

CASE PRESENTATION

POST-CARDIAC SURGERY BRADYARRHYTHMIA [1, 2]

DISCUSSION

PREOPERATIVE

A 67-year-old woman with no prior cardiopulmonary symptoms or other relevant medical comorbidities had a transient ischemic attack (TIA). Upon workup for her TIA, a routine transthoracic echocardiogram was performed and demonstrated a large atrial septal defect (ASD) and mitral valve mass. She was scheduled for robotic-assisted cardiac surgery to address these pathologies.

INTRAOPERATIVE

Induction of anesthesia and the patient's intraoperative course were uneventful through the docking of the robot and initiation of cardiopulmonary bypass (CPB). A left atriotomy was used to access the mitral valve at which time the mass was discovered to be a long anomalous chorda tendinea attached to A2. This chorda was not contributing to valve competency and was sharply dissected without incident. The large ASD was closed with two layers from the left atrial side. After separation from CPB, a remaining 2-millimeter ASD was discovered requiring reinitiation of CPB to fix. After each separation from CPB, the patient had complete heart block for several minutes which spontaneously converted to normal sinus rhythm with wide QRS complexes and U-waves and persisted without pacing wires. She was hemodynamically stable and extubated in the operating room.

POSTOPERATIVE

On postoperative day 1, the patient experienced bradycardia (40 beats per minute) alternating between junctional escape rhythms and symptomatic, hemodynamically unstable sinus bradycardia. This was treated successfully with one dose of glycopyrrolate after which she was observed to be hemodynamically stable for 2 additional days and discharged home. Upon outpatient follow-up, she had sinus tachycardia and initiated low-dose beta-blockade. She had no further known complications thereafter.

Patient-specific Risk Factors

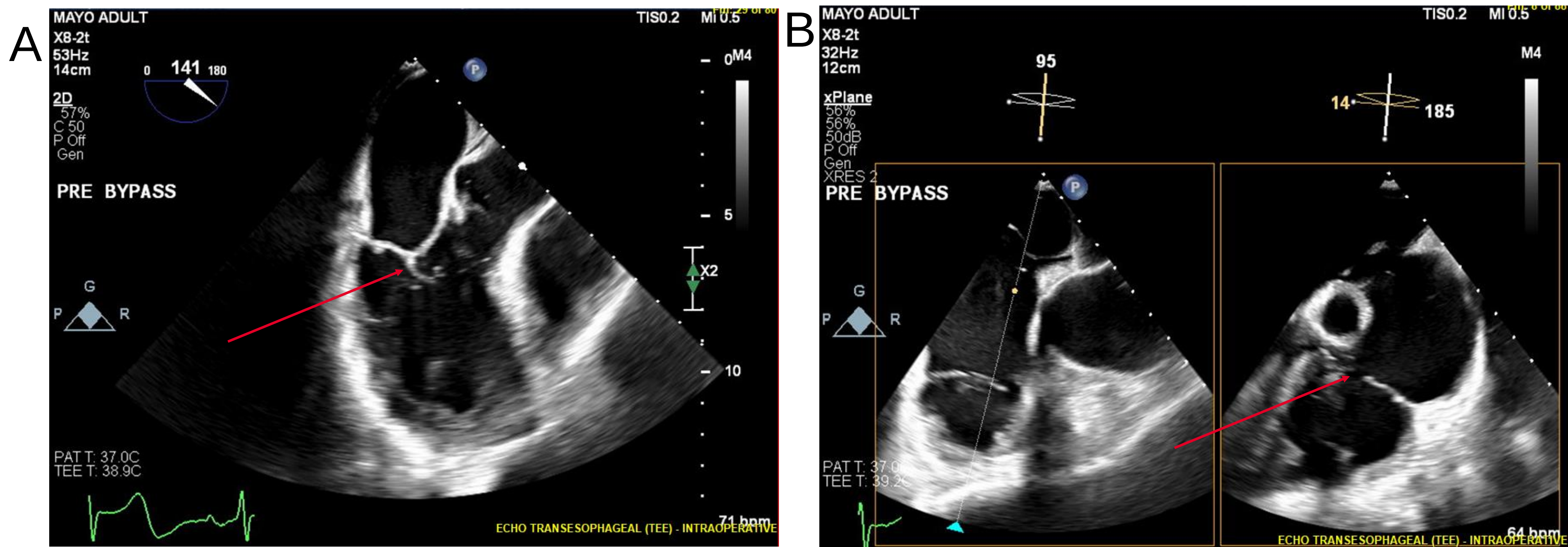
- Older age
- Perivalvular calcification
- Preoperative left bundle branch block
- LV aneurysmectomy
- Left main coronary artery stenosis
- Ostium secundum ASDs can but rarely cause conduction disorders

Surgical Risk Factors

- Mitral valve procedures associated with conduction disturbances in 30.6% of patients and complete heart block in 1.5% patients. Transseptal superior approaches to mitral valve can cause sick sinus syndrome and heart block.
- ASD repair can cause conduction disorder, although more common with ostium primum defects
- Longer CPB time
- Intraoperative medications such as methadone

Treatment

- Temporary or permanent pacing. Most dysrhythmias resolve within 7 days.
- Among those who receive permanent pacing, 30-40% remain pacemaker-dependent



Intraoperative transesophageal echocardiogram demonstrating mitral valve mass (A) and large atrial septal defect (B).

We describe a case of mitral valve mass resection and ASD repair in which a patient experienced intraoperative complete heart block and postoperative symptomatic bradycardia. This patient had multiple risk factors for these electrocardiographic changes. ASDs are associated with electrical remodeling of the atrial myocytes and increased intra-atrial conduction times from chronic volume stress. Preoperatively, the patient had a secundum defect with left-to-right shunt and mildly enlarged left and right atria [1]. Even though she did not have any preoperative conduction abnormalities, she likely had pre-existing myocardial pathology which increased her risk for these intraoperatively, in addition to older age at closure.

The patient also incurred increased risk of conduction abnormalities with the left atriotomy performed for resection of the long linear chorda. Mitral valve surgeries are associated with similar frequencies of second- or third- AV block due to direct surgical injury and edema [2].

These changes may explain the patient's episode of symptomatic bradycardia postoperatively, in addition to methadone. She received 14 milligrams (0.17 mg/kg) methadone intraoperatively, which is a standard medication used for intra- and post-operative pain control for cardiac surgery in our practice. Methadone has a long and variable half-life which can manifest as delayed bradycardia.

REFERENCES

1. Williams MR, Perry JC. Arrhythmias and conduction disorders associated with atrial septal defects. J Thorac Dis. 2018 Sep;10(Suppl 24):S2940-S2944. doi: 10.21037/jtd.2018.08.27. PMID: 30305954; PMCID: PMC6174150.
2. Peretto G, Durante A, Limite LR, Cianflone D. Postoperative arrhythmias after cardiac surgery: incidence, risk factors, and therapeutic management. Cardiol Res Pract. 2014;2014:615987. doi: 10.1155/2014/615987. Epub 2014 Jan 6. PMID: 24511410; PMCID: PMC3912619.