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Case Report- Ductal stenting to improve pulmonary blood flow Balloon Pulmonary valvuloplasty with critical pulmonary stenosis.

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ABSTRACT: Background- Ductal stenting in pulmonary atresia/ stenosis with intact ventricular septum is a re-emerging and promising technique and avoids surgical morbidity and mortality.
Case Report- We present a two days old baby presented with cyanosis, bradycardia and shock. Child was resuscitated, intubated, Chest X ray showed left sided pneumothorax, for which left sided Inter Costal Drain was inserted. Baby was stabilized. Echo showed critical valvar PS with severe RVH and ASD shunting right to left. Pulmonary valve was dilated with Tyshak II 7mm X 2cm balloon. Forward gradients reduced from 70 mm Hg to 15 mm Hg. Baby was extubated after 24 hours to oxygen by nasal cannula, maintained saturation around 85-90%. Baby started desaturating next day and was started on Prostin infusion, in view of poor RV compliance. On 2/11/2020, he was reintubated and was taken up for PDA stenting. Baby underwent uneventful PDA stenting (3mm X 15mm coronary stent) and saturations improved to 98%.

Keywords: Cyanotic heart disease, Critical Pulmonary stenosis, PDA stenting

I. METHODS-

We had a Term/ AGA/ baby, cried immediately after birth. He developed respiratory difficulty and cyanosis on day 2 of life. Baby was evaluated and was diagnosed to have cyanotic CHD (Duct dependent pulmonary circulation). Baby was started on Prostaglandin infusion and was referred to Artemis hospital for further evaluation and management. Baby presented in a very sick state, on ventilator and on Prostaglandin infusion.

Baby was cyanosed, bradycardiac and in shock. He was resuscitated, reintubated, Chest X ray showed left sided pneumothorax, and left sided sided Inter Costal Drain was inserted. Baby was stabilized. Echo showed critical valvar PS with severe RVH and ASD shunting right to left. Baby was planned for emergency balloon pulmonary valvotomy with informed high risk consent.

Pressure Data - Pre dilatation

Site	S/a mm Hg	D/v mm Hg	Mean mm Hg	Sat %	Po2
RV	72/7				
PA	12	8			
Ao	72	44		92	48

RV Angiogram showed Hypertrophied RV, Critical Valvular PS.
Pulmonary valve annulus was 7.5mm. Balloon dilatation was done sequentially with Coronary balloon size 4 mm x 2 cm followed by TYSHAK II balloon of 7mm x 2 cm. Post dilatation gradient across pulmonary valve was 15 mmHg. RV pressure decreased to 1/3 rd of systemic pressure. Patient tolerated the procedure well. No complications were seen.

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Pressure Data - Post dilatation					
Site	**S/a mm Hg**	**D/v mm Hg**	**Mean mm Hg**	**Sat %**	**Po2**
RV	24				
PA					
Ao	73	44		97	63.5

Baby was extubated after 24 hours to oxygen by nasal cannula and maintained saturation around 85-90%. Baby started desaturating next day and was again started on Prostaglandin infusion, in view of opening PDA and poor RV compliance. He was reintubated and was taken up for PDA stenting after parents consent.

Under all aseptic precautions Right femoral vein and left femoral artery access was taken using 5 Fr and 4 Fr access sheath. Using 4 Fr. Right Judkins catheter Aortogram was done in Lateral view. Aortogram shows PDA with large ampulla and constricted PA end. After accessing PDA dimensions and anatomy under fluoroscopy in multiple views PDA was stented using 3mm/18mm drug eluting stent. Post stenting angio showed adequate flow across PDA and good size branch PAs with good arborization and stable position of stent.

Post procedure hemodynamics were stable and saturation improved to 100% at Fio2 30%, Cath site hemostasis attained. Patient shifted to Pediatric cardiac ICU.

Pressure Data -					
Site	**S/a mm Hg**	**D/v mm Hg**	**Mean mm Hg**	**Sat %**	**Po2**
RV	34	5			
PA	24	13	17		
Ao	82	38	57	98	

Baby was kept on low dose heparin infusion for stent patency.

