

# A Rare Case Report of Ruptured Sinus of Valsalva in Pregnancy: Role of Transesophageal Echocardiography

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## ABSTRACT

Ruptured sinus of Valsalva (RSOV) is a rare but potentially fatal condition and is usually associated with congenital conditions like ventricular septal defect (VSD), aortic insufficiency, and bicuspid aortic valve.<sup>1</sup> Ruptured sinus of Valsalva is rare in pregnancy and if present, causes additional strain on the already stretched hemodynamics of a pregnant female.<sup>2</sup> Very few cases of an RSOV in pregnancy have been reported.<sup>2,3</sup> We describe a case of RSOV during pregnancy.

**Keywords:** Pregnancy, Ruptured sinus of Valsalva, Transesophageal echocardiography, Ventricular septal defect.

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## CASE DESCRIPTION

A 26-year-old woman presented with shortness of breath on exertion, chest pain, and palpitations at the 20th week of gestation. She had a spontaneous conception which was confirmed with ultrasound in the first trimester. Her trimester history was uneventful; she received folic acid in the first trimester and oral iron and calcium supplements and also tetanus toxoid (TT) immunization. She had quickening at the 5th month of gestation and was asymptomatic without any medications until the end of the second trimester.

She presented to the hospital at the end of the second trimester of pregnancy and on examination, her heart rate was 110/minute, blood pressure 96/66, SpO<sub>2</sub> 99%, respiratory rate 24/minute, and NYHA grade III. She had a pan systolic murmur on auscultation but no crepts in lung fields. 12-lead electrocardiography (ECG) showed normal sinus rhythm at a rate of 110 bpm with no evidence of right-heart strain. Sonography revealed a healthy fetus with adequate size for gestational age and no evidence of malformations.

2D transthoracic echocardiography (TTE) revealed that the right sinus of the Valsalva had ruptured into the right ventricle (RV) outflow tract. The defect had continuous flow across it (white arrow in Fig. 1) and was of size 0.7 cm as appreciated (Fig. 2).

She was medically managed with intravenous furosemide and oral metoprolol. The symptoms were not well controlled on medications and it was planned to take her up for surgical repair at the end of 32 weeks of gestation.

At the time of surgery, anesthesia was induced with injection propofol 40 mg, and intubation was facilitated after injection vecuronium 6 mg. An adult transesophageal echocardiography (TEE) probe was inserted for intraoperative TEE.

Intraoperative TEE revealed two distinct jets directed left to right of the heart and these were identified as a subpulmonic ventricular septal defect (VSD) (arrow) and an ruptured sinus of Valsalva (RSOV) (arrowhead) in the midesophageal parasternal long-axis view (Fig. 3).

After anesthesia induction, the baby was delivered through elective cesarean section. This was followed by an injection fentanyl 100 µg for midline sternotomy. Then, full heparinization was done

