



# Chest pain despite stent: Presentation and bedside management of a rare myocardial infarct complication

Clinton Kolseth, MD<sup>1</sup>; Khoa Nguyen, MD<sup>2</sup>; Srin Mukundan, MD<sup>2</sup>  
Oregon Health & Sciences University

## Introduction

Post-myocardial infarct ventricular septal rupture (VSR) occurs in less than 1% of all cases. However, current day estimates of mortality range between 20-50%. This case demonstrates a patient who presented with chest pain with initial work-up identifying a STEMI. Patient underwent stent placement, but recurrent chest pain prompted further exploration. A multidisciplinary approach in an intensive care setting is essential in the bedside management of this potentially lethal complication.

## Case Presentation

**Chief complaint:** 59-year-old male presenting with subacute worsening of left sided substernal chest pain for three weeks.

### Past Medical History:

- Hypertension managed with metoprolol
- Tobacco use disorder, currently smoking 1 pack/day
- Allergies: none
- Habits: no alcohol or recreational drug use

### Physical Exam:

- Vitals: T 98.1F, HR 67, BP 146/87, RR 18, O<sub>2</sub> 97% RA
- General: Well appearing in no acute distress
- Cardiovascular: Regular rate and rhythm, 2/6 holosystolic murmur best heard over apex, no rubs or gallops, no S3/S4, JVP at 1cm above clavicle at 30 deg, distal pulses intact
- Lungs: Clear to auscultation bilaterally.

### ED Course:

- ECG: convex ST elevations in Leads II, III, aVF.
- He was given aspirin, clopidogrel, and a heparin infusion was started. Code STEMI was activated.
- Coronary angiography showed a 99% mid-distal right coronary artery thrombotic occlusion. A drug-eluting stent was placed.

### Post-catheterization:

Despite rapid percutaneous intervention, patient continued to complain of left sided chest pain and nausea. Post-procedural transthoracic echocardiogram (TTE) revealed a 2.5cm muscular VSR in the mid-cavity (Figure 1). Patient was transferred to the cardiovascular intensive care unit for close observation and further management.

## CVICU Management

### Admission

- Patient continued to complain of chest pain and nausea.
- Lab values demonstrated acute kidney injury, elevated lactate, concerning for shock secondary to hypoperfusion.

### Intervention

- An arterial line was placed.
- IV sodium nitroprusside to reduce afterload was initiated. Patient's symptoms resolve.

