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Interventional retrieval of a balloon-expandable stent in an infant following Tetralogy of Fallot repair

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Percutaneous interventions with pulmonary stent deployment in infants are rescue procedures for critically ill patients with poor reoperation outcomes. A stent dislodgment can lead to significant complications requiring cardiac surgery and may be a result of technical difficulties, anatomical challenges, improper stent size or type (e.g., self-expanding stents may have a higher risk of dislodgment compared to balloon-expandable stents) [1–4].

A 10-month-old female infant was referred for Tetralogy of Fallot repair. In medical history, anoxemic attacks were observed at the age of 8 months requiring beta blocker therapy and interventional percutaneous balloon angioplasty for right ventricular outflow tract (RVOT) obstruction. Transthoracic echocardiogram, coronarography and computed tomography revealed an additional coronary artery from the right coronary artery crossing RVOT which made the surgery challenging. The repair was performed in cross clamp circulation. Right ventriculotomy was necessary with double patch technique (below and above coronary artery crossing RVOT)

avoiding myocardial infarction. Postoperative transthoracic echocardiogram showed residual subpulmonary and proximal pulmonary branches stenosis requiring reoperation with muscular band resection and pericardial patch plasty for pulmonary arteries. Postoperative RV failure was still present due to residual outflow obstruction, pulmonary branches stenoses, severe pulmonary and tricuspid valvular regurgitation.

The child was qualified for heart catheterization. The right femoral vein was punctured, 6F sheath was introduced and anticoagulation ensured with heparin infusion 50 U/kg. Hemodynamic evaluation revealed high central venous (16 mm Hg) and RV pressures (80% of systemic pressure) with pressure gradient across RVOT of 18 mm Hg. Right ventriculography confirmed residual subpulmonary as well as both pulmonary branches stenoses (Figure 1A–C). The child was qualified for pulmonary branches stent implantation. A Palmaz Genesis 8 mm/12 mm stent was supposed to be deployed into the right pulmonary artery. However, the stent was unstable while crossing RVOT and slipped partially from the balloon catheter without any chances for removal through the 6F sheath. We considered different options for stent retrieval including surgical cross clamp circulation, interventional forceps, Gooseneck snare loop or stent deployment in a peripheral vein (e.g. iliac or femoral vein with high risk of thrombosis and occlusion). The right jugular vein was punctured and a wide 9F sheath was introduced. An Amplatz Gooseneck snare 7 mm loop was established over 0.018 inch guidewire. The balloon-expandable stent was gently inserted into 9F sheath and removed from the body (Figure 1D–E). Finally, a Palmaz Genesis 8 mm/15 mm stent was deployed successfully into right pulmonary artery over 0.035 inch guidewire providing effective pulmonary flow (Figure 1F) and RV pressure drop to 60% of systemic pressure. The left pulmonary artery was bent without the chance for interventional balloon plasty or stent deployment. The general condition of the child had improved and was discharged home within 2 weeks. Reoperation with valved prosthesis implantation and residual muscular band resection was postponed for a few months.

The gooseneck snare devices and wide sheaths are used routinely to retrieve dislodged stents from the circulation. The presented case shows the clinical benefit of successful procedure without necessity for the repeat, open surgery.

Supplementary material

Supplementary material is available at https://journals.viamedica.pl/polish_heart_journal.

Article information

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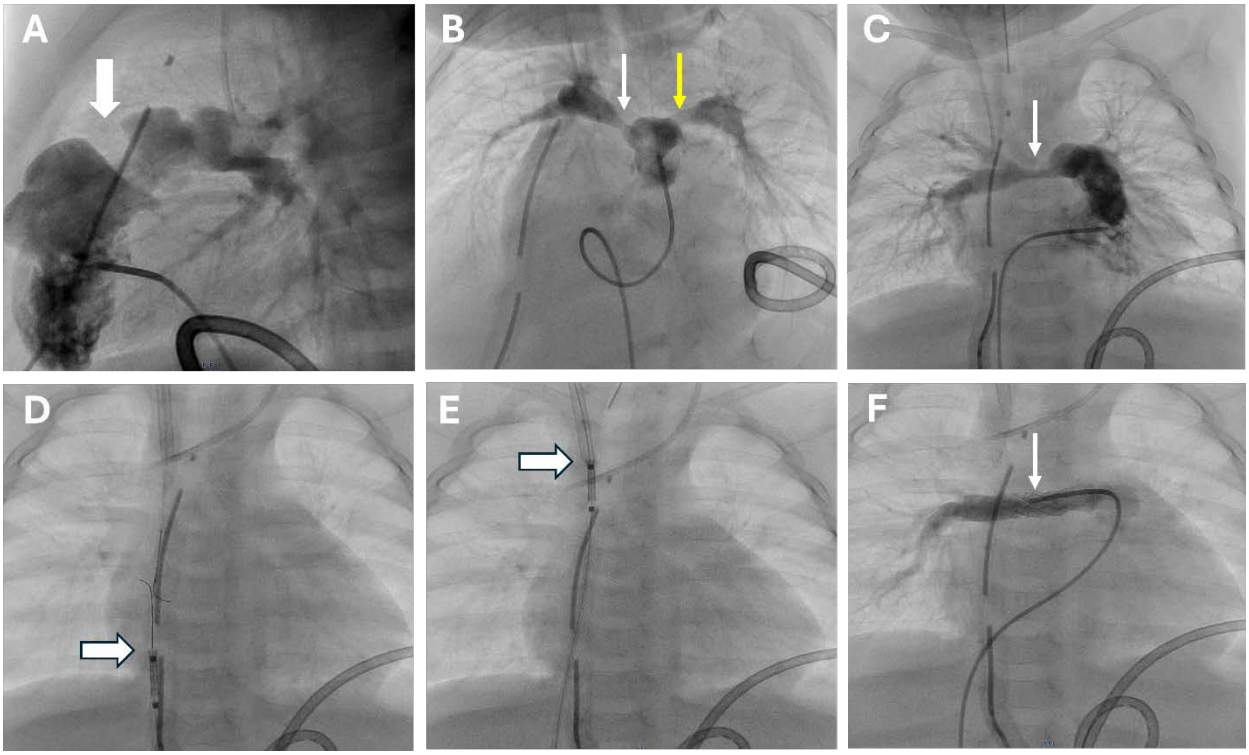

Figure 1. Stent retrieval with a Goose snare loop in an infant following Tetralogy of Fallot repair with residual subpulmonary and both branches stenosis. **A.** Right ventriculography in lateral view showing dilated right ventricle with residual subpulmonary stenosis just below the localization of the coronary artery crossing right ventricle outflow tract (white arrow). **B.** Pulmonary trunk angiography in cranial view (40 degrees) revealing right (white arrow) and left (yellow arrow) pulmonary branches stenosis following surgical plasty. **C.** Right ventriculography in anteroposterior view showing severe right pulmonary artery stenosis (white arrow). **D.** A stent partially slipped from the balloon catheter over 0.018 inch guidewire. **E.** The stent inserted into 9F sheath over Goose snare loop. **F.** Right pulmonary artery angiography following Palmaz 8 mm/15 mm stent deployment.