

# Dynamic Left Ventricular Outflow Tract Obstruction in an Elderly Woman

## A Case of Recurrent Syncope and Acute Decompensation

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### BACKGROUND

Significant left ventricular outflow tract obstruction (LVOTO) is defined as a peak gradient of  $\geq 30$  mmHg, with  $\geq 50$  mmHg indicating the need for septal reduction in symptomatic patients.

### PRESENTATION & HOSPITAL COURSE

A 73-year-old woman with a history of atrial fibrillation, hypertension, non-sustained ventricular tachycardia, and a dual-chamber pacemaker for bradycardia was admitted after a near-syncope episode. She reported frequent exertional syncope over eight months. Echocardiogram revealed significant LVOTO with systolic anterior motion (SAM) of the mitral valve, confirmed by left heart catheterization showing a "spike and dome" LV pressure pattern, with a peak gradient of 114 mmHg and mean gradient of 51 mmHg. Despite initial medical management, she developed acute respiratory distress and unstable tachyarrhythmia, requiring cardioversion, vasopressor support, and intubation. Persistent symptoms after stabilization led to transfer to a tertiary care center for septal reduction evaluation.

### DISCUSSION

The patient's recurrent syncope, initially attributed to bradycardia, led to pacemaker placement. Symptoms persisted due to dynamic LVOTO rather than conduction disease. Acute decompensation was driven by severe LVOTO and arrhythmia. The "spike and dome" pattern seen during catheterization is a hallmark of LVOTO, reflecting rapid LV ejection followed by dynamic outflow obstruction. The top differential diagnoses were hypertrophic obstructive cardiomyopathy (HOCM) versus LV cavity obliteration (LVCO). SAM was demonstrated on echocardiography, suggesting HOCM. The peak-to-mean gradient ratio of 2–3 was consistent with HOCM. Long-term management, including arrhythmia control and treatment of her hypertrophic disease, will be crucial for reducing future cardiovascular risk.

### CONCLUSION

This case highlights the importance of thorough evaluation and timely management in patients with recurrent syncope, ensuring dynamic LVOTO is recognized and differentiated from other conditions to prevent severe complications. Early assessment of pressure gradients in the cath lab may clarify diagnoses when echo findings are unclear.

An elderly woman with recurrent exertional syncope and a pacemaker was found to have **severe dynamic LVOTO with a staggering 114 mmHg peak gradient**, leading to acute decompensation and the need for cardioversion and intubation.

This case underscores the critical need to distinguish LVOTO from conduction disease, as **early recognition and intervention can prevent life-threatening deterioration.**

