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Case Report

The Nightmare in Defect Occlusion by Transcatheter: A Case Report

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ABSTRACT

Background: Atrial septal defect (ASD) closure with the transcatheter procedure is the first choice in patients who meet the criteria for insertion. Closure using this method is relatively safe and has low complications. Several factors must be considered so that this closure action can be optimal.
Case presentation: A 24-year-old woman came with shortness of breath during strenuous activities 3 years ago. Transthoracic echocardiography showed a gap in the interatrial septal gap 1.7 cm - 1.9 cm. The patient then underwent transesophageal echocardiography (TEE) and right heart catheterization (RHC). The patient was planned for percutaneous ASD closure with zero fluoroscopy technique. The patient was punctured on the right femoral vein, and ASD occluder memopart no 24 mm was inserted. A wiggle test was performed, and the occluder was correctly installed. When the device was detached, the patient's blood pressure dropped to 75/52. On TEE examination, pericardial effusion was found then pericardiocentesis was performed immediately with the evacuation of 600 ccs of pericardial fluid. The patient was then observed in the intensive cardiovascular care unit (ICVCU), and there was no additional pericardial fluid during observation.
Discussions: ASD closure can be done by percutaneous or surgery. Closure by percutaneous technique is the primary option. Complications and admission period is shorter than surgery. Preparation and procedural time are closely related to clinical outcomes.
Conclusion: Observation and knowledge of the procedure's risks are very important to detect complications and optimize clinical outcomes.

1. Introduction

In children and adults, atrial septal defect (ASD) becomes one of the two most common congenital heart defects.[1,2] ASD causes approximately 8% to 10% of congenital heart defects.[3] When catheter intervention for ASD was first used in the late 1990s, it became an alternative to surgery.[2] ASD repair with transcatheter has become a common practice in recent years.[4] Technically safe and feasible closure of ASD devices has been demonstrated.[3] Transcatheter closure has many advantages over surgical correction,[5] but it is also not free from complications.[3] Several cases have reported that there were early and late complications.[5]

2. Case Illustration

A 24-year-old woman came with shortness of breath during strenuous activities 3 years ago. The patient was first known to have congenital heart disease in 2019, during a routine check-up by health workers. The patient was then referred to the Saiful Anwar Hospital in Malang in 2020. The patient underwent transthoracic echocardiography (TTE) examination; it was found the presence of ASD secundum with 1.7cm-1.9 cm size.

The patient then underwent transesophageal echocardiography (TEE) and obtained a 10 mm aortic rim, 13 mm posterior rim, 14 mm floppy IVC rim, 13 mm SVC rim, and 13 mm mitral rim. The right heart catheterization (RHC) results, which showed a large ASD Secundum and high flow and low resistance. The patient was then planned for closure, but then it was delayed due to the pandemic and the patient was exposed to Covid-19.

The patient was rescheduled for ASD closure in February 2021. From the pre-operative laboratory results, no abnormalities were found. The patient was punctured in the right femoral vein, and ASD occluder memopart no 24 mm was inserted after with guided by TEE. A wiggle test was performed, and the occluder is stored correctly. When the device was detached, the patient's blood pressure dropped to 75/52 mmHg. On TEE examination, pericardial effusion was found, and pericardiocentesis was performed immediately with the evacuation of 600 ccs of pericardial fluid. The patient was then observed in the intensive cardiovascular care unit (ICVCU), and there was no additional pericardial fluid in the pericardial cavity. Laboratory results after the procedure showed no coagulation abnormality and decreased