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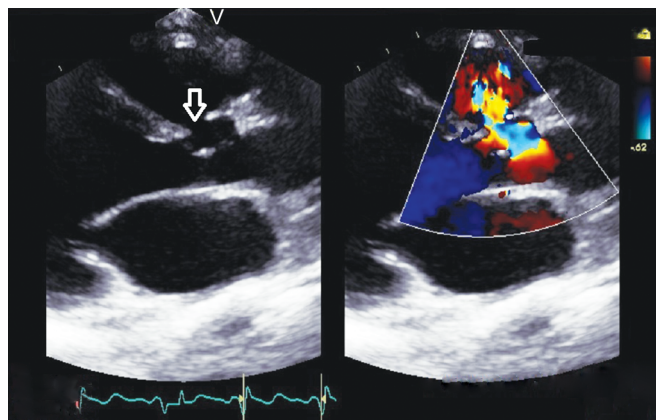
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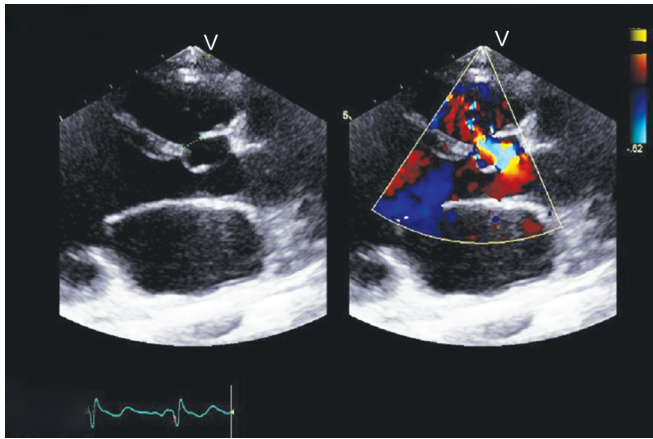
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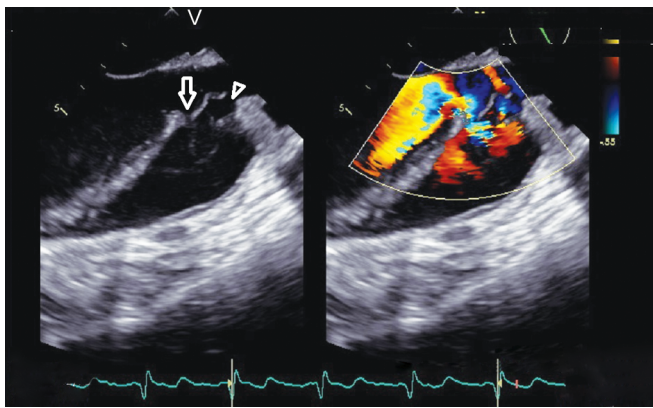
**Patient consent statement:** The author(s) have obtained written informed consent from the patient for publication of the case report details and related images.



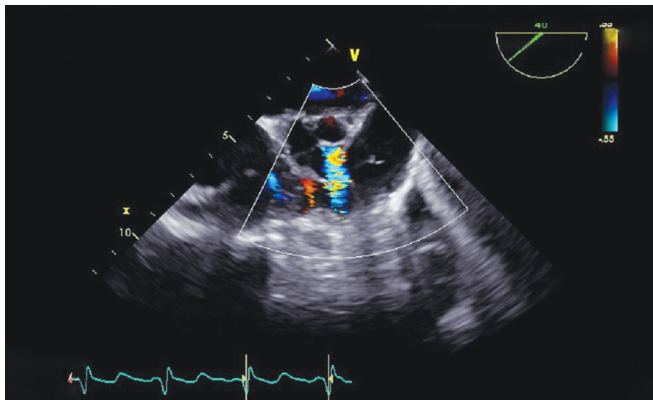
**Fig. 1:** Parasternal long-axis view in transthoracic echocardiography (white arrow). It is showing a ruptured sinus of the Valsalva into the right ventricular outflow region. Both 2D and color Doppler imaging are seen here



**Fig. 2:** A 0.7 cm defect seen secondary to the ruptured sinus of Valsalva in transthoracic echocardiography in the parasternal long-axis view



**Fig. 3:** Midesophageal long-axis view in TEE showing two defects. One is VSD (white arrow), other is a ruptured sinus of Valsalva (arrowhead)



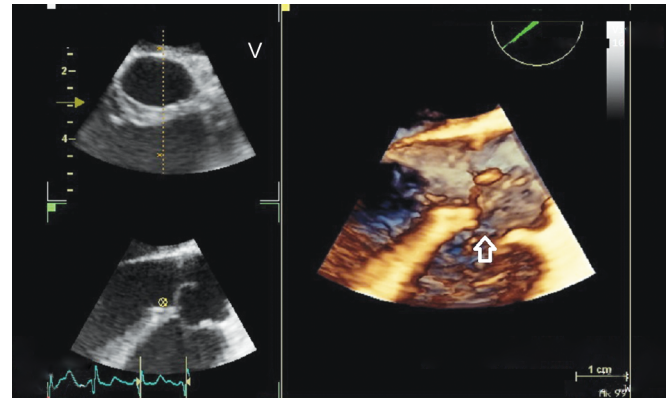
**Fig. 4:** A color Doppler at TEE ME RV inflow/outflow view showing left to right shunt due to RSOV opening into the RV outflow tract

to achieve an Activated Clotting Time (ACT) of >480 seconds. Following sternotomy repair of RSOV was done along with the closure of VSD on Cardiopulmonary Bypass (CPB).