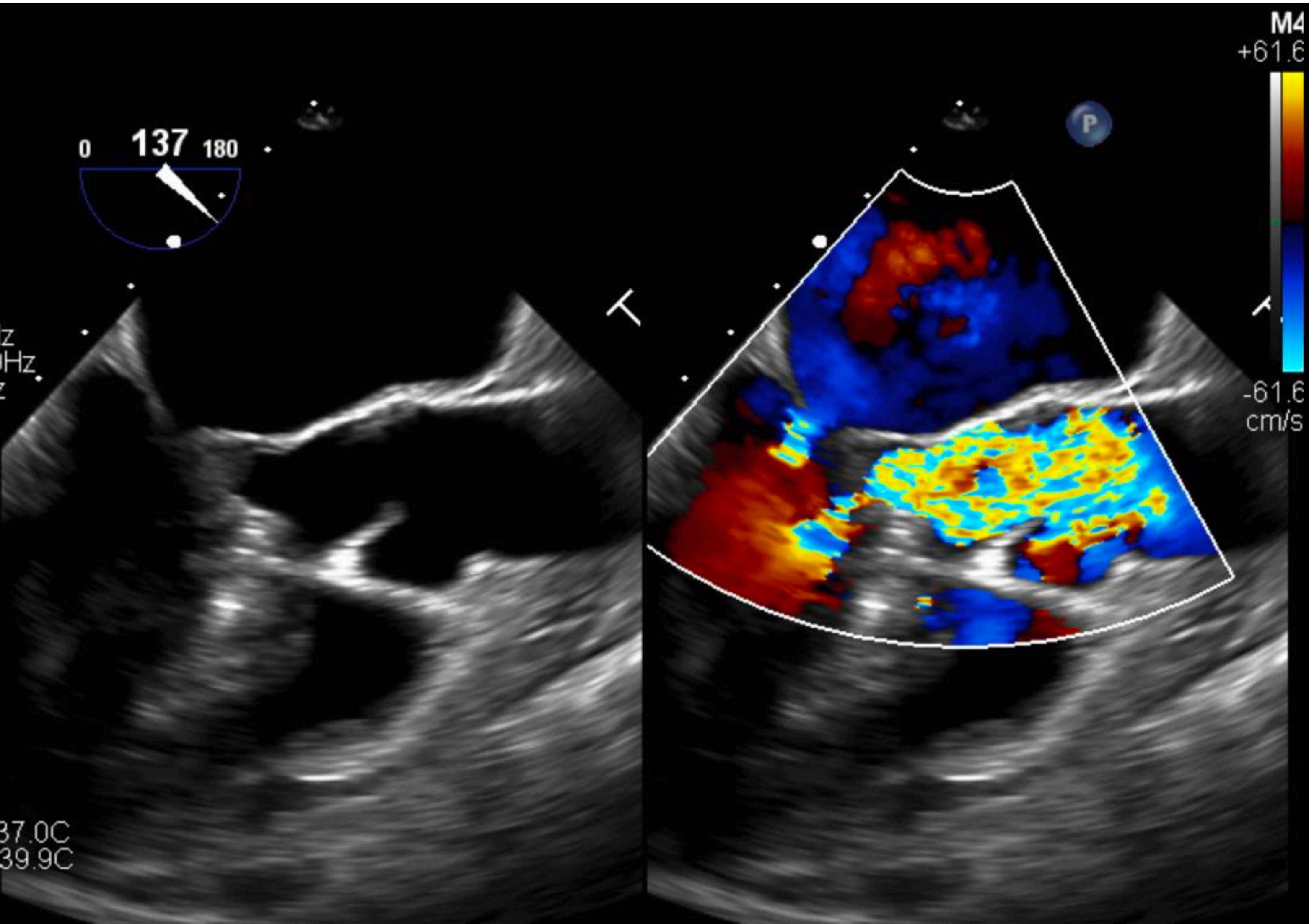
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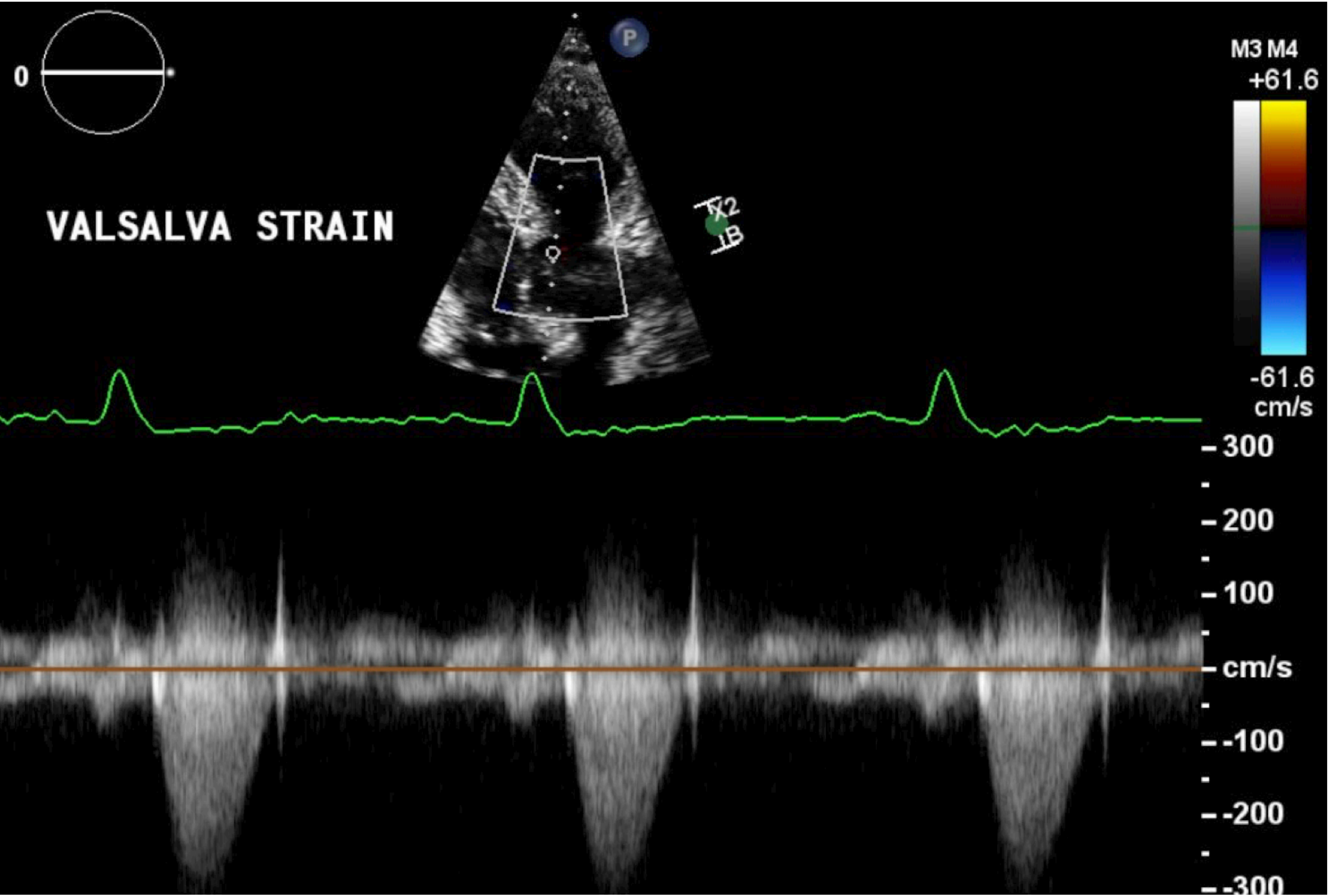
### TRANSESOPHAGEAL ECHOCARDIOGRAPHY

#### MIDESOPHAGEAL LONG AXIS VIEW AT 137°



Color compare images showing evidence of SAM. Turbulent flow noted at the LVOT. LVEF estimated at 65%.

### CONTINUOUS WAVE DOPPLER



Following treatment, above showing early peaking jet at rest.

### REFERENCES

- 1) Pollick C, Shmueli H, Maalouf N, Zadikany RH. Left ventricular cavity obliteration: Mechanism of the intracavitary gradient and differentiation from hypertrophic obstructive cardiomyopathy. Echocardiography. 2020 Jun;37(6):822-831. doi: 10.1111/echo.14710. Epub 2020 May 22. PMID: 32441850; PMCID: PMC7383474.
- 2) Maron MS, Olivotto I, Zenovich AG, Link MS, Pandian NG, Kuvin JT, Nistri S, Cecchi F, Udelson JE, Maron BJ. Hypertrophic cardiomyopathy is predominantly a disease of left ventricular outflow tract obstruction. Circulation. 2006 Nov 21;114(21):2232-9. doi: 10.1161/CIRCULATIONAHA.106.644682. Epub 2006 Nov 6. PMID: 17088454.

### DISCLOSURES

Bret K Farrow-Cypel: no relevant disclosures