Successful Emergent Aspiration of Thrombus for Postoperative Superior Vena Cava Obstruction Presenting Life-threatening SVC Syndrome in Early Infancy

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[Clinical Information]
Patient initials or identifier number: 13060966

Relevant clinical history and physical exam:
After fetal diagnosis of transposition of great arteries with restrictive atrial communication, the patient was delivered in the 38th week and performed balloon atrial septostomy immediately after birth. However, the patient was complicated with persistent pulmonary hypertension (PPHN) and presented with severe cyanosis. Extracorporeal membrane oxygenation had been needed for two weeks to get rid of PPHN. An arterial switch operation (ASO) was performed sixteen days after birth, while pleural effusion persisted after ASO. Severe chylothorax and metabolic acidosis were suddenly appeared with severe edema in the head, neck and upper limbs, which suggested acute SVC obstruction.

Relevant test results prior to catheterization:
Central venous pressure was 26mmHg. Blood gas analysis revealed severe metabolic acidosis.

Relevant catheterization findings:
Venography showed complete occlusion of SVC. A Radifocus® guide wire was barely passed through the site of occlusion, over which PTA was performed. However, many thrombi remained on the vessel wall, which caused residual stenosis.

[Interventional Management]
Procedural step:
We considered stent implantation for the stenotic SVC. However, it was not feasible for this small infant because he is too small to implant a stent with adult-size potential. We advanced the 4Fr short sheath introducer (Terumo, Tokyo, Japan) from right jugular vein to the stenotic site and aspirated thrombus using the sheath. After removing a lot of thrombi, we advanced the sheath introducer from right jugular vein to the stenotic site and aspirated thrombus through the sheath. Many thrombi were aspirated. 4Fr sheath had enough inner diameter to aspirate the thrombi as alternatives to thrombus aspiration catheters. Final venography showed no residual stenosis and thrombi. Fifty-six days after thrombectomy, venography revealed complete patency of SVC. SVC obstruction in early infancy may be difficult to maintain patency and require frequent interventions. The Combination of PTA and transcatheter thrombectomy may be feasible choice immediately after the obstruction of SVC.

Case Summary:
We report successful transcatheter aspiration of thrombus combined with percutaneous transluminal angioplasty (PTA) for an infant complicated by superior vena cava (SVC) obstruction in postoperative period presenting critical SVC syndrome. After fetal diagnosis of transposition of great arteries with restrictive atrial communication, the patient was delivered in the 38th week and performed balloon atrial septostomy immediately after birth. However, the patient was complicated with persistent pulmonary hypertension (PPHN) and presented with severe cyanosis. Extracorporeal membrane oxygenation had been needed for two weeks to get rid of PPHN. An arterial switch operation (ASO) was performed sixteen days after birth, while pleural effusion persisted after ASO. Severe chylothorax was emerged on the thirty-sixth days of his life, while central venous pressure was elevated acutely followed by severe edema in the head, neck and upper limbs, which suggested SVC obstruction. After confirming the complete occlusion of SVC by venography, a Radifocus® guide wire was passed through the site of occlusion, over which PTA was performed. After PTA, venography showed residual stenosis and thrombus on the vessel wall. We advanced the sheath introducer from right jugular vein to the stenotic site and aspirated thrombus using the sheath. After removing a lot of thrombi, final venography showed no residual stenosis and thrombi. Fifty-six days after thrombectomy, venography revealed sufficient patency of SVC. SVC obstruction in early infancy may be difficult to maintain patency and require frequent interventions. Combination of PTA and transcatheter thrombectomy may be feasible choice immediately after the obstruction of SVC.

Transcatheter Treatment of Complete Occlusion of the Left Pulmonary Artery by Extension of Ductal Tissue

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[Clinical Information]
Patient initials or identifier number: K Lee

Relevant clinical history and physical exam:
He was born at gestational age 35wks in birth weight 2.8kg as NSVD. Echocardiographic examination was done due to audible cardiac murmur and desaturation, which revealed pulmonary atresia with VSD, and short MPA segment and conflueny of branch pulmonary arteries. At 24 HD, he received conduit insertion between right ventricle and pulmonary artery.

Relevant test results prior to catheterization:
On the cardiac CT taken at POD 6th, showed total occlusion at proximal LPA.

Right ventriculogram showed complete obstruction at proximal LPA suggesting ductal constriction.
Procedural step:
We passed the occluded segment with Grandslam Ashahi 0.014” guide wire, and then did staged balloon angioplasty with 1.2mm and 2.5mm coronary balloon. Finally we put the 4mm*12mm stent at the occluded segment successfully.

Relevant test results prior to catheterization:
The chest X-ray showed CT-ratio of 0.7 with a huge main pulmonary trunk. ECG demonstrated right axis deviation, presence of rsR’ in V1, ST depression in right precordial leads. CT-angiogram showed inlet-perimembranous VSD 24 mm with bidirectional flow, PDA 12 mm with bidirectional flow, severe juxta-ductal COAT and very huge MPA compressed left main bronchus. Echocardiographic findings were similar to CTA and also confirmed a systemic pulmonary arterial pressure with severe right ventricular hypertrophy.

Interventional Management
Procedural step:
Cardiac catheterization showed PA pressure 124/52 (79) mmHg, AAO pressure 108/66(9) mmHg, DAO pressure 80/64 (72) mmHg, Qp:Qs 1.3, PVR 18 U.m², Rp:Rs 0.6. Descending aortogram showed angiogram showed severe juxtaductal COAT 6 mm with post-stenotic dilation 23 mm and PDA 10 mm. Diameter of DAO below 3rd aortic branch 18 mm and DAO diameter at diaphram 15 mm.
Severe PAH in this patient may contributes from 3 major factors: large VSD /PDA, severe left sided obstruction, and high PVR. We decided first to put covered self-expandable stent (Advanta V12 Atrium stent 16x61) and post-dilate with Z-Med balloon 23x30 mm to minimize DAO obstruction and PDA flow. Then, started oral sildenafl (or other pulmonary vasodilators) for at least 6 months and repeat flow/resistance assessment again to assess feasibility of VSD closure.

Case Summary:
VSD, severe coarctation of the aorta and PDA with severe PAH. Successful covered stent placement at COAT. VSD will reassess the feasibility for closure in 6 months after oral sildenafl treatment as a priming pulmonary vasodilator.

Case 1
Due to very limited material, we decided to use ADO 6-4 via delivery sheath 6 fr. But the delivery sheath could not pass through PDA.
We tried to snare the PDA aortic tip and made it pass the PDA, itself. And successful implantation was done.