Percutaneous Veno-Pulmonary Artery Support for Post-Cardiotomy Right-Ventricular Failure in Situs Inversus Totalis

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Background

Situs inversus totalis (SIT) can complicate hemodynamic assessment and procedural orientation because thoraco-abdominal anatomy is mirrored. We report the feasibility and short-term clinical course of ProtekDuo-based veno-pulmonary artery (V-PA) extracorporeal support for refractory post-cardiotomy RV failure in a patient with SIT.

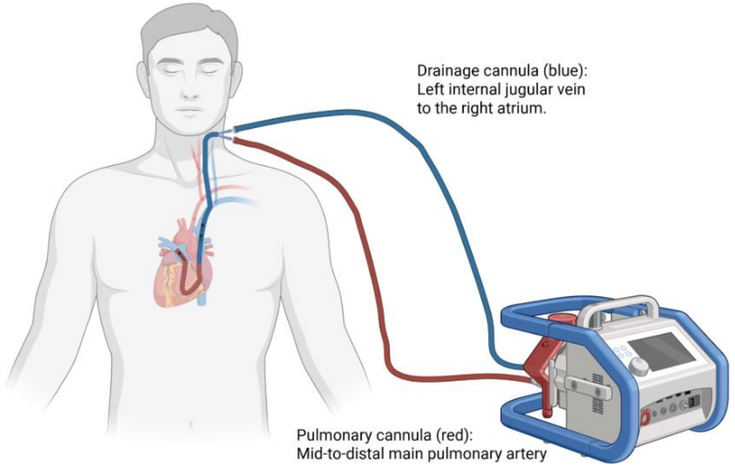
Clinical Case

A 67-year-old man with SIT, an ascending aortic aneurysm, moderate-to-severe aortic stenosis, and atrial fibrillation underwent ascending aorta repair, aortic valve replacement, right coronary artery bypass grafting, and left-atrial appendage closure. On POD 2, he developed shock with blood pressure 65/45 mmHg, escalating vasopressor needs, and CVP 28 cm H2O. TTE showed an intrapericardial hematoma compressing the RA and RV; mediastinal exploration and hematoma evacuation produced only transient improvement. On POD 3, cardiac index was 0.81 L/min/m² and TEE showed severe biventricular failure, LVEF 25–30%, TAPSE 0.74 cm, rising pulmonary artery pressures, and PAPi 0.75. After reversible causes were excluded, a 29-Fr ProtekDuo was placed via the left (anatomic right) internal jugular vein under fluoroscopic and echocardiographic guidance, and V-PA support was initiated.

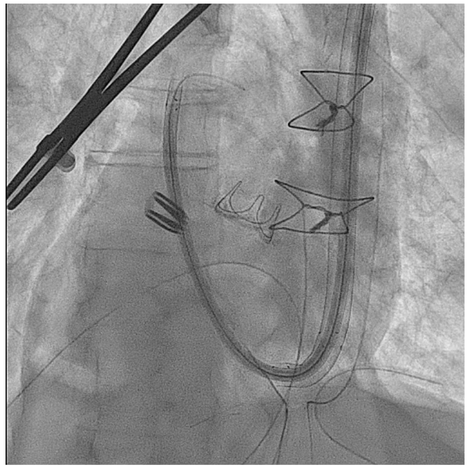
Discussion

The mirrored anatomy required deliberate adjustment of imaging orientation to confirm cannula position and maintain effective pulmonary-artery flow with right-ventricular unloading. Hemodynamics normalized promptly after support initiation, and vasopressors were weaned. By POD 4, TAPSE improved to 0.89 cm and LVEF to 40–45%; by day 6, LVEF was 55–60% with near-normal RV size and function. The patient was decannulated on day 9 and discharged to long-term acute care. This case supports the technical feasibility of ProtekDuo-facilitated V-PA support in SIT when multimodality imaging is adapted to mirrored anatomy.

ProtekDuo veno-pulmonary artery configuration



Fluoroscopic cannula position in mirrored anatomy



Clinical Trajectory:

- POD2: shock with BP 65/45 mmHg and CVP 28 cm H2O; intrapericardial hematoma evacuated
- POD3: cardiac index 0.81 L/min/m², LVEF 25–30%, TAPSE 0.74 cm, PAPi 0.75; ProtekDuo V-PA support initiated
- POD4: TAPSE improved to 0.89 cm and LVEF to 40–45%; vasopressors discontinued
- POD6: LVEF 55–60% with near-normal RV size and function
- POD9: decannulated and subsequently discharged to long-term acute care

Conclusion

In refractory post-cardiotomy RV failure with SIT, ProtekDuo-facilitated V-PA support was technically feasible and was associated with rapid hemodynamic stabilization, recovery of ventricular function, and successful decannulation when fluoroscopic and echocardiographic guidance were adapted to mirrored anatomy.