

Robotic Assisted Suture-less Aortic Valve Replacement

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Background

We report a case of severe bicuspid aortic valve stenosis replaced robotically using a suture-less aortic valve.

Case Presentation

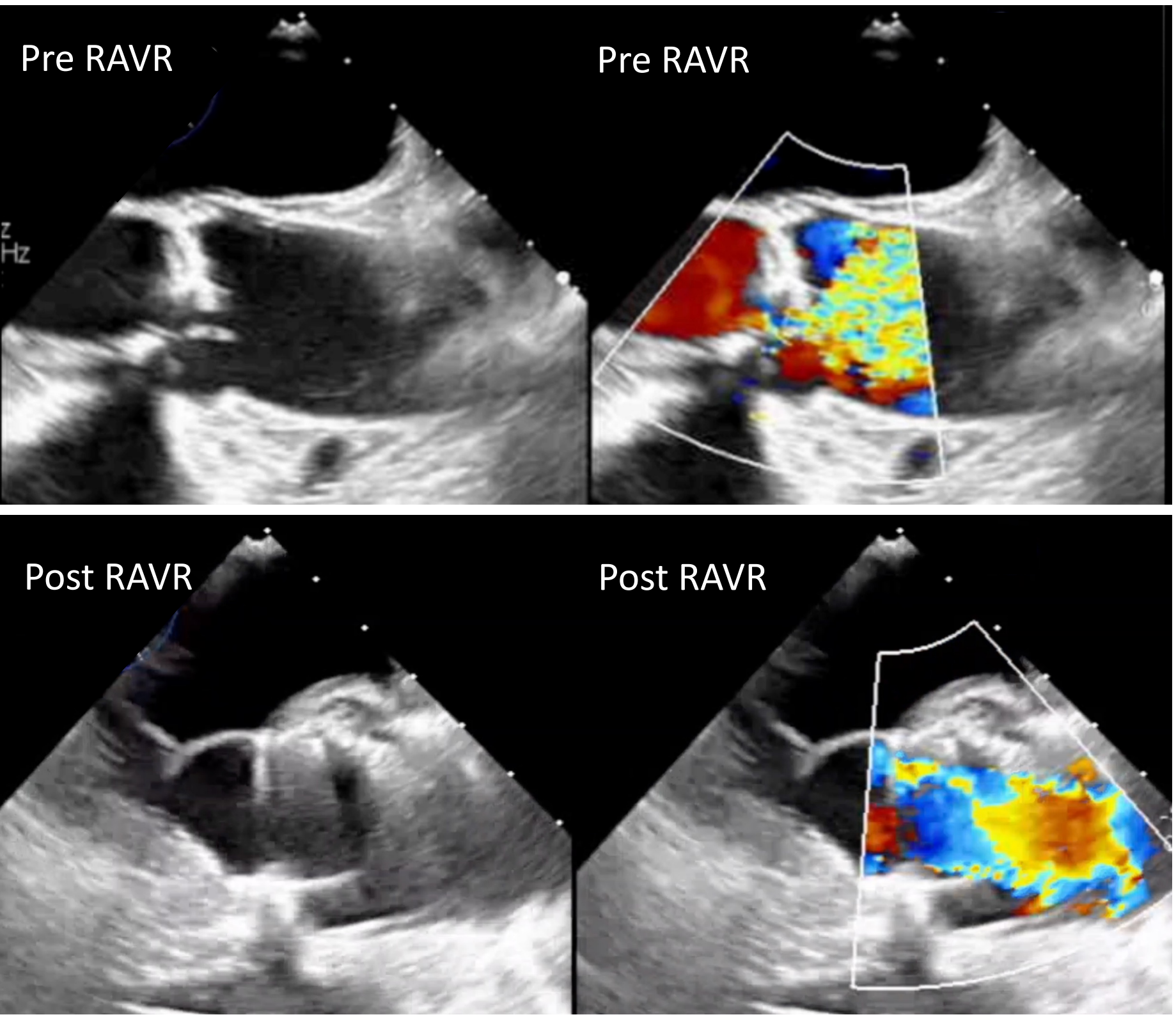
We present a **59**-year-old male with severe bicuspid aortic valve stenosis.

Pre-op echocardiogram revealed an aortic valve gradient of 61 mmHg. This patient’s STS predicted a risk of mortality of **0.71%**.

