



# Initial Results of Totally Endoscopic Ventricular Septal Defect Repair: Experience From a Single Center in Vietnam

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## INTRODUCTION

Ventricular septal defect (VSD) is the most common congenital heart defect. Minimally invasive right axillary thoracotomy has been widely used in small children with favorable outcomes. However, surgical exposure becomes more difficult in older and heavier patients, while median sternotomy remains more invasive. Totally endoscopic surgery may provide a less invasive alternative with faster recovery and better cosmetic results.

## METHODS

We retrospectively reviewed 80 patients weighing  $\geq 15$  kg who underwent totally endoscopic VSD repair using a 3D endoscopic system at the Cardiovascular Center, E Hospital, between January 2020 and December 2025. Demographic data, operative times, complications, and early echocardiographic outcomes were analyzed.



Figure 1. Patient positioning and trocar placement for totally endoscopic VSD repair

## PREOPERATIVE CHARACTERISTICS

| Parameter                  | Result             |
|----------------------------|--------------------|
| Mean age                   | 9.5 years          |
| Mean body weight           | 28.8 kg            |
| Most common defect type    | Perimembranous VSD |
| Mean defect diameter       | 5.3 mm             |
| Associated cardiac lesions | 64%                |



Figure 2. Port placement and cannulation

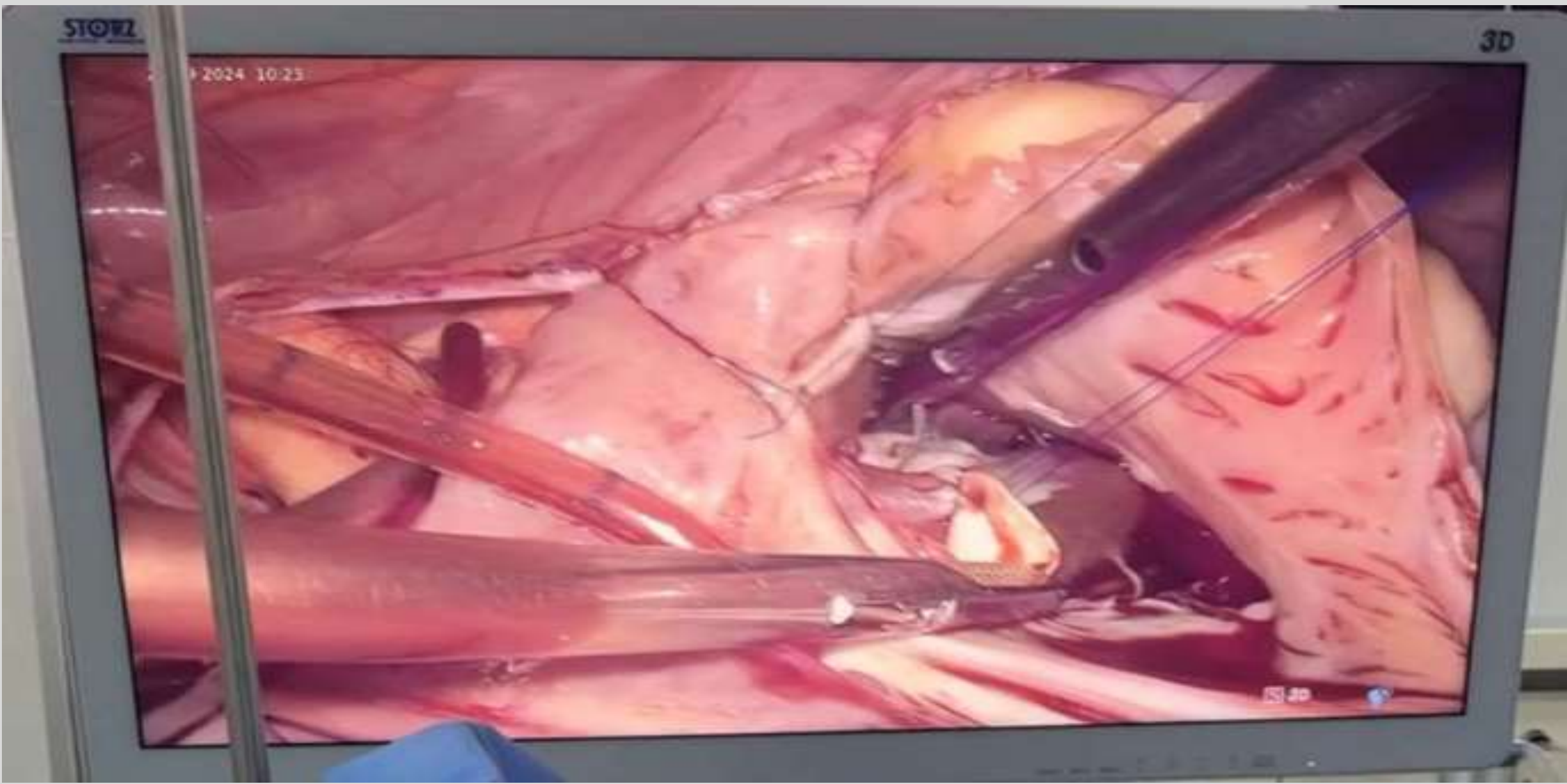


Figure 3. Endoscopic intracardiac view

## OPERATIVE CHARACTERISTICS

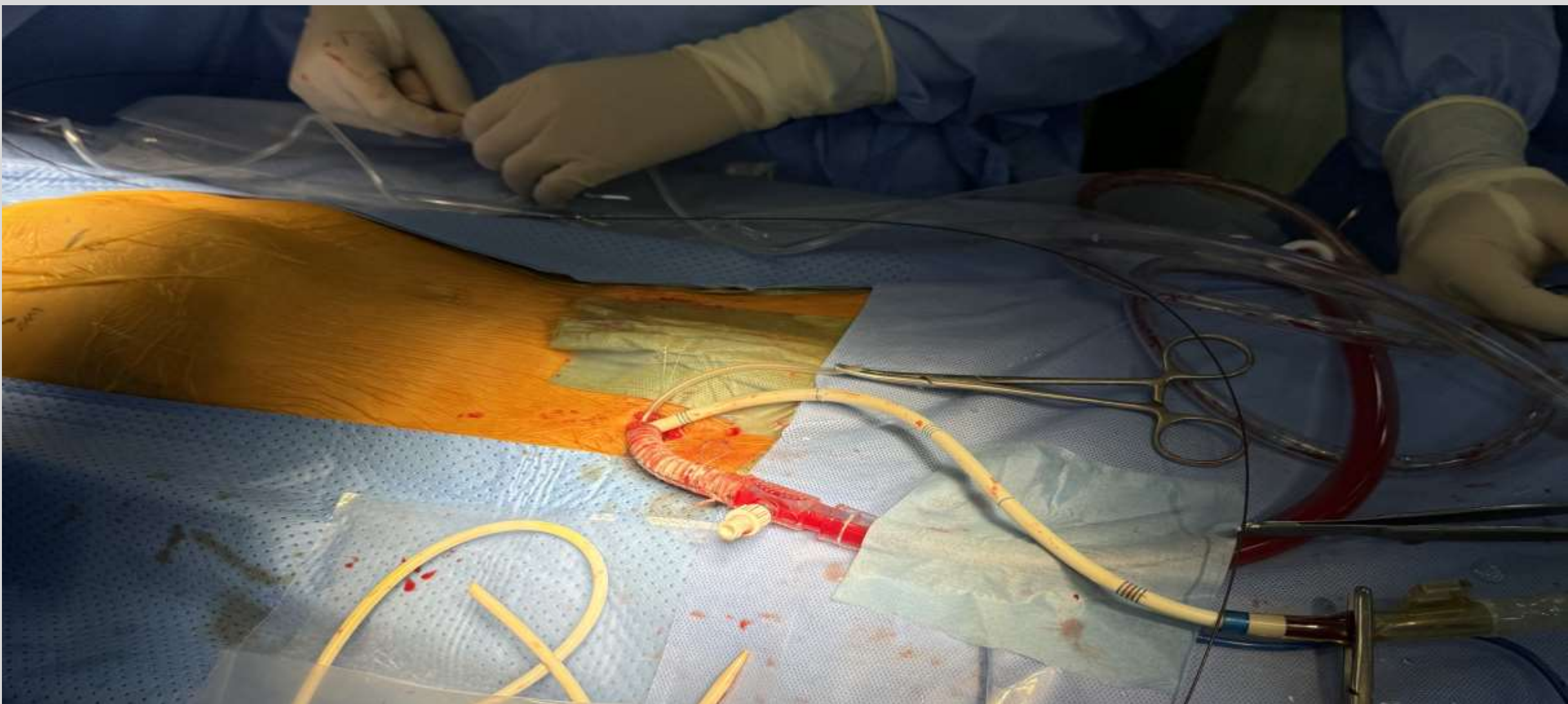
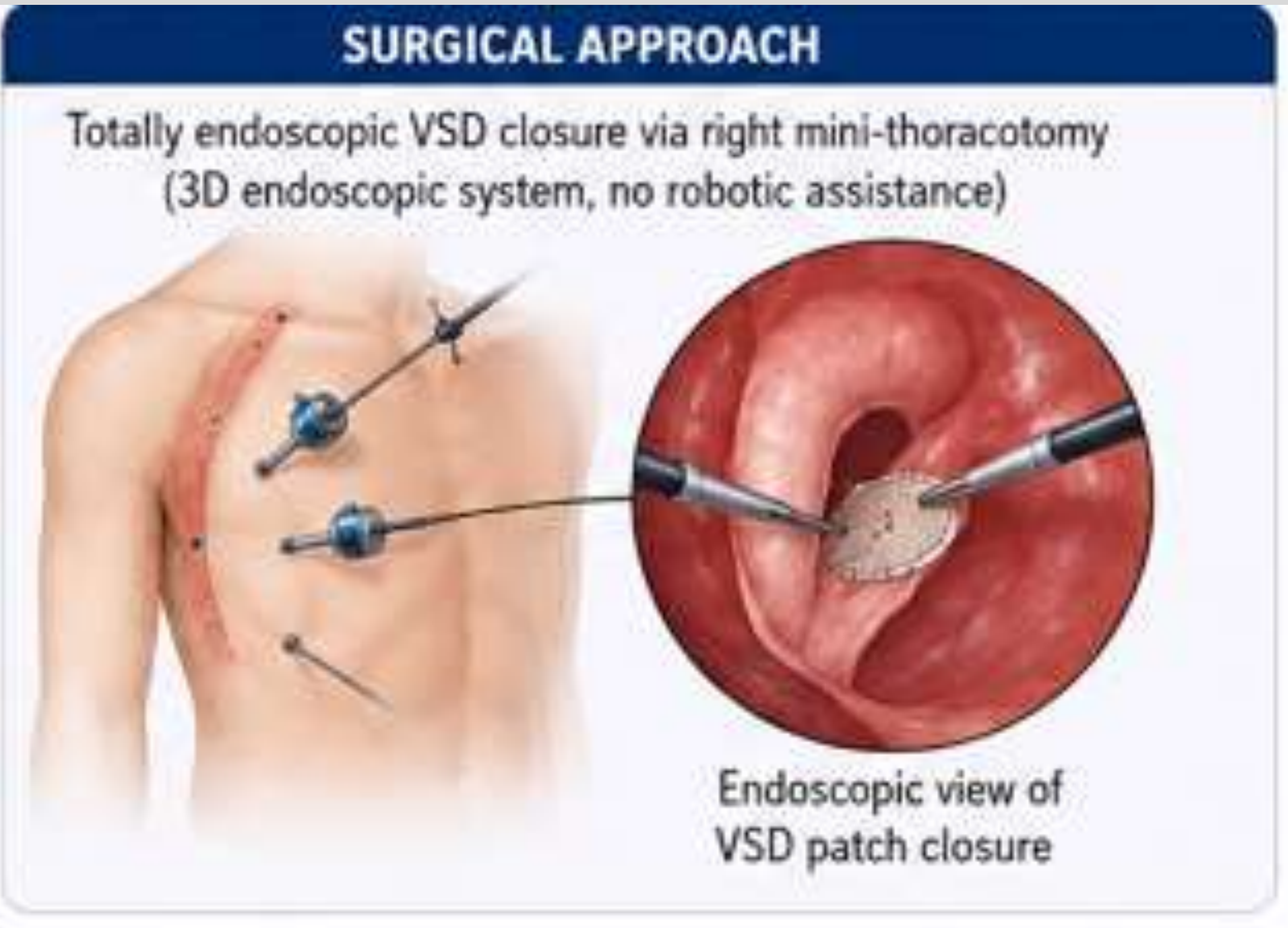


Figure 4. Femoral arterial and venous cannulation

- Mean cardiopulmonary bypass time: **141 minutes**
- Mean aortic cross-clamp time: **82 minutes**
- Mean defect size: **5.3 mm**
- Defect size was consistent with the **preoperative echocardiographic assessment**
- Most cases were closed using **synthetic patches**
- Only a minority of patients underwent **direct closure**
- Femoral arterial cannulation was usually **unilateral**
- Superior and inferior vena cava cannula sizes were **adapted to patient body size**

## EARLY POSTOPERATIVE OUTCOMES

- Mean ventilation time: **6.7 hours**
- Mean ICU stay: **1.1 days**
- Mean hospital stay: **10.7 days.**
- Complication rate was **low**:
  - 1 postoperative bleeding
  - 1 pleural hematoma
  - 2 femoral vascular injuries
- All complications were managed successfully
- 8 residual shunts** were detected, mostly small and not requiring intervention.



## TAKE-HOME MESSAGE

Totally endoscopic VSD repair without robotic assistance is a safe, reproducible, and minimally invasive technique with favorable early outcomes and excellent cosmetic results in selected patients weighing  $\geq 15$  kg.



Figure 5. Postoperative cosmetic result after totally endoscopic VSD repair