

THE USEFULNESS OF TRANSESOPHAGEAL ECHOCARDIOGRAPHY GUIDANCE DURING TRANS CATHETER CLOSURE OF VENTRICULAR SEPTAL DEFECT WITHOUT FLUOROSCOPY

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ABSTRACT

Perimembranous Ventricular Septal Defect (PmVSD) is one of the most common type of congenital heart abnormality. Transcatheter closure of PmVSD is an emerging alternative modality to surgical closure, but has high radiation exposure. We reported a transcatheter VSD closure in PmVSD's patient through femoral venous route under the guidance of Trans-Esophageal Echocardiography (TEE), without fluoroscopy. The catheter's delivery and device deployment guided by long axis and short axis TEE's view. The procedure was success without any complication. Transcatheter device closure of VSD under TEE guidance without fluoroscopy is effective and safe.



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1. Introduction

Ventricular Septal Defect (VSD) is a communication between the left and right ventricle or the left ventricle and right atrium. VSD is the most common type of congenital heart abnormality, accounting for up to 40% of congenital heart defects. Perimembranous Ventricular Septal Defect (PmVSD) is one of the most common congenital cardiac malformations. Since the first successful on-pump PmVSD closure, surgical repair through median sternotomy under cardiopulmonary bypass (CPB) has been considered the gold standard in pediatric cardiac surgery. As catheterization techniques develop and spread, traditional transcatheter VSD closure has been used to date, but result in radiation exposure and potential arterial complications. Transcatheter closure of PmVSD is an emerging alternative modality to surgical closure, but has high radiation exposure. Patient with complex heart disease can be exposed to large cumulative radiation doses that increase the risk of cancer to up to 6.5% above baseline, even in the limited time frame studied. In an effort to reduce radiation exposure, Transesophageal Echocardiography (TEE) has been used for guidance during transcatheter closure of VSD in recent years [1], [2].

In this case, we reported a transcatheter VSD closure through femoral artery route under the guidance of TEE without fluoroscopy.

2. CASE REPORT

A 18 years old woman, came to RSUP H. Adam Malik outpatient clinic with easily fatigue as chief complain. Transthoracic Echocardiography (TTE) showed a defect at intra ventricular septum, perimembranous type with left to right shunt, the size was 7 mm. There was severe tricuspid regurgitation with high probability of pulmonary hypertension. The patient had a good left ventricular systolic function and good right ventricular contractility. From the TEE examination, the defect size was 6-7 mm inlet near tricuspid valve with Membranous Septal Aneurysm (MSA). The patient was diagnosed with PmVSD and MSA (Fig 1).

