WE'RE GONNA NEED A LONGER STENT- STENTING A LONG, TORTUOUS DUCTUS ARTERIOSUS IN TETRALOGY OF FALLOT AND PULMONARY ATRESIA VIA A TRANSVENOUS APPROACH

Brian Boe,[1], Rachel Taylor,[2], Darren Berman,[3]

[1] Nationwide Children's Hospital, [2] Children's Hospital & Medical Center, [3] Children's Hospital Los Angeles

A family of Jehovah's Witness faith traveled to our institution for delivery of their baby boy with prenatal diagnosis of tetralogy of Fallot and pulmonary atresia in hopes of a bloodless surgical repair. The pregnancy was also complicated by IUGR and the patient was delivered at 36 weeks gestational age with a birth weight of 1.7 g. Post-natal transthoracic echocardiogram confirmed the prenatal diagnosis with confluent branch pulmonary arteries connected to a unique, tortuous ductus arteriosus. A cardiac CT scan nicely showed the ductal anatomy which arose off the left innominate artery from the right-aortic arch and took a tortuous course before connecting with the branch pulmonary arteries (Video 1). The CT scan was used to identify optimal gantry angles for the procedure and long stents were ordered based on the PDA measurements. The patient was referred to the cardiac catheterization laboratory for PDA stent implantation.

A right radial arterial line was placed, and right femoral venous access was obtained. A wedge catheter was used to cross the tricuspid valve, VSD, and aortic valve. The wedge catheter and short sheath were then wire-exchanged for a long sheath which was positioned in the aortic arch. The ductus arteriosus was carefully crossed using a coaxial combination of a directional catheter, microcatheter, and coronary wire. The intracardiac approach introduced many curves into the delivery, resulting in buckling of the long sheath within the heart. Ultimately the ductus was stented using the 4 mm x 28 mm and 4 mm x 8 mm Rebel coronary stents to completely cover all of the ductal tissue (Video 2). The patient recovered well from the procedure and was ultimately discharged home in another state with close monitoring via the CHAMP application.

By 2 months of age, the patient's weight was 3.1 kg and his oxygen saturations had drifted down from the mid 80's to low 70's. As he was too young for a bloodless repair, he was referred back to the catheterization laboratory for intervention. Angiography revealed a mild degree of in-stent stenosis with the stented ductus arteriosus. The stented ductus arteriosus was attempted to be intervened via another intracardiac approach, though the delivery system kept buckling back within the heart. Given the patients growth, we transitioned to femoral arterial access. The entire PDA stent was dilated using a 5 mm balloon, improving systemic saturations. The patient did well following his second catheterization. He was ultimately brought back to our institution at 9 months of age (5.7 kg) for a bloodless, complete repair of tetralogy of Fallot.

Learning points of the procedure

- CT imaging can guide PDA stenting though measurements of the ductus and obtaining optimal gantry angles

- Home monitoring programs can greatly facilitate the management of high-risk outpatients