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Using the chronic total occlusion (CTO) technique to recanalate totally occluded pulmonary artery in a patient after Fontan operation

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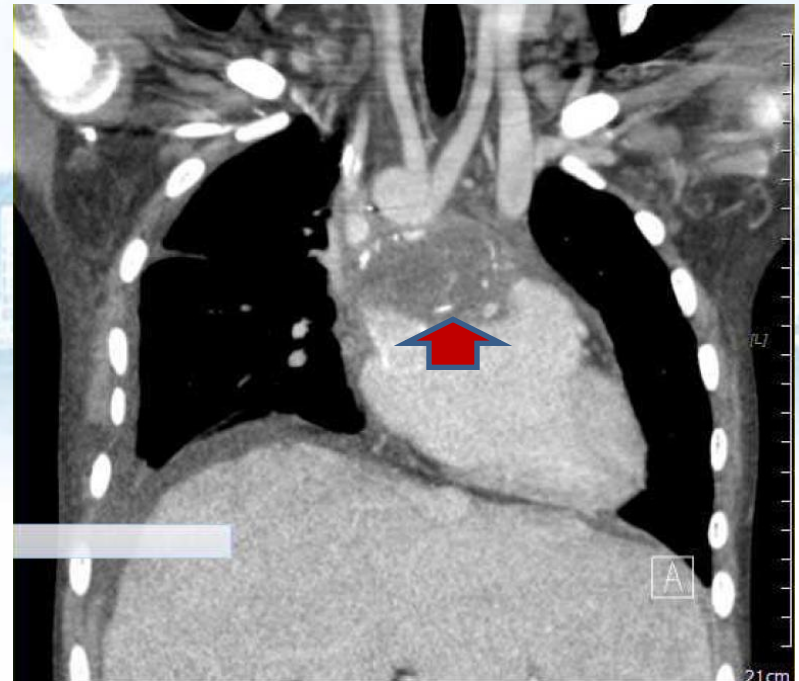


Introduction

- Protein-losing enteropathy (PLE) is a rare but life-threatening complication after the Fontan operation.
- It is speculated that the elevated systemic venous pressures associated with the Fontan circulation cause the intestinal protein loss by increased pressures in the enteric lymphatic system.
- Patients who have had a Fontan operation may not tolerate even mild obstructions within the Fontan circulation.

Case Background

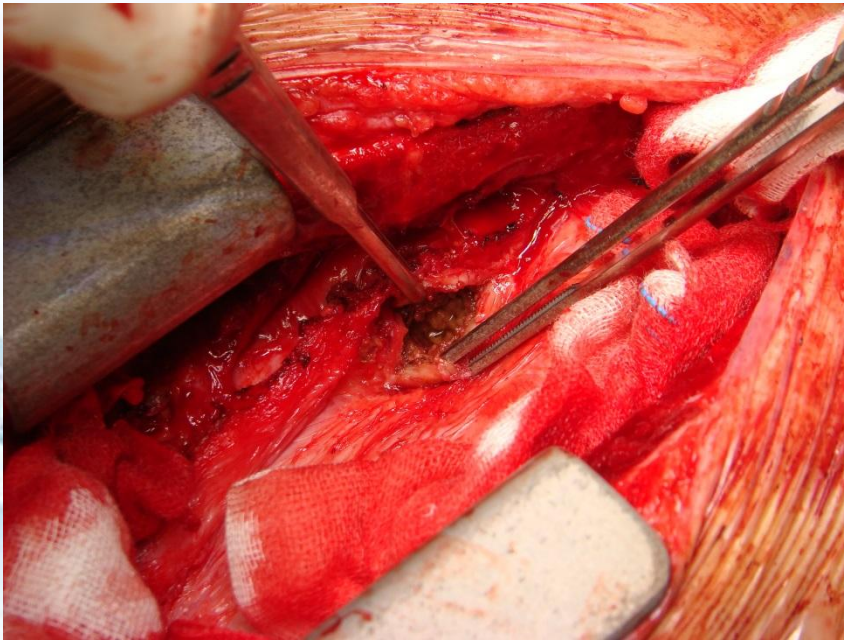
- A 13-year-old girl patient with right atrial isomerism (common AV valve, single ventricle, ECD, TGA with severe PS, R't arch) post right BT shunt in infancy and then TCPC procedure at 10-year-old.
- Protein-losing enteropathy (PLE) was found at 12-year-old (2 years later).
- Chest computed tomography (CT) was done to evaluate.



