Step by Step: Perimembranous VSD

Xiangqing Kong MD PhD

The First Affiliated Hospital of Nanjing Medical University

VSD closure in Mainland

- **Till 2012, 27,000 pm-vsds were closed with the device in 377 medical centers.**
- **Device:**
  - **Amplatz (2001)**
  - **Device made in china (2002)**

VSD closure: steps

- patient selection
- device selection
- manipulation
- complications

Clinical Indications

- **Body Weight: >=12 kg; Age: >= 3y**
- **Hemodynamically significant shunt:**

  Qp/Qs>1.5, or LV enlarged on echocardiogram
- **Residual shunt after surgery**
- **Shunt after trauma or myocardial infarction**

Clinical Contradictions

- **Active infection that causes bacteremia.**
- **Thrombus formation at VSD or the sites for catheter insertion**
- **Device-related functional abnormality of aortic or tricuspid valve**
- **Pulmonary vascular occlusive disease**

Anatomical Indication

Five chamber view (apical or parasternal)

Rim to the aortic valve

Distance between superior rim of VSD and aortic valve > 2 mm

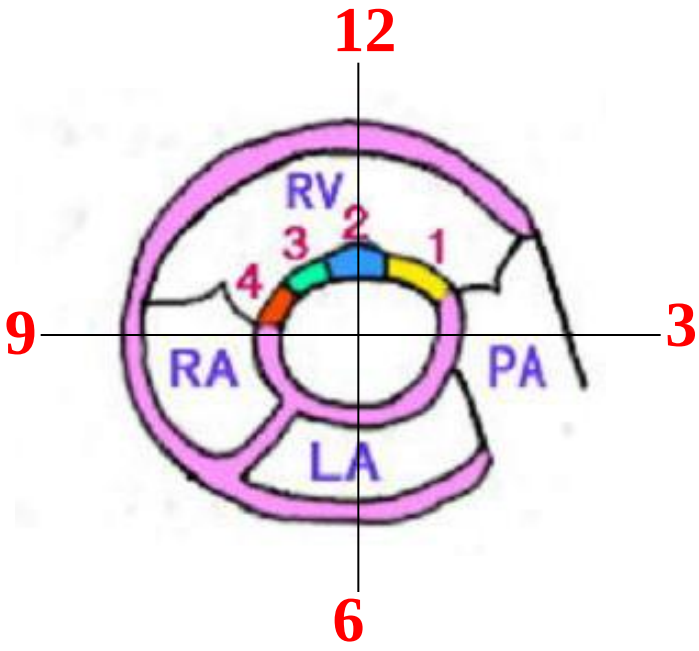
Rim to the tricuspid valve

Prolapse of the aortic valve (?)

Aortic regurgitation

Anatomical Indication

Short axis view (apical or parasternal)



Rim to the pulmonary valve

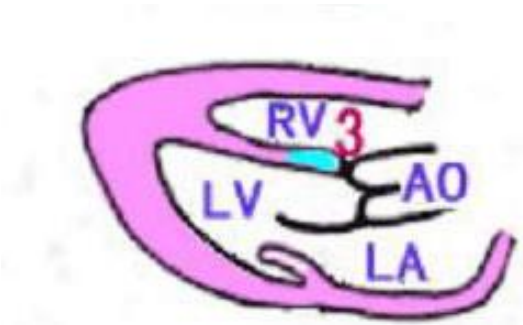
Rim to the tricuspid valve

Prolapse of the aortic valve

Aortic regurgitation

Anatomical Indication

Long axis view (apical or parasternal)