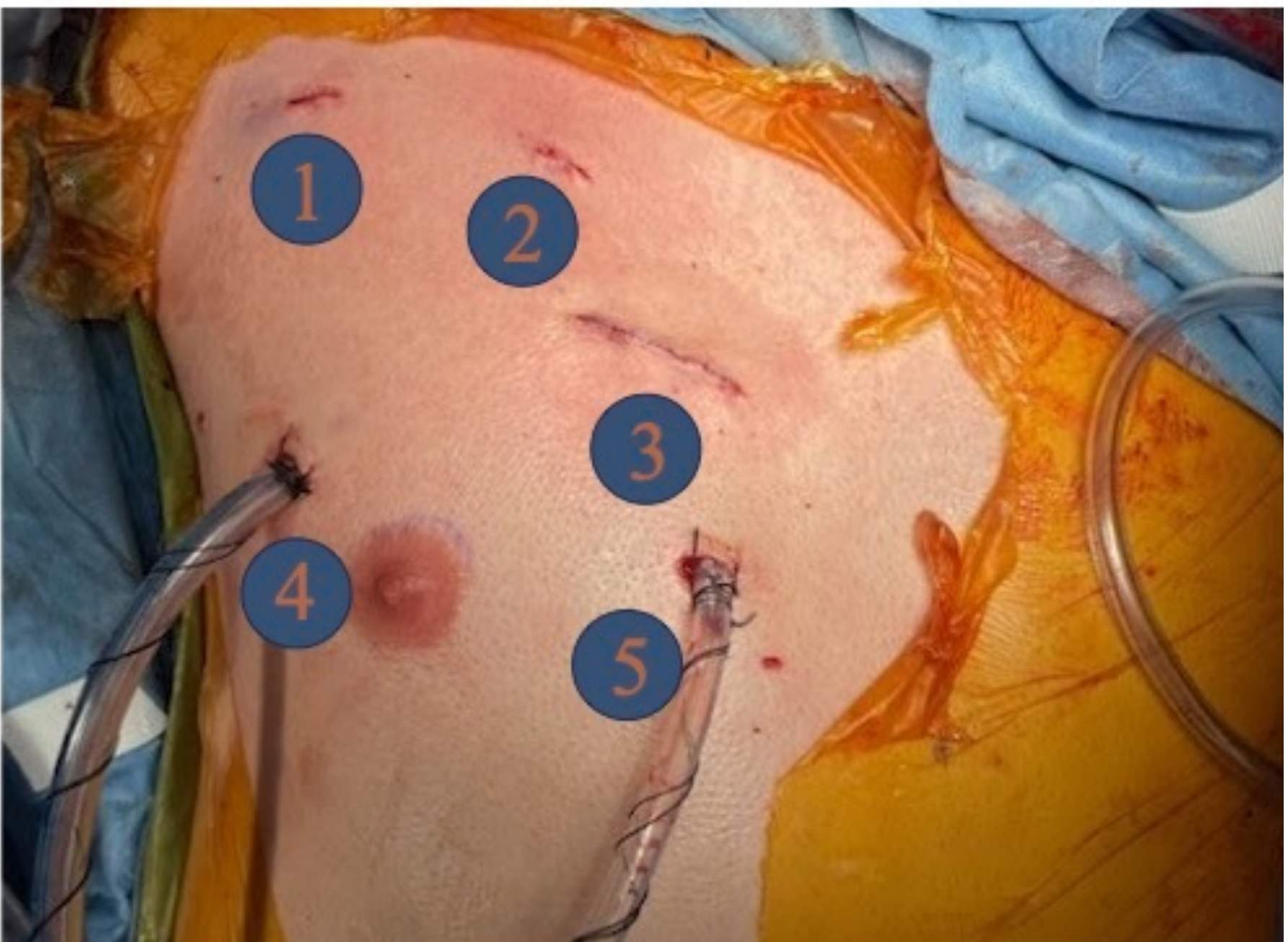
After discussing the surgical decision-making with the patient, we decided to proceed with the minimally invasive surgical approach.

Surgical Technique

Robotic aortic valve replacement has similar steps to the open approach. First, **cardiopulmonary bypass** was accessed through percutaneous groin cannulation, and four-port sites were created. The **valve** was then **exposed** and **resected**. The **25 mm suture-less valve** was deployed. Lastly, the **aortotomy** was closed and the patient was weaned off bypass.