Baby was not tolerating feeds and had one episode of hematemesis. Hemoglobin dropped to 8gm/dl, for which 2 units of Pediatric aliquots of LDPRC was transfused. Gastric rest was given. After 72 hours, slowly feed was built up.

Baby was discharged on full feeds and hemodynamically stable condition, SpO2=98%.

Followup-

Baby is hemodynamically stable, on mother's feed, SpO2=98%.

Echo showed well opening Pulmonary valve (PG 15 mm Hg), PDA stent was functioning well. RV hypertrophied, Normal LV systolic function.

II. DISCUSSION

Pulmonary valve stenosis (PVS) is a heart valve disorder. In pulmonary valve stenosis the opening is too narrow, leading to a reduction of flow of blood to the lungs. While the most common cause of pulmonary valve stenosis is usually bicuspid Pulmonary valve, it may also be due to a malignant carcinoid tumor. Both stenosis of the pulmonary artery and pulmonary valve stenosis are forms of pulmonic stenosis (nonvalvular and valvular, respectively) but pulmonary valve stenosis accounts for 80% of pulmonic stenosis. PVS is the key finding in Noonan syndrome.

Critical pulmonary stenosis (PS) is one of the life-threatening congenital heart diseases which present during the neonatal period with cyanosis. Surgical valvotomy was once the procedure of choice for critical PS; however, balloon pulmonary valvuloplasty (BPV) has now become the standard treatment.

Duct-dependant circulation in a newborn baby presents as a life-threatening emergency. Neonates with pulmonary valve stenosis/ atresia or aortic valve atresia are born normal at birth. Their circulation is maintained through flow in patent ductus arteriosus (PDA). These patients can survive only if duct patency is reliably maintained for

sometime either by Prostin or ductal stenting before they can be taken up for valvuloplasty or staged cardiac surgical repair.

III. CONCLUSION

PDA stenting saves life not only in duct dependant circulation but also in conditions where desaturation is the main culprit due to poor RV compliance. In our case saturation did not improve after BPV and feed intolerance also started, such a cyanosed patient cannot be sent home without PDA stenting.

Firm decision and quick action in our case was justified although no such case has been reported in the past in literature.

BPV alone does improve saturation but in severely hypertrophied RV waiting for propranolol response could have resulted in catastrophe, so PDA stenting must be considered in such case.

REFERENCES

[1]. Cuypers JA, Witsenburg M, van der Linde D, Roos-Hesselink JW. Pulmonary stenosis: Update on diagnosis and therapeutic options. Heart. 2013;99:339–47.

[2]. Gehan Attia Alsawah MD, Mona M.Hafez MD,Balloon valvuloplasty for critical pulmonary valve stenosis in newborn: A single center ten-year experience.Progress in pediatric cardiology, Volume 43; December 2016, Pages 127-131

[3]. Gewillig M, Boshoff DE, Dens J, Mertens L, Benson LN. Stenting the neonatal arterial duct in duct-dependent pulmonary circulation: new techniques, better results. J Am Coll Cardiol. 2004;43:107–112.

[4]. Gibbs JL. Ductal stenting for restricted pulmonary blood flow in neonates: 15 years on but still a very limited place in clinical practice. Heart. 2008;94:834–835.

[5]. Kan JS, White RI, Jr, Mitchell SE, Gardner TJ. Percutaneous balloon valvuloplasty: A new method for treating congenital pulmonary-valve stenosis. N Engl J Med. 1982;307:540–2.

[6]. Okubo M, Benson LN. Intravascular and intracardiac stents used in congenital heart disease. Curr Opin Cardiol. 2001;16:84–91.

[7]. Rao P.S. Percutaneous balloon pulmonary valvuloplasty: state of the art. Catheter Cardiovasc Interv. 2007;69:747–763.

[8]. Schneider M, Zartner P, Sidiropoulos A, Konertz W, Hausdorf G. Stent implantation of the arterial duct in newborns with duct-dependent circulation. Eur Heart J. 1998;19:1401–9.