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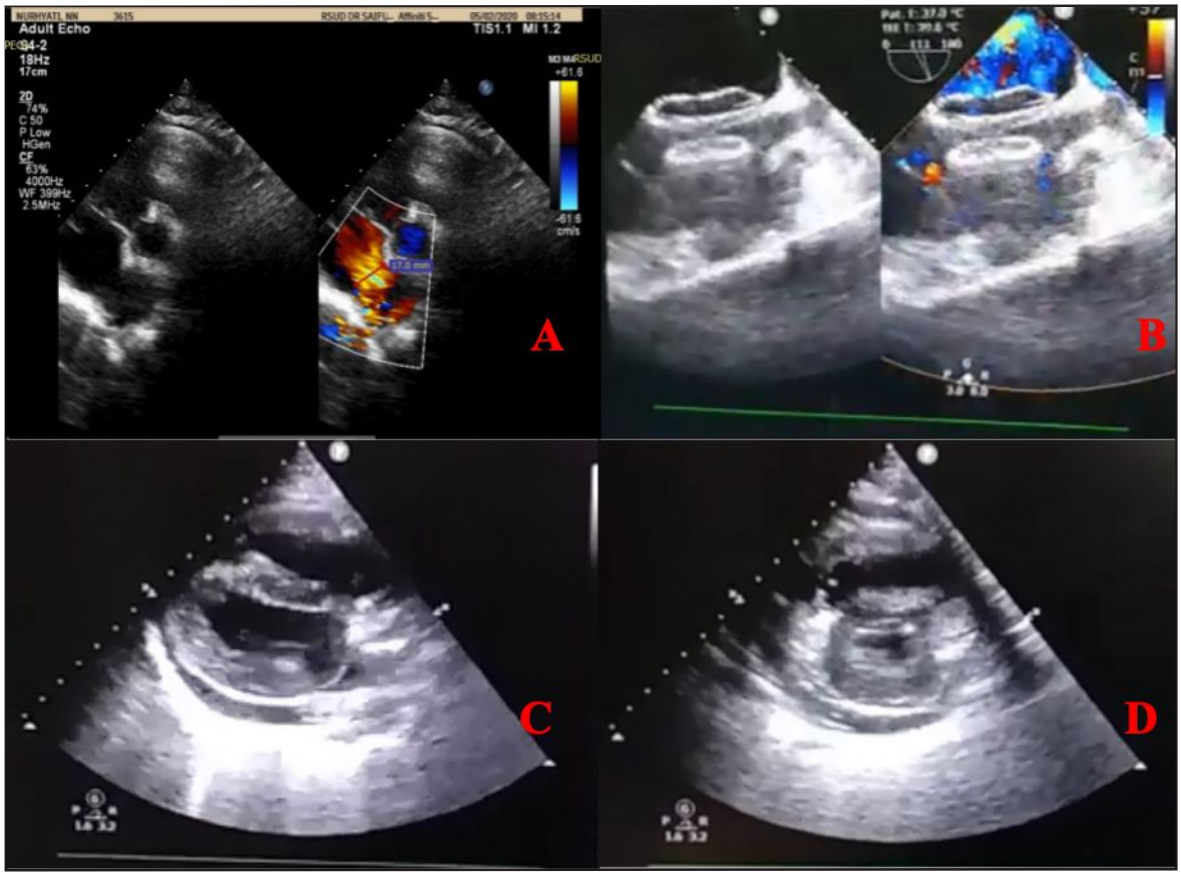

Figure 1. (A) : ASD secundum with a diameter about 17 mm; (B) : post ASD closure with occluder Memopart no. 24 mm; (C) : PLAX view shows pericardial effusion in apex and posterior of left ventricle; (D) : PSAX view show pericardial effusion in inferior left ventricle.

hemoglobin. After being observed for 1 day at the ICVCU, there was no pericardial fluid production. The patient was then transferred to an intermediate room. And a few days, the patient was discharged without any further complications.

3. Discussion

ASDs are most common in the fossa ovalis region of the atrial septum, called the secundum ASD.[3] Most patients with ASD are often unaware that they have the condition until it is too late in life. Different factors have been implicated in worsening the condition in adults like RV failure, atrial arrhythmia, increased left ventricular end-diastolic pressure and reduced left ventricular compliance, and elevated pulmonary artery pressure.[1,3]

Heart catheterization's primary role has shifted in the last 50 years from a diagnostic investigation to a therapeutic procedure. Cardiopulmonary bypass has no longer become the main procedure in treating ASD. King and Mills were the first to perform closure by transcatheter in 1976.[3] After amplatzer septal occluder (ASO) devices were invented, percutaneous ASD closure became fully practical in clinical setting.[3] Secundum ASD can now be successfully closed using a transcatheter approach is about 85-70% of cases. A number of drawbacks may jeopardize the success and feasibility of percutaneous ASD closure.[6,7] In 2011, the American Heart Association (AHA) issued a scientific statement describing the following criteria for ASD closure: 1. ASD of the secundum type with a Qp/Qs ratio less than or equal to 1.5:1. Recurring ischemic attacks or strokes caused by an abnormal right-to-left shunt in the blood vessels of the brain symptoms of cyanosis brought on by a transient right-to-left ASD shunt. As long as we meet the criteria and know the timing, transcatheter closure of ASD is the preferred treatment method in patients with relevant defect anatomy (class I). ASD closure device implantation rates of 97.9–98.7 percent were achieved.[4]