Rim to the tricuspid valve

Prolapse of the aortic valve

Aortic regurgitation

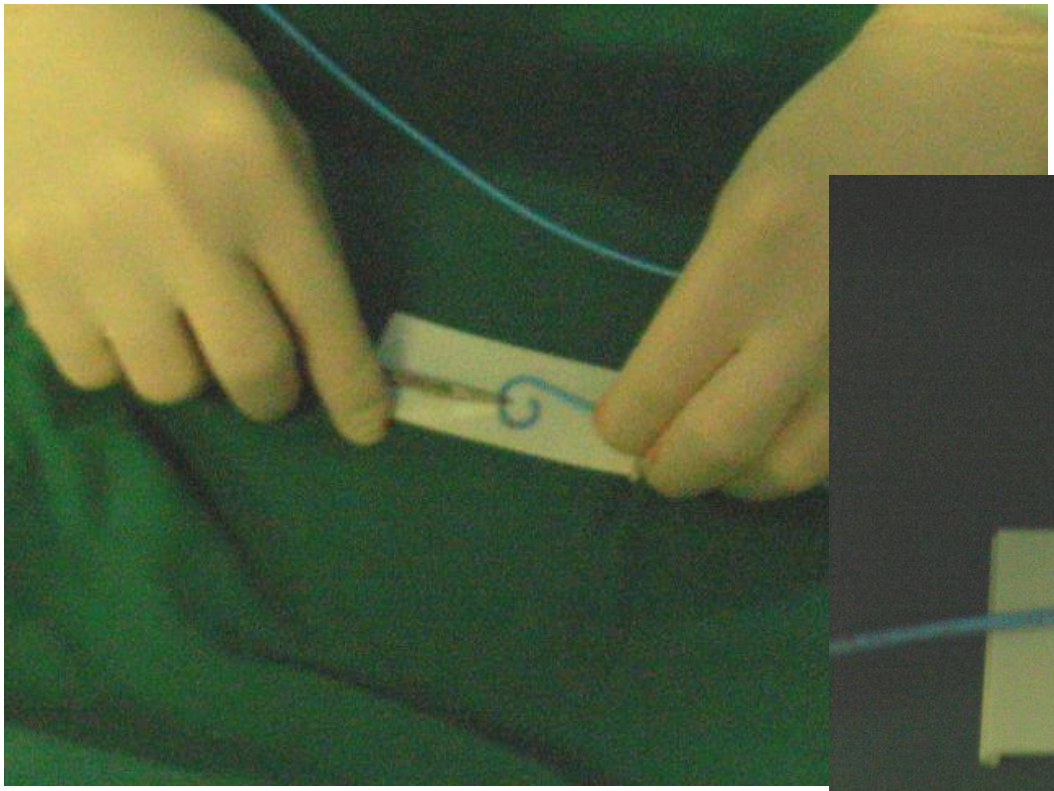
Manipulation

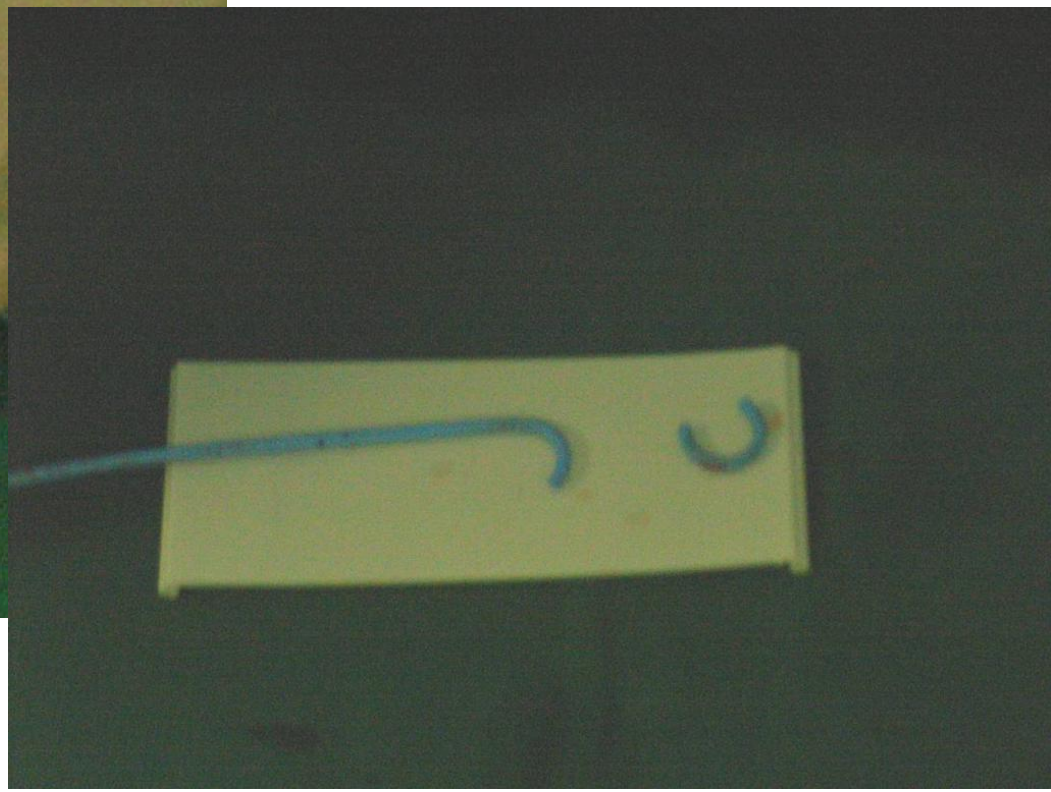
- X-ray (LV angiography projection view)
  - general: LAO 60° + CRA 20°
  - intracristal VSD: LAO 80° + CRA 20°

Manipulation

- **Establishing the arteriovenous loop**
  - **RCA catheter**
  - **direct “floating” over the VSD with a guide wire, decreased the stimulation and injury to LV**
  - **remodeling of pigtail catheter to fit the various angle of the flow through VSD**

Remodeling of pigtail catheter





Complications

- **temporary III AV block: 0.6%**
- **Pacemaker: 0.05%**
- **Enlargement of LV: 0.03%**

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Risk Factors and Outcomes of Post-Procedure Heart Blocks After Transcatheter Device Closure of Perimembranous Ventricular Septal Defect

Rong Yang, MD, Xiang-Qing Kong, MD, Yan-Hui Sheng, MD, Lei Zhou, MD, Di Xu, MD, Yong-Hong Yong, MM, Wei Sun, MD, Hao Zhang, MD, Ke-Jiang Cao, MD

Nanjing, China

Conclusions

The incidence of PPHBs after transcatheter closure of pmVSD is relatively high, but the outcome of PPHBs after transcatheter closure of pmVSD was satisfactory, as most patients recovered to normal conduction. More careful monitoring after transcatheter closure of pmVSD should be applied for patients whose pmVSD is close to the tricuspid valve and far away from the aortic valve. Oversized devices should be avoided.

Complications

- **Cardiac tamponade: 0.05%**
- **Migration of device: 0.17%**
- **Hemolysis: 0.27%**
- **AR: 0.10%**
- **TR: 0.64%**
- **BR: 0.01%**
- **Narrow of RVOT: 0.15%**
- **Stroke: 0.02%**

Summary

- **Transcatheter closure of pmVSD is technically easy.**
- **We can select asymmetric or symmetric device to close pmVSD without the difference of the complications.**
- **Still, some questions are to be answered.**

Questions

- Although the incidence of arrhythmia related to the catheter closure of pmVSD, particularly III AVB is low, how to decrease it?
- What does the AVT, AJT or BBB means? Long-term follow-up is critical.
- How to explain the enlargement of LV after the catheter closure of pmVSD?


Thank you