Difficult decisions.

Percutaneous closure of Postinfarction Ventricular Septal Defect
– peri-procedural and long-term observation

Michał Gałęczka, Dominika Rokczyk, Mateusz Knop, Linda Litwin, Roland Fiszer, Małgorzata Szkutnik, Jacek Białkowski

1. Department of Congenital Heart Defects and Pediatric Cardiology, School of Medicine with the Division of Dentistry in Zabrze, Medical University of Silesia, Katowice, Poland
2. Department of Congenital Heart Defects and Pediatric Cardiology, Silesian Center for Heart Diseases, Zabrze, Poland

Introduction

Postinfarction Ventricular Septal Defect (PIVSD) was described for the first time in 1953 and since then it has been one of the most challenging clinical problems of cardiology, affecting even children. PIVSD is a rare and severe complication of myocardial infarction (MI), occurring usually 3 to 5 days after MI and bringing 94% mortality of conservative approach and 47% mortality of surgical treatment. PIVSD scar healing is divided into three periods: acute (up to 3 weeks, with very fragile borders), subacute (3-12 weeks) and chronic (more than 12 weeks, firm borders). Since first PIVSD operation in 1957 (Denton Cooley), early surgery has been the first method of treatment of such demanding patients (pts; AHA 2013 guidelines). In 1988 James Lock used Rashkind PDA Device to close PIVSD percutaneously, creating alternative solution (ESC 2014 guidelines; IIB/C).

Transcatheter closure (TC) of PIVSD can be a good alternative to surgery in selected pts.

Materials and methods

All data of 26 consecutive pts (64.6±10y; 9 female) in whom TC of PIVSD was attempted in our center between 2000-2015 were retrospectively analyzed. Initially, all pts were in NYHA III or IV, including 18 pts with cardiogenic shock and 4 pts with recanalization of previously operated PIVSD. Every pt had coronary arteries angiography performed before TC, subsequently: 12 pts PCI, 6 pts CABG (in 4 pts simultaneously with PIVSD surgical closure). Mean time between PIVSD occurrence and its TC was 10±5 weeks (2-36); most of pts were in subacute phase of scar healing (Fig.1). Mean PIVSD diameter was 11.4±3.8mm (5-21mm) in angiography.

Implants used during TC: 16 Amplatzer Atrial Septal Occluders, 4 Amplatzer Postinfarction VSD Occluders, 2 Amplatzer Muscular Ventricular Septal Occluders, 1 Amplatzer Cribriform Septal Occluder, 2 Cardi-O-Fix ASD Occluder, 1 Cera ASD Occluder (Fig.2). All procedures (80-220min; mean time 141min) were performed under fluoroscopic (10-87min; mean time 39min) and TEE guidance in routine sequence: LV ventriculography with PIVSD measurement (Fig.3), defect crossing form RV (13 pts) or LV (12 pts) (Fig.4), arterio-venous loop creation with the use of lasso (12 pts) (Fig.5), calibration (17 pts; dynamic - OBW balloon or static – sizing balloon) (Fig.6) and implantation (Fig.7,8).

Results

Twenty (74%) from 26 attempted PIVSD TCs were technically successful with significant residual shunt in 4 (multiple defects) and medium residual shunt in 3 pts. Procedure was abandoned because of unfavourable apical morphology with septum dissection in 2 pts, because of occluder instability between very fragile defect’s borders in 2 pts (acute phase) and because of large PIVSD diameter in 2 pts (including 1 embolization to PA, implant retrieved surgically). No peri-procedural death, embolization in 1 pt, VF in 4 pts (revealed after defibrillation), VT in 6 pts (revealed after cardioversion), transient III grade AV block in 3 pts and transient hemolysis after TC in 1 pt were noticed. Significant immediate improvement occurred in 14 pts and they were discharged from hospital but 6 pts died before discharge because of increasing multiorgan failure. Mean follow-up was 5,2±4,4y (0,2-15 years), during which 4 pts needed reintervention (percutaneous – 2 pts (Fig.9), surgical - 1 pt and both – 1 pt).

Conclusions

Transcatheter PIVSD closure is a feasible procedure and should be limited to properly selected pts - acute phase of PIVSD is not a proper period to perform TC. Amplatzer Atrial Septal Occluder™ seems to be suitable for most pts in subacute or chronic phase. Multiorgan failure is one of the leading reasons of unsuccessful pts’ outcome.

Key words

postinfarction ventricular septal defect, transcatheter closure, long-term observation

51st Annual Meeting of the Association for European Paediatric and Congenital Cardiology

Authors have no potential conflicts of interest to report.