Diagnostic Uncertainty of a Pulsatile Mass After Transapical Beating-Heart Mitral Valve Repair

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BACKGROUND

- Mitral valve repair is the preferred treatment for degenerative mitral regurgitation (MR), but conventional surgery requires sternotomy and cardiopulmonary bypass (CPB).
- Transcatheter edge-to-edge repair is an off-pump alternative but achieves optimal results only in select anatomy, leaving many high-risk patients without an ideal option.
- Transapical beating-heart mitral valve repair is a minimally invasive, off-pump technique through a left mini-thoracotomy, placing artificial chordae under transesophageal echocardiographic guidance.
- Complications of the transapical access tract remain incompletely characterized — **a delayed pulsatile mass may reflect a structural complication or an indolent infection.**

CASE PRESENTATION

- An 85-year-old man with symptomatic severe degenerative MR underwent off-pump transapical beating-heart mitral valve repair via a left mini-thoracotomy.
- Six months later he presented with **two enlarging, pulsatile subcutaneous masses** at the thoracotomy site (Figure 1).
- He was afebrile and hemodynamically stable, with normal inflammatory markers and no leukocytosis.

Figure 1. Two pulsatile subcutaneous masses at the left thoracotomy site, six months after transapical repair.

DIAGNOSTIC IMAGING

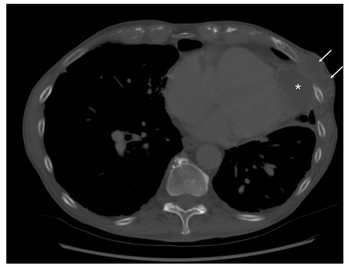

Figure 2. Contrast-enhanced CT. Rim-enhancing peri-apical collection abutting the left ventricular apex (asterisk); two collections extend into the left chest wall (arrows).

Figure 3. Targeted ultrasound. Bilobed anechoic collection tracking deep to the chest wall and contacting the left ventricle; Doppler limited by motion artifact.

- **Contrast-enhanced CT:** a ~5 cm rim-enhancing peri-apical collection abutted the LV apex, with two further collections tracking into the left chest wall; the myocardium–collection interface was indistinct.
- **Targeted ultrasound:** a bilobed anechoic collection contacted the LV; Doppler showed no definitive internal flow.
- **Imaging remained inconclusive —** a thrombosed pseudoaneurysm could not be distinguished from an infected collection, and ventricular communication could not be excluded.

OPERATIVE STRATEGY

Because pseudoaneurysm rupture during re-entry could not be excluded, the operation was planned around the higher-risk structural diagnosis:

1. Diagnostic uncertainty — pseudoaneurysm cannot be excluded.
   Equivocal CT and ultrasound; the LV–collection interface is indistinct and ventricular communication is possible.
2. Plan for the higher-risk diagnosis.
   Treat as a structural complication until proven otherwise to reduce risk of harm to patient.
3. Establish peripheral CPB.
   Femoral arterial and venous cannulation; bypass running before the chest is opened.
4. Reopen the thoracotomy only after CPB is running.
   Converts an unpredictable, potentially lethal re-entry into a controlled, protected operation.

INTRAOPERATIVE FINDINGS

- Exploration revealed a loculated abscess cavity in the chest wall, extending into the pericardium along the prior transapical access tract.
- Purulent material was evacuated; the cavity was debrided and irrigated and adhesions were lysed.
- **The pledgetted apical entry site was intact** — no myocardial disruption, pseudoaneurysm, or bleeding.
- The patient was weaned from cardiopulmonary bypass uneventfully.

POSTOPERATIVE COURSE

- The postoperative course was uncomplicated and the patient remained afebrile.
- Specimens underwent aerobic, anaerobic, fungal, and acid-fast bacillus culture, with broad-range polymerase chain reaction (PCR) testing.
- No organisms were identified; broad-spectrum antibiotics were continued.

DISCUSSION

- Late thoracotomy-site abnormalities after transapical access can closely mimic a left ventricular pseudoaneurysm.
- Altered postoperative anatomy degrades imaging certainty — multimodality imaging may remain inconclusive despite a complete workup.
- When a structural complication cannot be confidently excluded, operative planning should assume the higher-risk diagnosis.

KEY TAKEAWAYS

1. When imaging is inconclusive, plan for the worst-case diagnosis.
   Equivocal findings after transapical access require operative caution.
2. Establish CPB by peripheral cannulation before re-entry.
   Convert an unpredictable re-entry into a controlled, reproducible operation.
3. A reproducible framework that prioritizes patient safety.
   Adoptable by any team facing late post-transapical thoracotomy-site abnormalities.

CONCLUSIONS

- As transapical access becomes more widely adopted, clinicians will increasingly encounter access-related complications.
- A pulsatile thoracotomy-site mass after transapical mitral repair may represent infection rather than structural failure, although these entities may be difficult to distinguish preoperatively.
- Early peripheral cardiopulmonary bypass before re-entry offers a safe and reproducible strategy when diagnostic uncertainty exists.

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Disclosures: The authors report no conflicts of interest. | Funding: None. | Written informed consent for publication was obtained from the patient.