

Use of Transthoracic Echocardiography (TTE) for Intraoperative Monitoring during a Cesarean Section for a Patient with Unicuspid Aortic Valve

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Introduction

- Cardiovascular diseases (CVD) complicate 1–4% of normal pregnancies and although infrequent, they are nevertheless the leading cause of maternal mortality.¹
- Aortic valve diseases (AVD) are often associated with poor maternal and fetal outcomes during pregnancy. These patients require a multidisciplinary approach for prenatal care and delivery.² Unicuspid aortic valve (UAV) is a rare congenital CVD, usually complicated by aortic stenosis (AS) as well as aortic insufficiency (AI). Aortopathies may also be associated.

Case Description

- After obtaining consent, we report the case of an 18 year-old female with a UAV and dilated aortic root presenting for delivery. She became pregnant while awaiting surgical correction of her UAV and dilated root. Pre-delivery CT angiogram demonstrated a dilated aortic root and ascending aorta with no evidence of dissection. TTE revealed normal biventricular function, with a mildly dilated left ventricle, as well as a UAV with moderate to severe AS and moderate to severe AI (see images below). She was followed closely by a multidisciplinary team throughout her pregnancy, and finally a plan was made for elective cesarean section (CS) at 37 weeks.
- In the operating room (OR) in addition to standard American Society of Anesthesiology monitors, an arterial line was placed. The anesthetic technique was a CSE with intrathecal opioids (Fentanyl 15 mcg, Epimorph 150 mcg) and a slowly titrated 2% lidocaine solution in the epidural catheter.
- The patient's initial systemic arterial blood pressure (BP) was 134/74 (mean 101) mmHg, heart rate (HR) 95 beats/min.

Case Description

- BP and afterload were maintained by a phenylephrine infusion titrated with care to avoid excessive hypertension and minimize shear stress on the patient's dilated ascending aorta. Fetal HR monitoring was also performed from the time of entry into the OR until surgical site preparation. Before and after the neuraxial block, as well as immediately after delivery of the newborn, an Intraoperative TTE was performed to calculate the patient's stroke volume and cardiac output (CO) After delivery, Carbetocin 100 mcg was administered IV over 15 minutes. There were no intraoperative changes on patient's hemodynamics or TTE exam. No surgical complications occurred. Postoperatively, patient was admitted to the ICU for hemodynamic monitoring and was subsequently discharged home 2 days later.

Discussion

To our knowledge, this is the 1st case of UAV presenting for a CS. TTE was successfully used for dynamic CO measurement during the onset of the sympathectomy and throughout the remainder of the procedure demonstrating the usefulness of such a non-invasive, safe technique.

References

- Ramlakhan, et al. Pregnancy and cardiovascular disease. *Nat Rev Cardiol*.2020;17(11):718-31
- Nishimura, et al. 2014 AHA/ACC guideline for the management of patients with valvular heart disease. *Circulation*.2014;129(23)

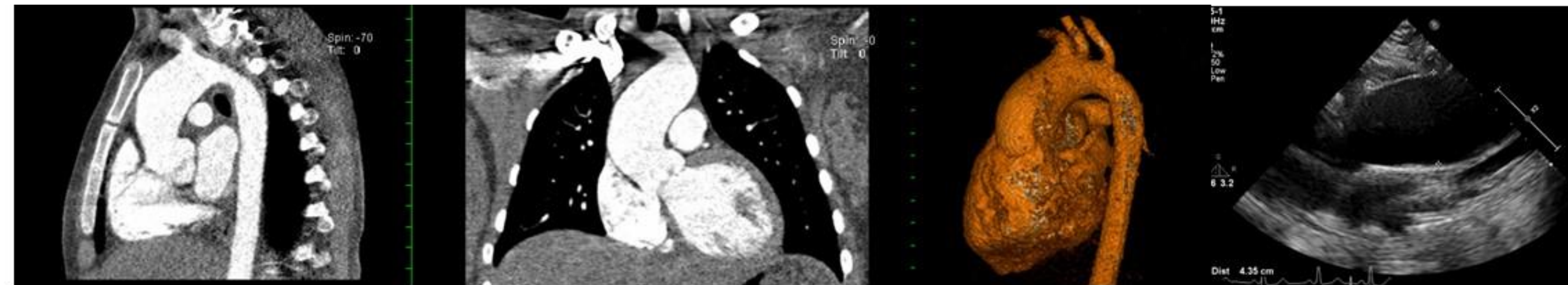


Figure 1: CT Angio showing dilated aortic root and ascending aorta with no evidence of dissection with the following parameters 34 x 39 x 30 mm, and 38 x 42 mm respectively which can be seen also by intraoperative TTE through the parasternal long axis view (4.35 cm)

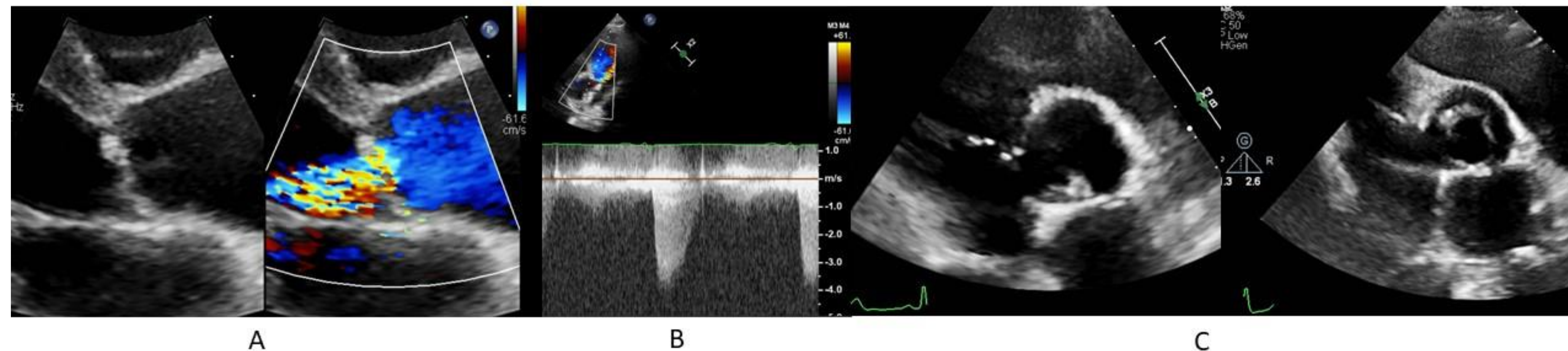


Figure 2: Intraoperative TTE:

- A) Parasternal long axis view with color flow mapping showing severe AR with AR jet height/LVOT diameter >65%,
 B) Apical 5 chambers view with CW doppler showing severe AS with peak velocity across the AV almost 4 m/sec (PPG 64 mmHg),
 C) Parasternal short axis view AV showing UAV with single commissure attached posteriorly and an eccentric elongated opening of the AV during systole