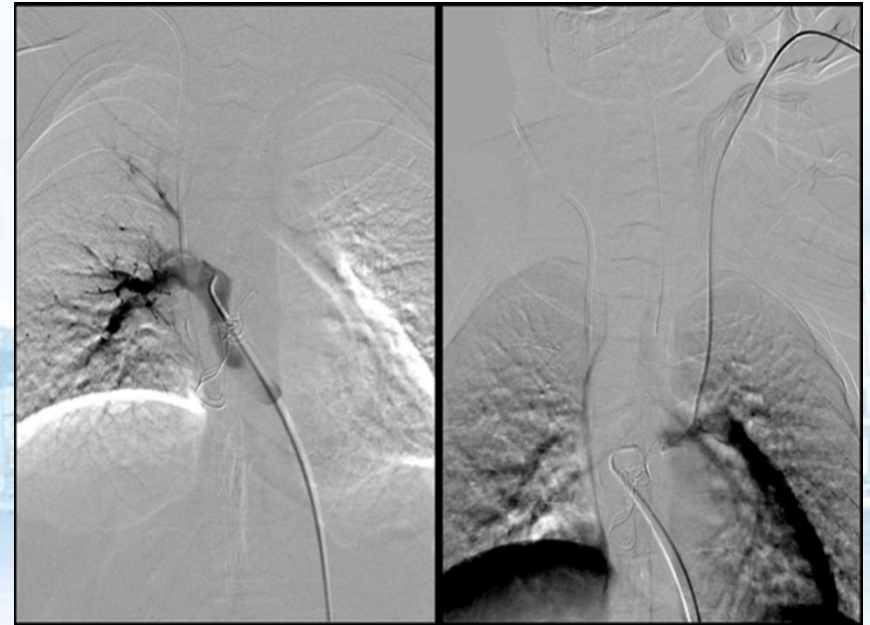
(A) Before TCPC: intact pulmonary artery (B) After TCPC: a heterogeneous mass

Hybrid Procedure

In the hybrid procedure room, the surgeon removed the heterogeneous hematoma (Fig. A), the angiogram from IVC and left SVC still revealed no communication of right and left pulmonary arteries (Fig. B).



