitive surgery can be postponed until the low body weight has improved, allowing it to be done more safely. Early discharge is possible with BAV, but careful follow up is needed to detect any recurrence of stenosis and development of significant aortic regurgitation.