The perioperative period was uneventful and she was extubated on a postoperative day 1 and discharged from ICU on day 4.

## DISCUSSION

Sinus of Valsalva normally functions to prevent the occlusion of coronary artery Ostia during systole when the aortic valves open.



**Fig. 5:** 3D reconstruction of TEE views showing RSOV (white arrow)

Rupture of the sinus of Valsalva can cause severe hemodynamic disturbances due to left to right shunt and often requires urgent surgical intervention. Association of an RSOV with a coexistent VSD is frequent.<sup>1</sup>

Various changes in hemodynamics during pregnancy might contribute to the worsening of cardiac status in patients with existing cardiac disease. These include an increase in heart rate by 10–20%, an increase in total blood volume, and an increase in cardiac output by 30–50% from baseline. This increases the shunt burden in patients with an existing left to right shunt. Thus, pregnant patients with an abnormal left to right shunt through the ruptured sinus of the Valsalva can become severely symptomatic.<sup>2</sup>

VSDs are the commonest congenital lesions and their association with RSOV is fairly common. Their size, location, and association with surrounding structures are very vital in deciding the plan of surgery. Transesophageal echocardiography is indispensable in the diagnosis of a VSD compared to TTE.<sup>4,5</sup>

TTE parasternal views are limited by the fact that they have a limited ability to include adjacent landmarks. In this patient, the flows of VSD and RSOV were missed on TTE probably because their flows in the right ventricular outflow tract (RVOT) were overlapping. For more accurate delineation of these two flows, TEE was more helpful. The detection of VSD, in this case, was important because increased flow through it was the reason for RSOV and it was necessary to address it during the surgical management of the same.

Transesophageal echocardiography is a vital tool for a detailed assessment of patients who present with RSOV. This detailed assessment involves detecting the etiology and any associations for the ruptured sinus. Transesophageal echocardiography provides high-resolution images of VSDs, particularly of the muscular and membranous parts. Transesophageal echocardiography midesophageal aortic valve short-axis and long-axis views at angles 0°, 40–60°, and 120° are all good for imaging the VSDs. These views also give a good assessment of associated structures (Figs 3 to 5).

This case report becomes an example that perioperative TEE is an important and irreplaceable tool in the perioperative period of a patient presenting with RSOV and can site important associations that might be needed to address in the same setting and missing which would not be in the best interest of the patient.

## REFERENCES

1. Charfeddine S, Abid D, Triki F, et al. Unusual case of ruptured sinus of valsalva aneurysm in a pregnant woman. *Pan Afr Med J* 2017;27:271. DOI: 10.11604/pamj.2017.27.271.9741.

2. Rashid U. Ruptured sinus of Valsalva at 18 weeks of pregnancy. *J Am College Cardio* 2018;71(Suppl 11):A2523. DOI: 10.1016/S0735-1097(18)33064-x
3. Goel L, Gautam P, Suchith C. Ruptured aneurysm of right. *Indian J Anaesth* 2009;53(1):88–93. PMID: 20640086.
4. Neema PK, Sethuraman M, Rathod RC. Implications of intraoperative transesophageal echocardiography detection of ruptured sinus of valsalva in a patient with severe aortic regurgitation Undergoing aortic valve replacement. *Anesthesia* 2006;20(6):847–849. DOI: 10.1053/j.jvca.2005.05.020.
5. Sarupria A, Kapoor PM. Trans-esophageal echocardiography: an indispensable guide for transcatheter device closure of ruptured sinus of valsalva aneurysm. *Ann Card Anaesth* 2012;15(2):156–157. DOI: 10.4103/0971-9784.95081