Acute Desaturation Following Balloon Angioplasty of Aortic Arch Obstruction after Norwood Surgery.

Penford G., Yong S., Mehta C., Bhole V., Dhillon R., Stumper O.
Birmingham Children's Hospital, Birmingham, UK

Introduction:
Obstruction of the reconstructed aortic arch is a recognized complication after Norwood surgery, this can be addressed by balloon angioplasty prior to stage 2 surgery (cavopulmonary (CP) shunt.) However, the increased afterload created by the arch obstruction can act as an important driving pressure for pulmonary blood flow. Thus, relief of arch obstruction after Norwood may lead to acute desaturation. This report seeks to describe occurrence and management options for this phenomenon.

Methods:
Retrospective, single center case-note review of all post-Norwood patients who underwent balloon angioplasty of aortic arch obstruction between 2008 and 2014. Success of angioplasty was considered a reduction of invasive peak gradient to <10mmHg.

Results:
Norwood surgery was performed in 232 neonates, with 195 surviving to pre-stage 2 catheter (84%). Balloon angioplasty to re-coarctation was performed in 52 (26%) patients, three interventions were unsuccessful, two underwent re-intervention. Of these, 15 (29%) suffered acute severe desaturation (drop of > 10%). One (age <3months) underwent emergency Sano conduit revision, 1 underwent emergency CP shunt within 12 hours, 2 underwent CP shunt <7days, 2 desaturated >10% but were managed conservatively and underwent elective CP shunt. Nine patients (18%) underwent concomitant stenting +/- upsizing of the RV-PA conduit or BT shunt, see figure 1 for example angiography. In these patients, stage 2 surgery was deferred until the child achieved optimum age and weight, (median 54days(31-102)). Two patients had transient complete heart block, one patient had VT requiring DC cardioversion.

Conclusion:
Balloon angioplasty of significant aortic arch obstruction after Norwood 1 surgery can result in acute severe desaturation requiring early intervention. This complication must be anticipated. Concomitant stenting of the RV-PA conduit or BT shunt is an effective technique to address this problem. It is recommended that operators are prepared to stent the RV-PA conduit or BT shunt to avoid emergency conduit revision or high risk early cavopulmonary shunt.