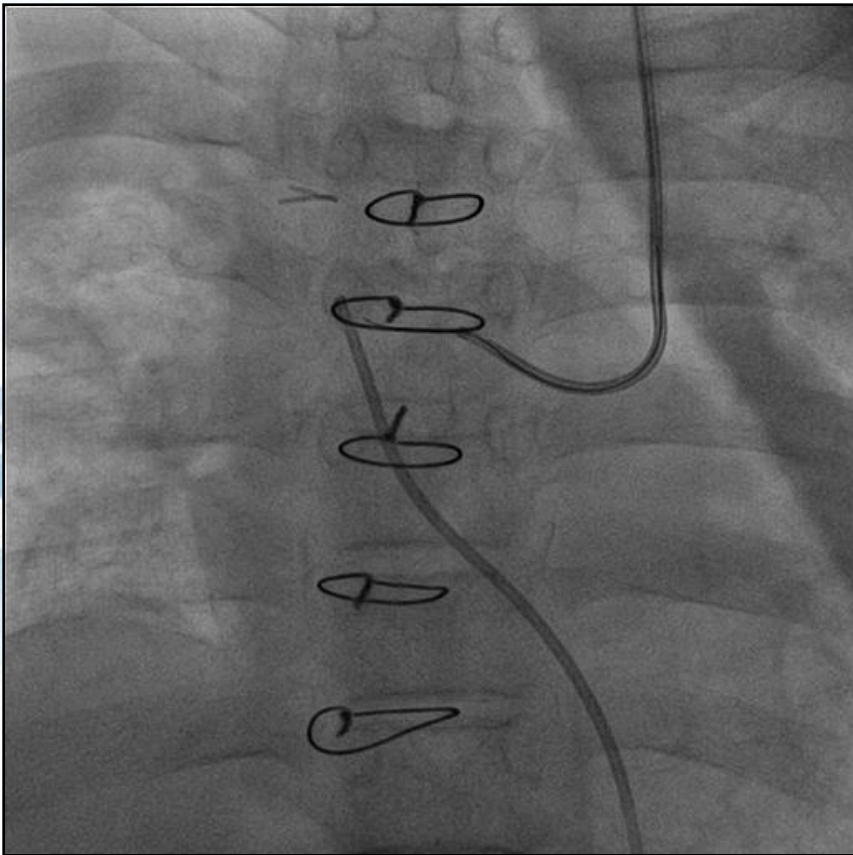
(A) The heterogeneous hematoma



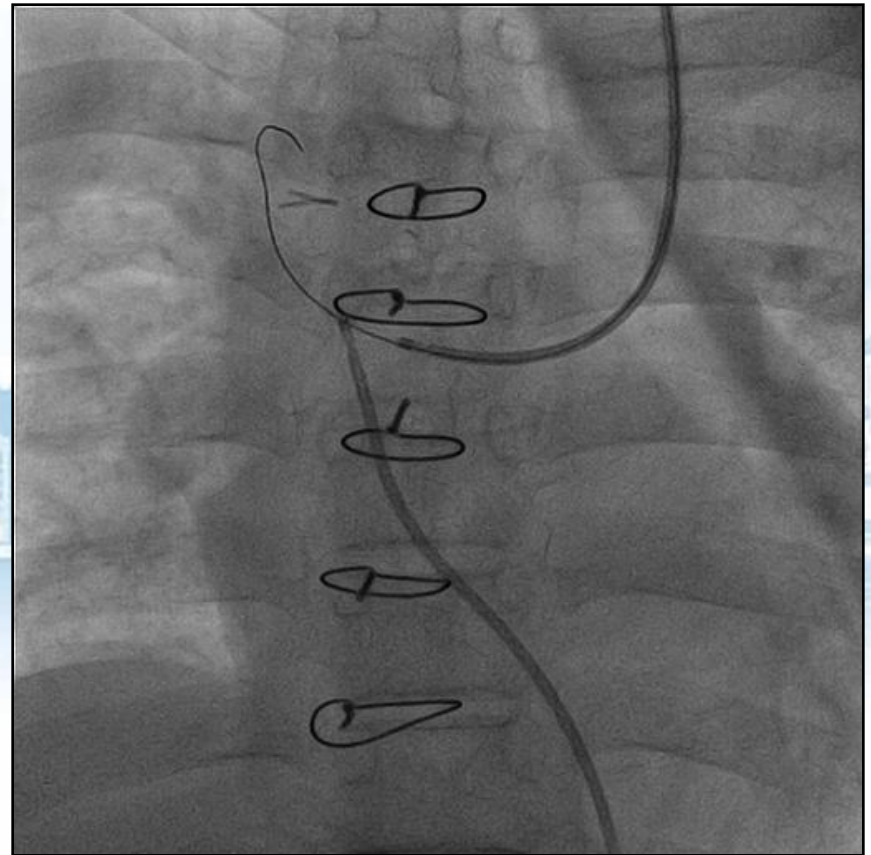
(B) IVC angiogram and left SVC angiogram showed no communication flow

The Chronic Total Occlusion (CTO) Technique

A 0.018cm V-18 wire to penetrate through the confluent PA (Fig A) and guide the multipurpose catheter to reach the RPA (Fig B).