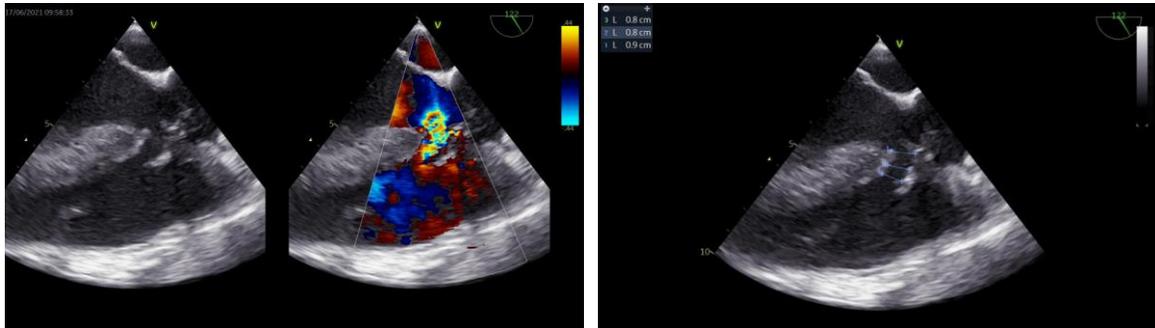


Figure 1. The VSD measured by TEE

The defect was planned to close using Multi-Functional Occluder (MFO) device no. 8/10 guided by TEE. The Multi-Purpose (MP) catheter size 6F inserted to Descendent Aorta then Arcus Aorta, Ascending Aorta, and then straight to LV crossing the defect and then pushed to RV. The catheter's delivery guided by long axis TEE view, where we can see the aortic root, aortic valves, LVOT and VSD clearly. The MP catheter then was pulled and switched to the delivery sheath no 14F. Then the MFO VSD occluder no. 10/8 was inserted and placed at the defect. The device was well seated with mild tricuspid regurgitation. Beside the long axis TEE view, we confirmed the device deployment procedure with short axis view where we can see the aortic valves, VSD and RVOT clearly (Fig 2). The procedure was finished with no significant problem. After the procedure, patient was sent to the recovery room and TTE evaluation was performed. From the examination, the device was sat properly and no residual shunt found.

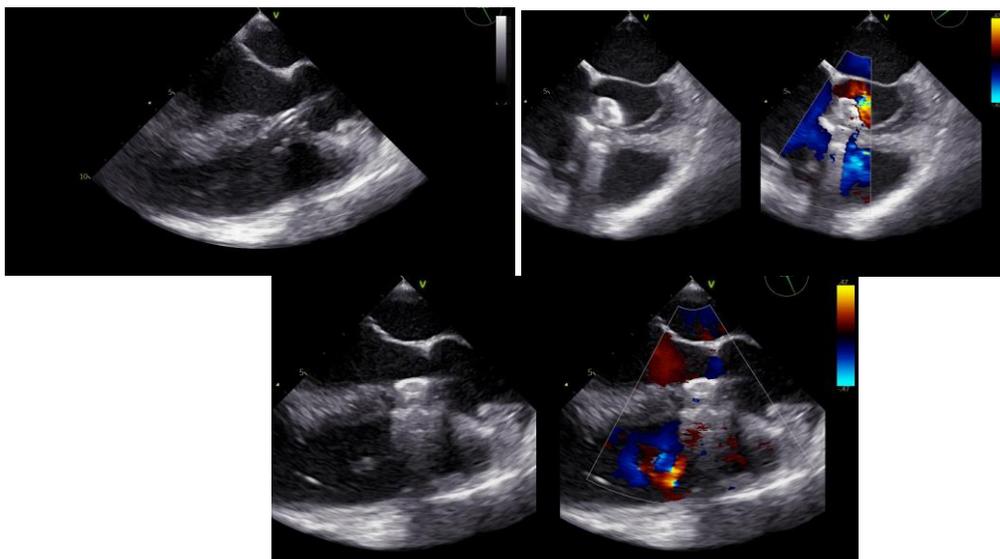


Figure 2. Transcatheter device closure by TEE guide

3. DISCUSSION

Nowadays transcatheter device closure of ventricular septal defects (VSDs) is an attractive and feasible alternative to surgical closure of congenital VSDs. Transcatheter closure of ventricular septal defects was first described by Rashkind when he used a single-disc device to perform.

In Haji Adam Malik General Hospital, transcatheter procedure without fluoroscopy has been done several times. This is the first transcatheter VSD closure case in Haji Adam Malik General Hospital. Challenge in doing device transcatheter VSD closure without fluoroscopy guidance is having a proper TEE view when the wire crossed through VSD. The combination between long axis and short axis view is very much needed. Device deployment can be assisted with this two views, in order to guide the operator when to open the RV disc and when to open the LV disc. Good communication between echocardiographer and interventionist is mandatory. [3] reported transcatheter pmVSD closure was succesful performed in 129 cases (97%), with proper case selection, good expertise, trancatheter closure is feasible with satisfactory early outcome. [2] reported transcatheter device closure under TEE guidance was succesful in 44 (95,7%).

4. CONCLUSION

Transcatheter device closure of PmVSD under TEE guidance without fluoroscopy is effective and safe. Good TEE's view during procedure and communication between echocardiographer and interventionist are mandatory.

5. REFERENCES

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