### POCUS

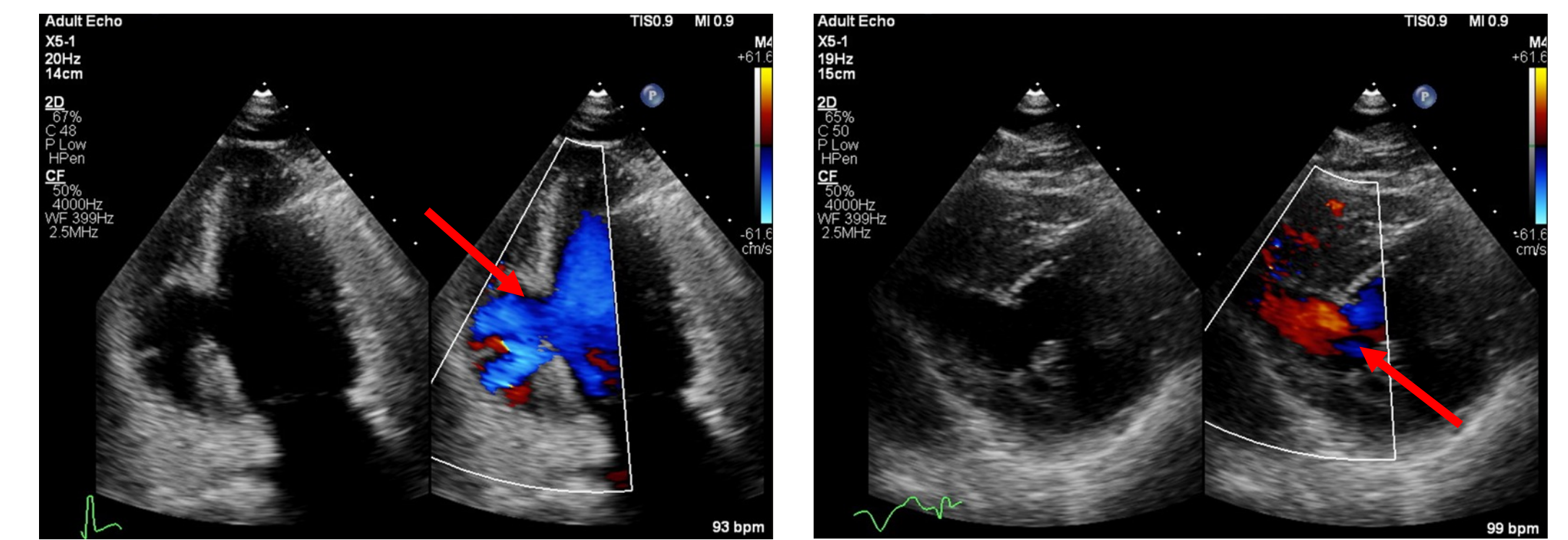
- Serial bedside TTEs were performed by intensivists to monitor the pulmonary-systemic flow ratio (Qp/Qs), a measure cardiovascular shunting, in real time.
- Qp/Qs gradually reduced from 2.4 on initial TTE to 1.8 in a 24-hour period (Figure 2).

### Stabilization

- Patient transitioned from sodium nitroprusside to oral hydralazine and isosorbide dinitrate after 72 hours.
- Patient did not require extracorporeal mechanical support.

### Surgical Repair

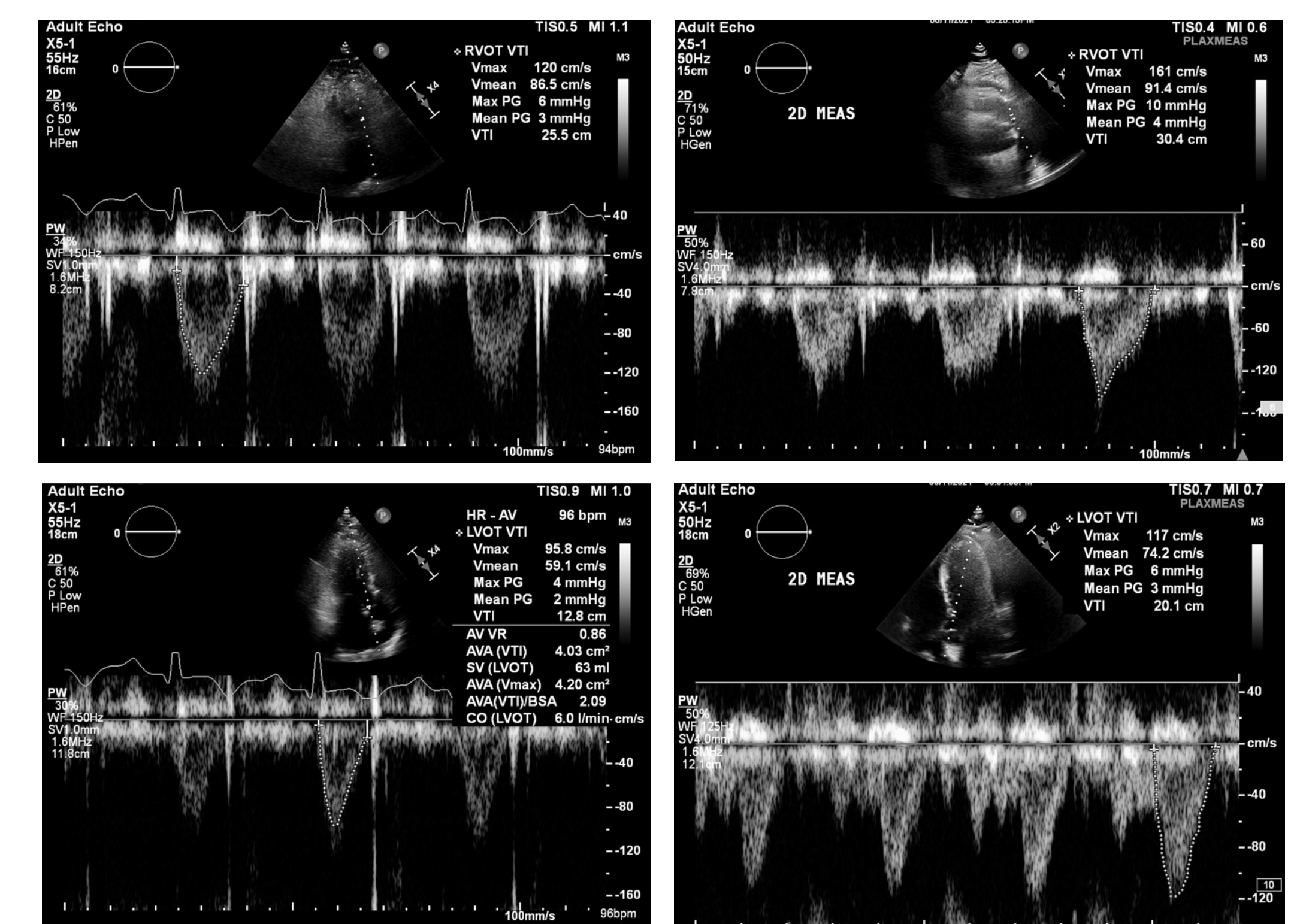
- Patient remained hemodynamically stable for four weeks, allowing for stabilization of ventricular tissue.
- Patient underwent successful surgical repair with cardiothoracic surgery.



