A New Frontier: No Working Port for Robotic Mitral Valve Repair

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Background

Robotic mitral valve surgery (rMVS) is a safe and effective minimally invasive option in patients needing repair [1].

Typically, rMVS is performed using four small incisions for eight-millimeter robotic trocars for the right arm, left arm, retractor, and camera, along with a "working port" via either an additional port incision or thoracotomy.

Here we report a mitral valve repair performed using only the four robotic ports without a working port. To our knowledge, this is the first reported case using such approach and the least-invasive surgical mitral valve repair performed to date.

The Case

A 61-year-old male presented via referral for mitral regurgitation, was deemed an appropriate robotic repair candidate, and underwent complex mitral valve repair, with patent foramen ovale and left atrial appendage closures, using all-percutaneous cannulation.

Patient Selection

Patient presenting with with severe MR

→ Deemed robotic surgery candidate

→ Extensive pre-operative planning and discussion utilizing:
- Multiple imaging modalities (echo, MRI)
- Shared patient decision-making

Access with Use of Only Four Ports

To enable the use of no working port, an **eight-millimeter robotic** camera port was placed in the right fourth intercostal space anterior to the anterior axillary line.

Under videoscopic visualization**, three other eight-millimeter ports** were placed: a robotic atrial retractor port, a right-arm port, and a left-arm camera port.

Prior to left atriotomy, the camera was placed in the left atrial retractor port and the robotic camera port was used for bedside access to the chest.



Surgical Details

Prophylactic pain control was accomplished using cryoablation of intercostal nerves T3-T8.

Once the left atrium was opened, **the camera was moved back to the traditional camera port and left atrial inspection was facilitated by the atrial retractor.**

When all robotic ports were in use, bedside access to the chest was achieved by removing and subsequently replacing the left-arm robotic instrument.

Operation included:
- Repair of the P2 valvular segment with use of neochords
- Annular band placement.

Cardiopulmonary bypass and cross-clamp times were 158 and 89 minutes, respectively.

Postoperatively, the patient showed trace mitral regurgitation and was discharged on postoperative day one.

Conclusions

The use of four eight-millimeter ports, without a working port, is an innovative and patient-friendly approach to robotic mitral valve repair. Our case reveals the continually expanding role for robotics in minimally invasive cardiac surgery.

Disclosures

Dr. Guy is a consultant for Edwards Lifesciences, Medtronic, and proctor for Intuitive Surgical.

References

1. Gillinov, A.M., et al., *Robotic mitral valve surgery: current limitations and future directions.* Ann Cardiothorac Surg, 2016. **5**(6): p. 573-576.