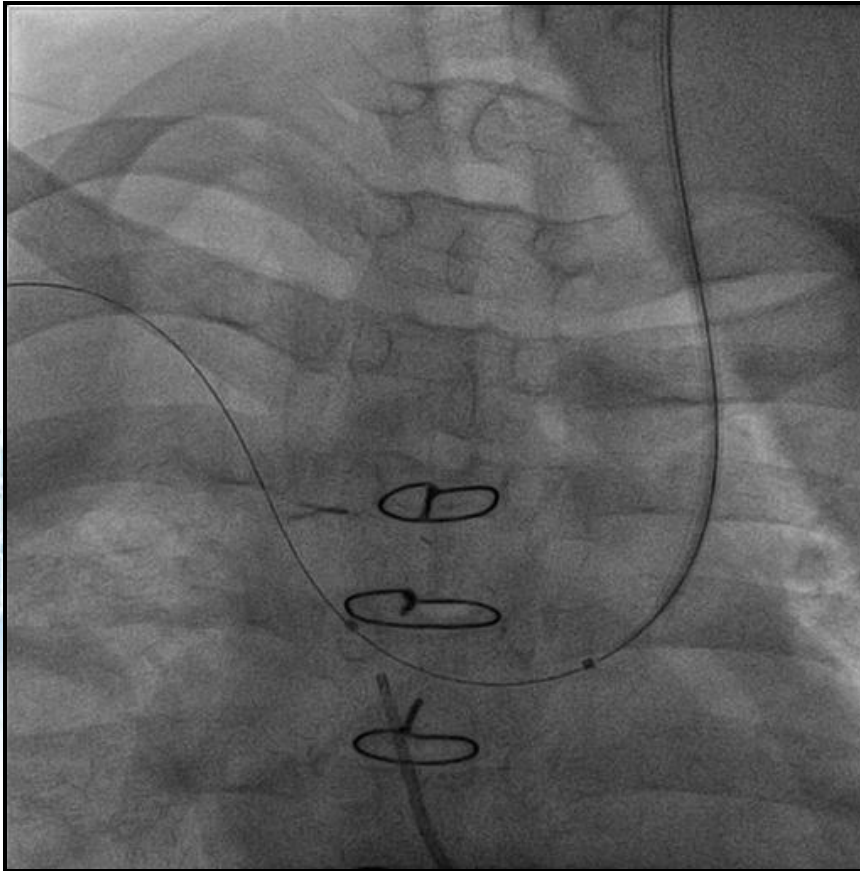


(A)