**Figure 1.** Short axis and apical views of formal TTE obtained after percutaneous coronary angiogram. Color doppler confirms the presence of interventricular septal wall rupture.

### Pre-Vasodilator

### Post-Vasodilator



**Figure 2.** Example of serial bedside TTEs to evaluate right ventricular/left ventricular outflow track velocity time, integral in evaluation of the Qp/Qs.

## Discussion

- Prior to the onset of rapid and emergent percutaneous intervention, the incidence of VSR was approximately 2%. Today, the rates have been estimated to be around 0.31%. Early detection of VSR is key to reducing mortality.
- Identification of a murmur on physical exam is essential in identifying VSR. Upon auscultation, a loud harsh systolic murmur over the left sternal border and apical area can be appreciated. The murmur can sometimes radiate to the left axilla, mimicking mitral regurgitation. Almost all patients will complain of recurrent chest discomfort.
- This case demonstrates that not only is point-of-care ultrasound (POCUS) useful in confirming physical exam findings and diagnoses non-invasively, it can also be a useful tool in guiding management, particularly when it comes to real time hemodynamic manipulation in the intensive care setting.
- Timing of VSR remains a controversial subject to this day. Modern guidelines suggest urgent VSR repair following an MI. However, recent literature has been contradictory. It has been demonstrated that delaying surgery allows for reduction of myocardial inflammation pre-operatively, thus improving surgical outcomes. Therefore, hemodynamic stabilization prior to surgery will likely play a large role in the management of VSR in the future.

## Take Home Point

VSR is a medical and surgical emergency, and requires a thorough history and physical examination to properly identify this post-MI complication. Management requires swift identification and transfer to the ICU for close observation and afterload reduction. Management of this rare complication requires a multimodality approach from the ambulatory setting to the operating room.

## References

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<sup>1</sup>: Oregon Health and Sciences University, Department of Medicine

<sup>2</sup>: Oregon Health and Sciences University, Knight Cardiovascular Institute