Percutaneous Closure of Atria Septal Defects under Transthoracic Echocardiography Guidance without Fluoroscopy and Intubation

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Background

- Atrial septal defect (ASD) repair
- Interventional ASD occlusion

Surgeon

Percutaneous! No incision!

Physician
Who shall I trust?

Debate

Surgeon

VS

Physician

Hybrid procedure
No X-ray
transthoracic occlusion

Percutaneous procedure
No thoracotomy
Background

No argument, Keep developing!

Percutaneous closure of ASD with echocardiography guidance

No incision

No fluoroscopy
We perform percutaneous occlusion of ASD guided by TEE without fluoroscopy and incision.

- Supine position, general anesthesia
- The right femoral vein was punctured
- TEE guidance
- Femoral vein---inferior vena cava---right atrium---ASD--left atrium
- Delivery sheath inserting via ASD
- Implant occluder to close ASD
Percutaneous occlusion of ASD guided by TEE
Percutaneous occlusion of ASD guided by TEE

The guide wire and catheter inserted via the inferior vena cava

Delivery sheath passed ASD

Delivered the occluder

Implanted occluder
Scarcity of percutaneous occlusion of ASD guided with TEE

More advantage
More difficult

Substitute transthoracic echo (TTE) for TEE

General anesthesia endotracheal intubation
Percutaneous occlusion of ASD guided with TTE
Percutaneous occlusion of ASD guided by TTE

The guide wire and catheter were inserted via the inferior vena cava.

Guide wire passed ASD

Implanted Occluder

Deployed
To explore a new method of interventional ASD closure without fluoroscopy, general anesthesia and incision.

To study the feasibility of percutaneous closure of ASD only with TTE as imaging tool.
Methods

【TTE Group】

- 60 patients underwent percutaneous closure of ASDs with TTE
- Patients received local anesthesia or sedation with propofol

【TEE Group】

- 67 patients underwent percutaneous closure of ASDs with TEE
- Patients received endotracheal intubation under general anesthesia
There was no significant difference in age, defect size, success rate or hospital stay between the two groups.

<table>
<thead>
<tr>
<th>Group</th>
<th>Procedure time(min)</th>
<th>Costs(RMB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TTE</td>
<td>50.10 ± 10.09</td>
<td>30814.73 ± 5089.71</td>
</tr>
<tr>
<td>TEE</td>
<td>63.05 ± 10.35</td>
<td>36244.90 ± 5082.40</td>
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</tbody>
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*P < 0.001  P < 0.01*
Results

Patients of both groups were successfully in completion of the ASD occlusion and followed-up by 1 month

<table>
<thead>
<tr>
<th>Residual shunt</th>
<th>Peripheral Vascular Injury</th>
<th>Cardiac Tamponade</th>
<th>Malposition</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1 (TTE)</td>
<td>0</td>
<td>0</td>
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</table>
Discussion

- No fluoroscopy
- No contrast agent
- No incision
- Real-time monitoring
  - Endotracheal intubation
  - TEE probe insertion

- No general anesthesia and endotracheal intubation
- No damage of endotracheal tube and TEE probe
- No mechanical ventilation
- No ICU stay
Discussion

- Stable echocardiography views
- Medical quality: team, training, skill
- Learning curve
- “Effective distance”

The distance was from the right parasternal third intercostal space to the puncture site.
Conclusion

- TTE-guided percutaneous ASD closure realized absolutely no-invasive treatment with satisfactory success rate and lower costs.

- TEE-guided percutaneous ASD closure can be served as a backup of TTE-guided percutaneous ASD closure.
Welcome communication!

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