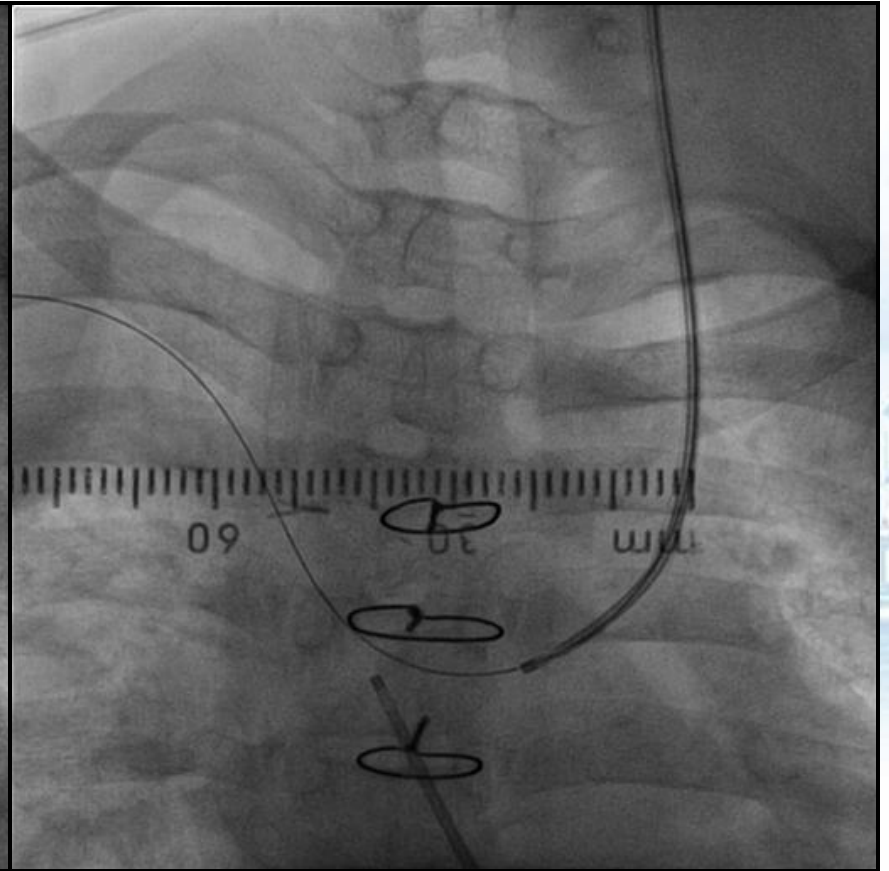


(B)