*The pre-robotic Aortic Valve Replacement (RAVR) echocardiogram reveals **severe** aortic stenosis with a calculated aortic valve gradient of 61 mmHg. After the replacement with a 25 mm suture-less valve, the post-operative echocardiogram reveals the **resolution** of aortic valve stenosis.*



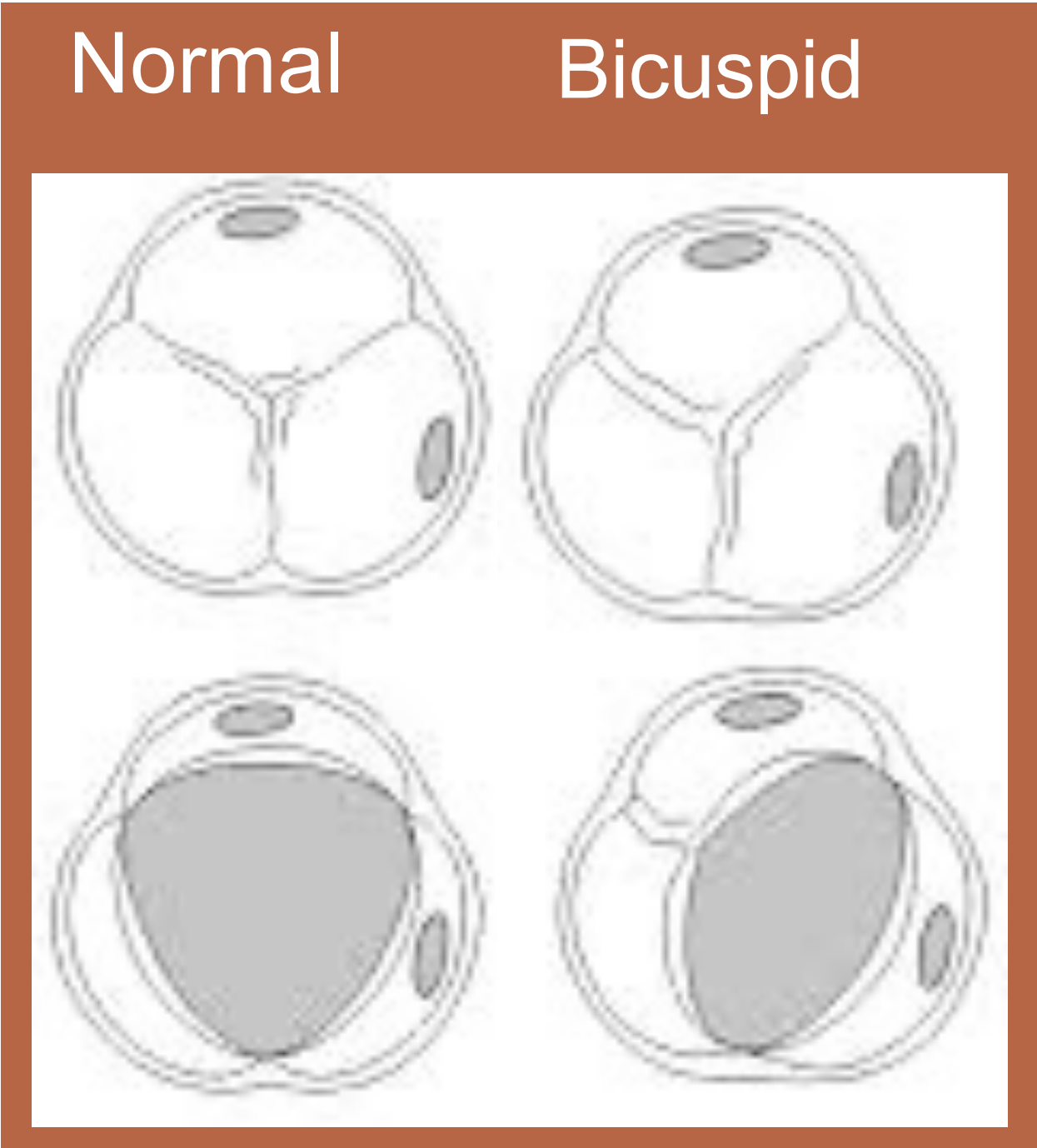
Right chest port sites used included:

- 1) Aortic cross-clamp in the 1st ICS
- 2) Arm 1 in the 1st ICS.
- 3) **3 cm** working and camera port in the 2nd ICS.
- 4) Arm 3 in the 3rd ICS.
- 5) Arm 4 in the 4th ICS.

Operative Findings

This patient was extubated in the OR. No paravalvular leak was noted on post-op echo. No transfusions were given during the operation.

This patient was able to ambulate with moderate assistance on post-op day one. Then the patient was ambulating independently and was discharged on post-op day three.



Discussion

Surgeons must use their **clinical decision-making** skills to determine if patients should receive surgical or transcatheter aortic valve replacement. The transcatheter approach may pose a higher risk for patients with **bicuspid** aortic disease. **Young** patients with **low-risk** aortic stenosis who undergo the minimally invasive surgical approach may achieve **improvements** in their longitudinal outcomes.

Conclusion

Robotic aortic valve replacement with suture-less valves can be performed **safely** using similar approaches to robotic mitral valve replacements. This case study shows that robotic AVR can close the gap between minimally invasive surgeries for **young, low-risk** individuals with **bicuspid** aortic valve stenosis.