Long-term follow-up shows that residual shunts are extremely rare following device implantation. 21.4 percent of patients had a residual shunt at the time of device implantation. 83.1 percent of the patients discharged from the hospital were able to close their cases. 97% of patients were cured at the 2-year follow-up. It is estimated that 3.5 percent of patients have experienced device embolism/malposition, arrhythmia, and pericardial effusion in 2.6 percent and 0.5 percent, device thrombus, residual flow, and device impingement in 0.5–1.5 percent of cases.[3,8]

When ASD patients treated with transcatheter closure develop pericardial effusion, it can be caused by erosion or perforation. The most common cause of pericardial effusion is cardiac erosion, which commonly occurs on the left atrium roof or aortic side of the heart.[9] So, suppose cardiac CTA does not reveal any evidence of cardiac erosion. In that case, the next step is to look for hematoma around the pulmonary vein or the left atrium appendage, which is a common occurrence when a wire is inserted into the heart. Unfortunately, in our cases, we didn't perform any ct scan to look for the causes.[10]

4. Conclusion

Transcatheter ASD closure is highly available to date. It has many advantages over surgical correction, but it also can be a nightmare when we face the complication; but with increasing experience, complications will be reduced to a minimum. The risk of complications may be higher in patients with a minimal rim of ASD defect than in the majority of those with less challenging defects.

5. Declarations

5.1. Ethics Approval and Consent to participate
Not applicable.

5.3. Availability of data and materials
Data used in our study were presented in the main text.

5.4. Competing interests
Not applicable.

5.5. Funding source
Not applicable.

5.6. Authors contributions
Idea/concept: II, SW, RP. Design: II, SW, RP. Control/supervision: HM. Data collection/processing: II, SW, RP. Analysis/interpretation: II, SW, RP. Literature review: HM. Writing the article: II, SW, RP. Critical review: HM. All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

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References

1. Asakai H, Weskamp S, Eastaugh L, d'Udekem Y, Pflaumer A. Atrioventricular block after ASD closure. Heart Asia. 2016;8(2):26-31. doi:10.1136/heartasia-2016-010745

2. Yang MC, Wu JR. Recent review of transcatheter closure of atrial septal defect. The Kaohsiung Journal of Medical Sciences. 2018;34(7):363-369. doi:10.1016/j.kjms.2018.05.001

3. Khajali Z, Firouzi A, Pouraliakbar H, Hosseini Z, Jorfi F. Case report of worsening of preexisting pericardial effusion after ASD device closure: is it calamitous? Egypt Heart J. 2021;73(1):50. doi:10.1186/s43044-021-00171-8

4. Kovacevic P, Srdanovic I, Ivanovic V, Rajic J, Petrovic N, Velicki L. Late complications of transcatheter atrial septal defect closure requiring urgent surgery. pwki. 2017;4:335-338. doi:10.5114/a-ic.2017.71617

5. Altunbas G. A unique late complication of transcatheter atrial septal defect closure. Anatol J Cardiol. Published online 2019. doi:10.14744/AnatolJCardiol.2019.30388

6. Faccini A, Butera G. Atrial septal defect (ASD) device trans-catheter closure: limitations. J Thorac Dis. 2018;10(S24):S2923-S2930. doi:10.21037/jtd.2018.07.128

7. Tanghöj G, Odermarsky M, Naumburg E, Liuba P. Early Complications After Percutaneous Closure of Atrial Septal Defect in Infants with Procedural Weight Less than 15 kg. Pediatr Cardiol. 2017;38(2):255-263. doi:10.1007/s00246-016-1507-3

8. Roy D, Sharma R, Bunce N, Ward D, Brecker S. Selecting the optimal closure device in patients with atrial septal defects and patent foramen ovale. Interventional Cardiology. 2012;4(1):85-100. doi:10.2217/ica.11.90

9. Jalal Z, Hascoet S, Baruteau AE, et al. Long-term Complications After Transcatheter Atrial Septal Defect Closure: A Review of the Medical Literature. Canadian Journal of Cardiology. 2016;32(11):1315.e11-1315.e18. doi:10.1016/j.cjca.2016.02.068

10. Jung SY, Choi JY. Transcatheter closure of atrial septal defect: principles and available devices. J Thorac Dis. 2018;10(S24):S2909-S2922. doi:10.21037/jtd.2018.02.19