Stenotic PA--Balloon Dilation

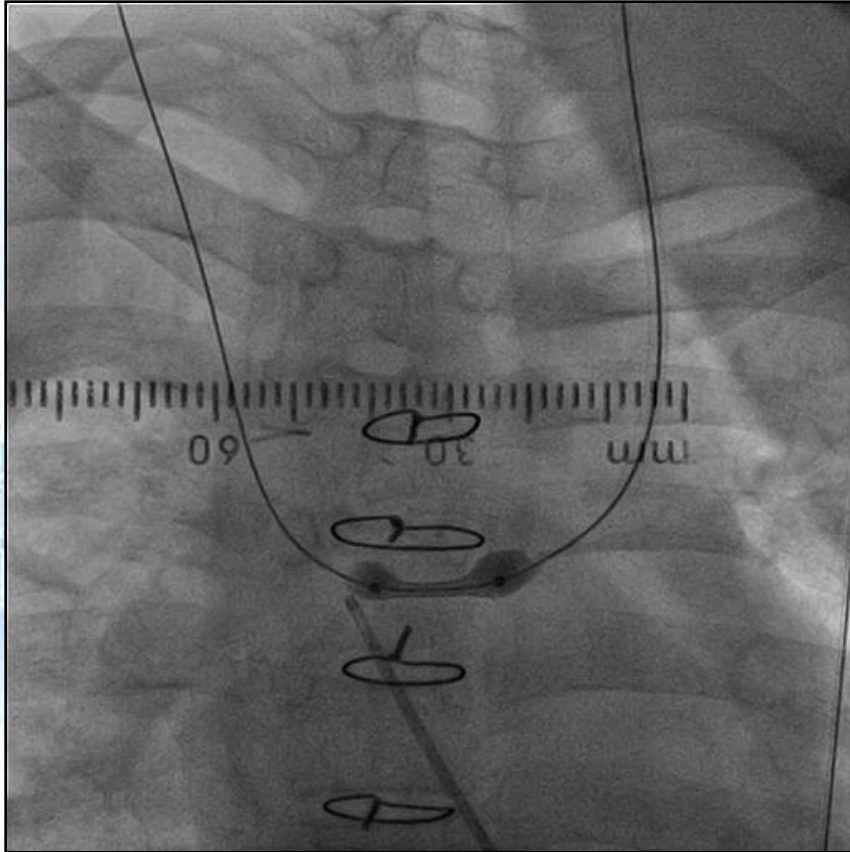


(A) Mustang balloon dilation

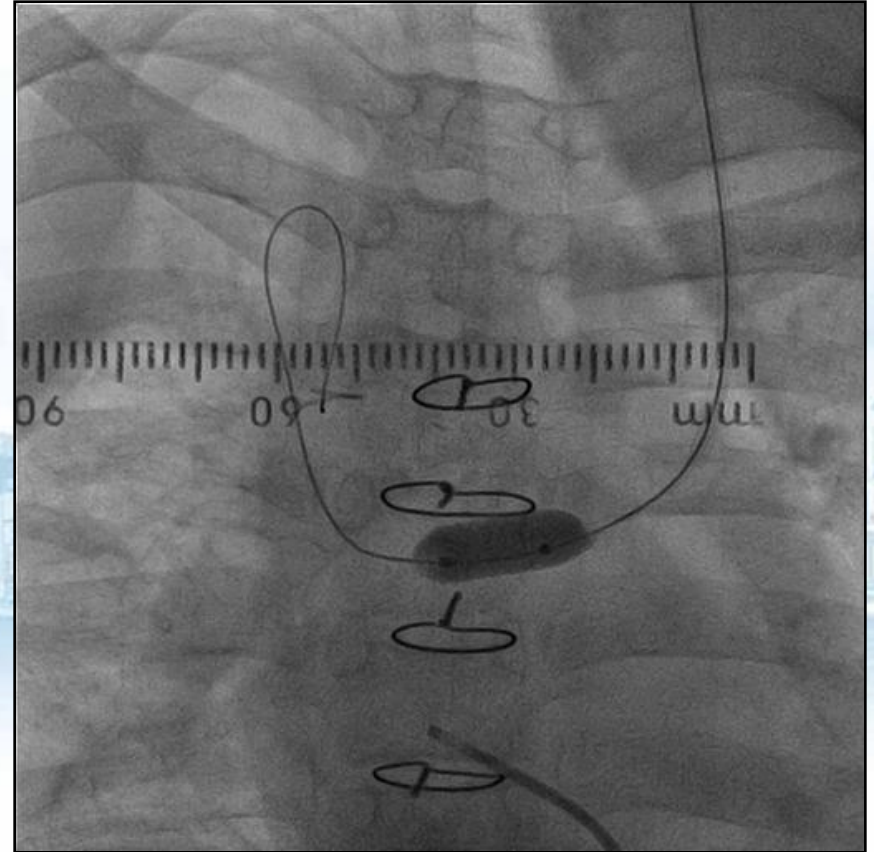


(B) Left SVC angiogram revealed flow from LPA to RPA

Stent deployment

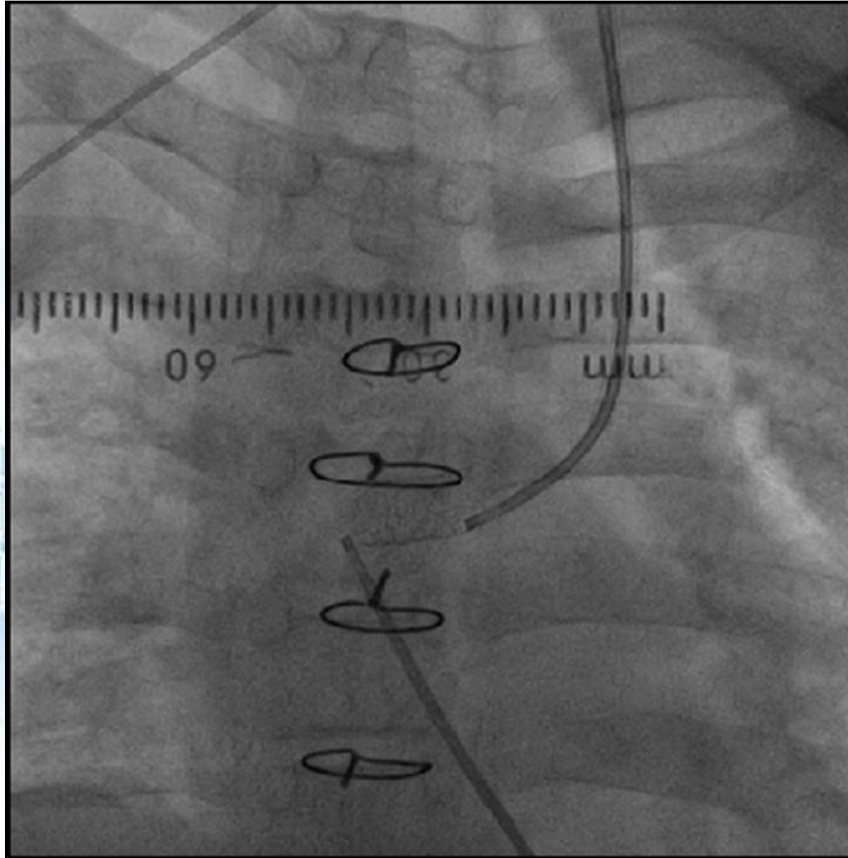


(A) Scuba stent 9mm*18mm was put in pulmonary artery

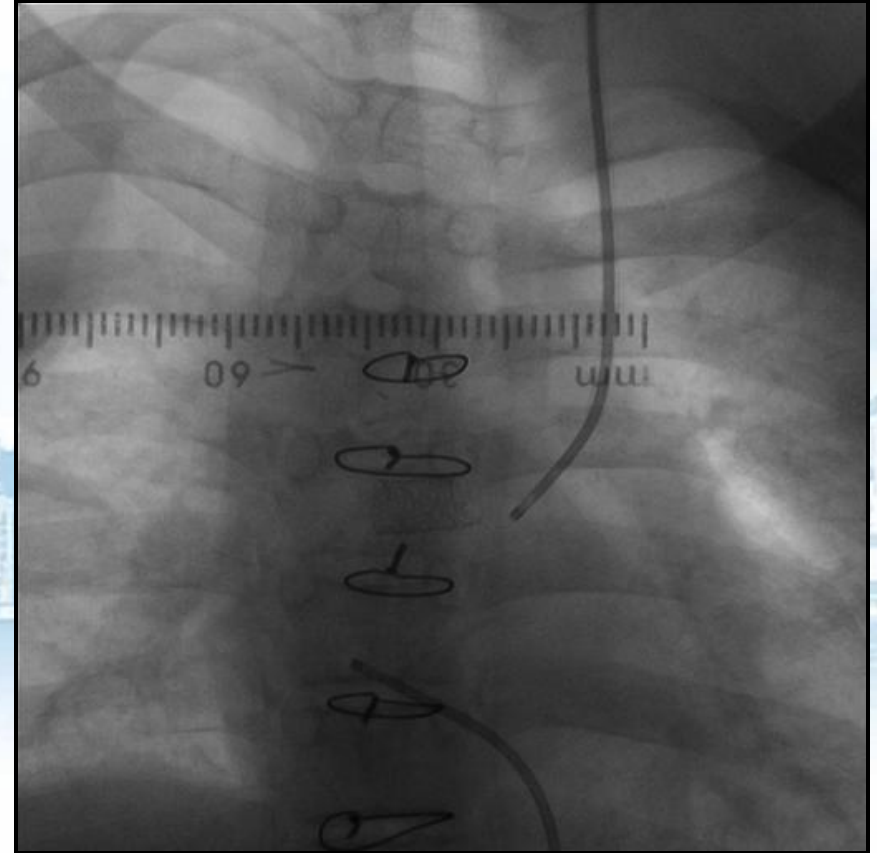


(B) Wanda balloon 10mm*20mm to further dilate this stent

Stent deployment



(C) Scuba stent 9mm*18mm was put in pulmonary artery



(D) IVC angiogram revealed patent RPA to LPA flow

Discussion and Conclusion

- Treatment of protein-losing-enteropathy (PLE) targets the underlying disease in the Fontan patients.
- Correction of anatomy and physiology problems could improve the PLE symptoms.
- Hybrid methods and current interventional procedure could relieve obstruction and improve clinical condition.



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