CHEST

A 74-Year-Old Man With Refractory Hypotension After Spine Surgery

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VIDEO

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A 74-year-old man with a remote history of prostate cancer status after prostatectomy, underwent a staged anterior (ALIF) and posterior lumbar interbody fusion (PLIF). The perioperative course of the first stage was remarkable only for a slightly higher than expected blood loss (approximately 300 mL). The patient did not require a blood transfusion and was discharged to the floor from the postanesthetic care unit.

The patient returned to the operating room the following day for the second stage of the procedure (PLIF). The intraoperative course was notable for persistent sinus tachycardia with an estimated blood loss of 700 mL. He was given 2,500 mL of isotonic crystalloids and 500 mL of albumin throughout the procedure, and urine output was noted to be 400 mL.

On admission to the postanesthetic care unit, the patient continued to be tachycardic, with a heart rate of 130 beats/min and blood pressure of 110/70 while receiving phenylephrine infusion at 1 μg/kg/min. The respiratory rate was 22 breaths/min, with oxygen saturation of 96% while receiving oxygen via a nasal cannula at 6 L/min. Results of the remainder of the physical examination were within normal limits. Initial presumptive diagnosis was hypovolemia due to underestimation of blood and other insensible losses. Additional crystalloid, albumin, and 1 unit of packed red blood cells were administered without significant change in hemodynamics. Over the course of the next hour, he developed respiratory distress and had an increasing oxygen requirement.

Laboratory data were notable for the following: hemoglobin, 11.0 g/dL; Pao_2, 65 mm Hg; and lactate, 1.2 mM. A 12-lead ECG showed sinus tachycardia with right bundle branch block, which was unchanged from the preoperative ECG.

The posterior paraspinal drain output was relatively low, which decreased the suspicion for surgical bleeding in this immediately postoperative patient. Focused abdominal ultrasound (modified focused assessment with sonography for trauma) examination for assessment of intraperitoneal fluid collections produced negative results. With ongoing evidence of shock and no evidence of bleeding, a focused cardiac ultrasound was performed to assess biventricular function. This focused examination demonstrated a hyperdynamic, underfilled left ventricle, dilated right ventricle (Fig 1) with septal

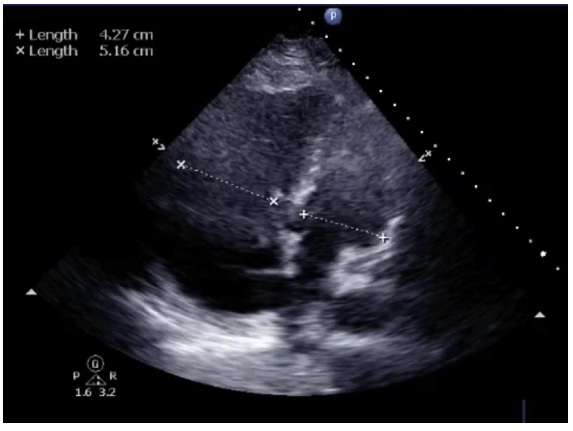

Figure 1 – *Apical four-chamber view. Still image that is directed posteriorly as the coronary sinus is seen. Although the left ventricle is foreshortened, dimensions of the right ventricle (×—×) and left ventricle (+—+) are recorded.*

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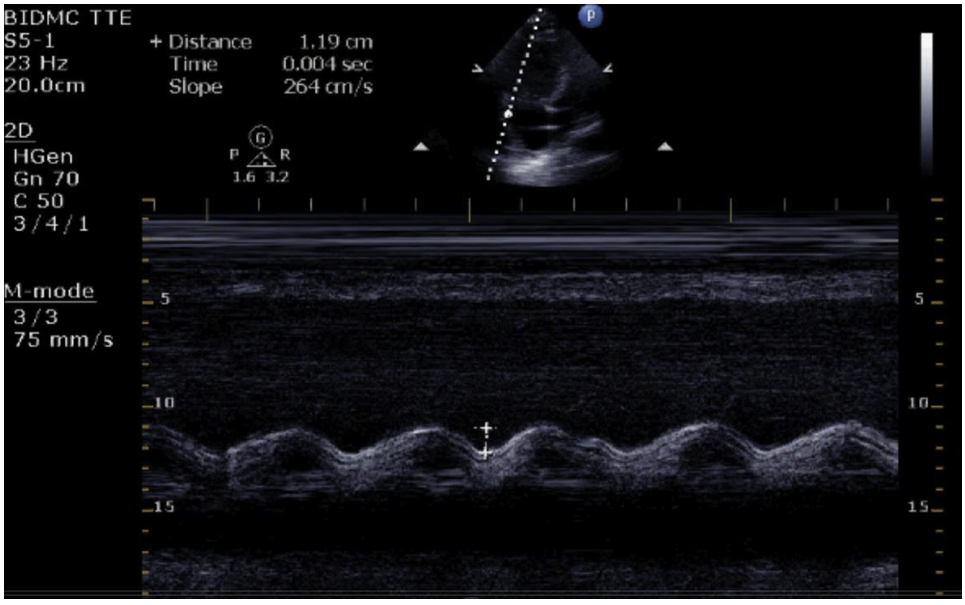

Figure 2 – *Apical four-chamber view with M mode across the tricuspid annulus. The tricuspid annular plane systolic excursion is recorded and is 1.19 cm.*

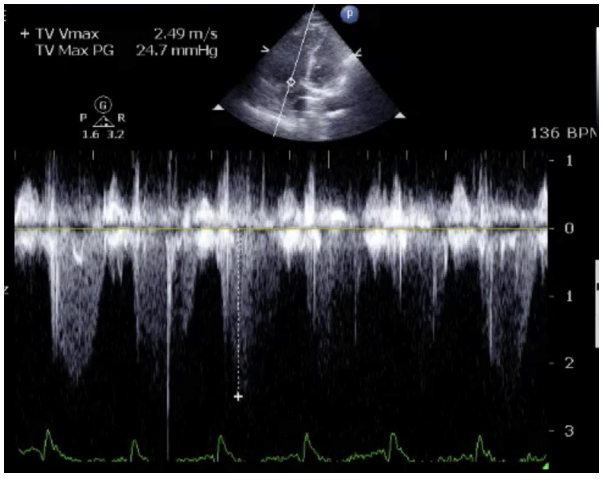

Figure 3 – *Apical four-chamber view with continuous wave Doppler interrogation of tricuspid regurgitation. The pulmonary artery systolic pressure can be estimated by the velocity of the tricuspid regurgitation jet. The relationship $4v^2$ + right atrial pressure (central venous pressure), which is the right ventricular systolic pressure, is equal to the pulmonary artery systolic pressure as long as there is no pulmonic stenosis or right ventricular outflow tract obstruction.*

flattening consistent with right ventricular pressure, and volume overload (Video 1). Tricuspid annular plane systolic excursion (TAPSE) was depressed (Fig 2), suggesting reduced right ventricular function along with akinesia of the mid-free wall and hypercontractility of the apical wall of the right ventricle (McConnell sign). The estimated pulmonary artery systolic pressure was 30 mm Hg (Fig 3).

Question: Based on the echocardiographic findings in Figures 1-3 and Video 1, what additional tests should be considered?