Complicated Mechanical Complications of Myocardial Infarction

Critical Role of Echo to Guide Management

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Use of Echo in the Setting of Myocardial Infarction

• Diagnosis – RWMA in setting of unclear history and ECG
• Prognostication – Pre-discharge Echo for LVEF, 40 days
• Complications
  • Thrombus
  • Mechanical Complications
  • RV infarction
  • Concomitant Heart Conditions
CASE PRESENTATION - Thanks to Yining XU MDCM, FRCPC

- **ID:** 56 F, very active, from home
- **PMHX:** Lt Breast CA s/p mastectomy several months prior with no chemotherapy or radiation
- Not known to have DM/HTN/DLP/CAD
- **Medications:** Letrizole

- **HPI**
  - RSCP with radiation to her throat ~ 3 minutes, 7 days ago
  - Spontaneously resolved
  - Next AM, progressive SOBOE, PND, orthopnea with myalgias and fatigue
  - Presented to ER due to worsening dyspnea

### Exam and EKG

- **BP:** 95/60, HR 90 regular, RR 30, Sat 90% on 2L NP
- **RESP:** using accessory muscles, crackles up to the bilateral upper lung zones
- **CVS:**
  - JVP elevated at 13 cm H₂O
  - Normal S1 S2, Holosystolic murmur grade II/VI radiating to axilla
STAT BEDSIDE TTE to stratify need for emergent cath – limited windows due to persistent left chest pain and bandages post-mastectomy

- Echo confirms diagnosis of LCx STEMI with preserved overall LV EF and significant (> mild-moderate) MR
LABS

- Initial High Sensitivity Trops 1180 nmol/l
- Normal CBC, Lytes, Kidney functions, TSH

- DX: Late presentation ACS (Kilip class 2) with Ischemic MR

Plan:
- ASA/Plavix/IV Heparin, Oxygen
- Diuresis with IV Lasix
- Markedly improved within an hour (BP 110, HR 80, \(O_2\) sat 95%), so...
- Angiogram in AM

NEXT MORNING ...

- Diuresed 2 L overnight
- Pre AM rounds: lying flat, conversing pleasantly with staff

- But then...
- Oxygen desaturation to 75% on room air.
- SBP 75 mmHg with worsening SOB, HR 120
DDx – Pump (R, L, Valve, Pericardium)

- Intubated and Supported with Norepinephrine
- STAT Bedside Echo: **No gross pericardial effusions**
- Brought STAT to Cath Lab
- Planned TEE during Cath to rule out MR from papillary muscle rupture
TEE DURING ANGIOGRAM

- TEE Confirms localized LCx territory WMA with > moderate Carpentier 3b MR.
The Importance of the Left Ventricle Form and Function

• Plan:
  • Urgent OR: CABG + Mitral valve replacement
    • Why Not PCI, Why replacement?

• While the Angiographer was deploying the access site closure device...

• SBP dropped to 75 mmHg
DDx?

- Coronary Perforation – wire passed
- Other...

I have no idea why the probe was still down...
“Dom, She’s about to arrest...”
WHY DO WE DO CPR?

- No aortic dissection seen on TEE
- ?Coronary perforation: No dye leak on reinjection
- LV free wall rupture suspected
Can we actually see the rupture?

EMERGENT OR

• PEA arrest
• Emergent Pericardiocentesis: Fresh Blood
• To OR ~ 20 minutes with ACTIVE CPR until on pump
  • Left ventricle lateral wall perforation was patched with autologous pericardial patch occluding OM 1
  • CABG X 3 (OM2, OM3, RCA)
  • Mitral Valve Replacement
    • Posterior leaflet severely tethered
Admitted to ICU with Levo 40, Epi 28, Vaso 0.04, iNO with IABP 1:1

POD #1, off propofol, responsive to commands

Hypotensive on large doses of vasopressors
Echo – Post-op

- Tamponade, Tamponade, Tamponade
- LV pump failure
- RV pump failure
- Valvular dysfunction
- Dissection

POST OP DAY 1 – Low C.I.
POST OP COURSE

• RV Failure
• Ventilator Associated Pneumoni
• AKI requiring temporary CVVH

• POD #30: discharge to rehab center (No neurological deficit)

Complications of MI – Be Systematic Including Critical Role of Echo

• MR – ruptured papillary muscle, but don’t forget remodeling and tethering
• Free wall rupture
• Acute VSR
• RV dysfunction – in this case, related to difficulty in protecting the RV intra-op, especially with long OR
• Systematic approach, close collaboration (cath, echo, surgery, CVICU, ICU...), and a little luck is necessary