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CASE REPORT

# Successful Anaesthetic Management of ASD Device Closure for Aneursymal ASD in a Lactating Motherwith Guidance of Tee Under Conscious Sedation with Thrive

**Ilaveyini Sathiaseelan**

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## ABSTRACT

Atrial septal defect is a common congenital cardiac abnormality encountered in adults, with ostium secundum defects representing the most frequent subtype. Transcatheter closure is widely preferred for anatomically suitable defects because it avoids surgical intervention and is associated with shorter recovery. Anaesthetic management may be challenging when prolonged transesophageal echocardiographic guidance is required, particularly in patients with complex septal anatomy. General anaesthesia provides airway protection and procedural immobility but may delay recovery and necessitate airway instrumentation. Conscious sedation preserves spontaneous ventilation and may facilitate earlier recovery, although careful patient selection and continuous monitoring are essential. Transnasal humidified rapid-insufflation ventilatory exchange can support oxygenation during procedural sedation while maintaining spontaneous ventilation, but its application during structural cardiac interventions remains less established. Additional considerations may arise in lactating women, where early recovery and appropriate medication selection are important. We report the successful use of THRIVE-assisted conscious sedation for transcatheter closure of an aneurysmal secundum ASD in a lactating woman.

## KEYWORDS

• Heart Septal Defects • Atrial • Procedural Sedation • Lactation • Transcatheter • Aneurysm • Cardiac

**AUTHOR'S AFFILIATION:**

Southern Railway Headquarters Hospital, Perambur, Chennai, Tamil Nadu, India.

**CORRESPONDING AUTHOR:**

**Ilaveyini Sathiaseela,** Southern Railway Headquarters Hospital, Perambur, Chennai, Tamil Nadu, India.

**E-mail:** maxiloure@gmail.com

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## INTRODUCTION

Atrial septal defect (ASD) is one of the most common congenital heart defects diagnosed in adults, with secundum ASD being the most frequent subtype of ASD. If left untreated, a persistent left-to-right shunt can gradually lead to right heart volume overload, atrial and ventricular dilatation, atrial arrhythmias, pulmonary hypertension, and eventually right heart dysfunction. Closure is recommended for haemodynamically significant defects with right ventricular volume overload. In patients with suitable anatomy, transcatheter device closure has become the preferred treatment because it is minimally invasive, offers faster recovery, shorter hospital stays, and outcomes comparable to surgery.[1,2] Anaesthetic management during transcatheter ASD closure remains challenging, particularly when prolonged transesophageal echocardiographic (TEE) guidance is required. While general anaesthesia provides airway control and optimal procedural conditions, conscious sedation is increasingly used because it preserves spontaneous ventilation, reduces airway manipulation, and allows faster recovery. However, it requires careful patient selection, close monitoring, and meticulous airway management, especially in patients with complex anatomy.[1,3]

The presence of an atrial septal aneurysm (ASA) adds further complexity because the highly mobile septum can make device positioning and deployment more difficult, requiring precise imaging and minimal patient movement. Although a few reports have shown successful device closure under conscious sedation, evidence regarding anaesthetic management in aneurysmal ASD remains limited.[3,4] THRIVE has shown benefits in procedural sedation by improving oxygenation and supporting spontaneous ventilation, although its role during structural cardiac interventions is still not well established.[5-7] Published evidence on the anaesthetic management of lactating women undergoing structural heart interventions remains limited.[8,9] We report the successful anaesthetic management of a 21-year-old lactating woman with a secundum ASD and a large ASA who underwent transcatheter device closure under conscious sedation.

## CASE PRESENTATION

A 21-year-old lactating woman from Lucknow presented with intermittent central chest pain, giddiness, and New York Heart Association (NYHA) class II dyspnoea for nine months and worsened last 3 months. She had been diagnosed with ASD associated with ASA one year earlier. The patient had no significant neonatal, medical, or family history of cardiovascular disease. She underwent an uneventful lower segment caesarean section (LSCS) nine months before presentation and remained asymptomatic throughout the pregnancy. Her symptoms appeared in the postpartum period. Antiplatelet therapy was stopped seven days before the planned procedure, and prophylactic unfractionated heparin (5,000 IU) was administered until the evening before the intervention.

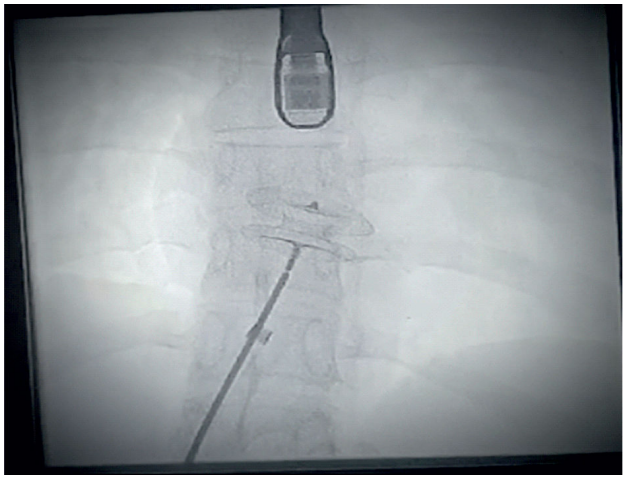


**Figure 1:** Intraprocedural fluoroscopic and transesophageal echocardiographic guidance using precise transcatheter deployment and stable positioning of the occlusion device across the aneurysmal atrial septal defect.

Preoperative assessment classified her as American Society of Anaesthesiologists physical status IV with a moderate Revised Cardiac Risk Index (RCRI). General examination was unremarkable, except for an ejection systolic murmur over the central sternal region. The results of respiratory and neurological examinations were normal. Transthoracic echocardiography revealed situs solitus with levocardia, preserved biventricular function, and a left ventricular ejection fraction of 65%. A 1.8-cm secundum ASD within a type I R atrial septal aneurysm (1 cm excursion) produced a significant left-to-right shunt (Qp:Qs, 2.5:1) with right atrial and ventricular dilatation and an estimated pulmonary artery pressure of 36 mmHg. No associated congenital defects, thrombi,

emboli, regional wall motion abnormalities, or significant valvular diseases were identified. Electrocardiography showed a normal sinus rhythm (86 beats/min), and laboratory investigations, including haemoglobin (11.6 g/dL), renal and liver function, blood glucose, and coagulation profile, were within normal limits.

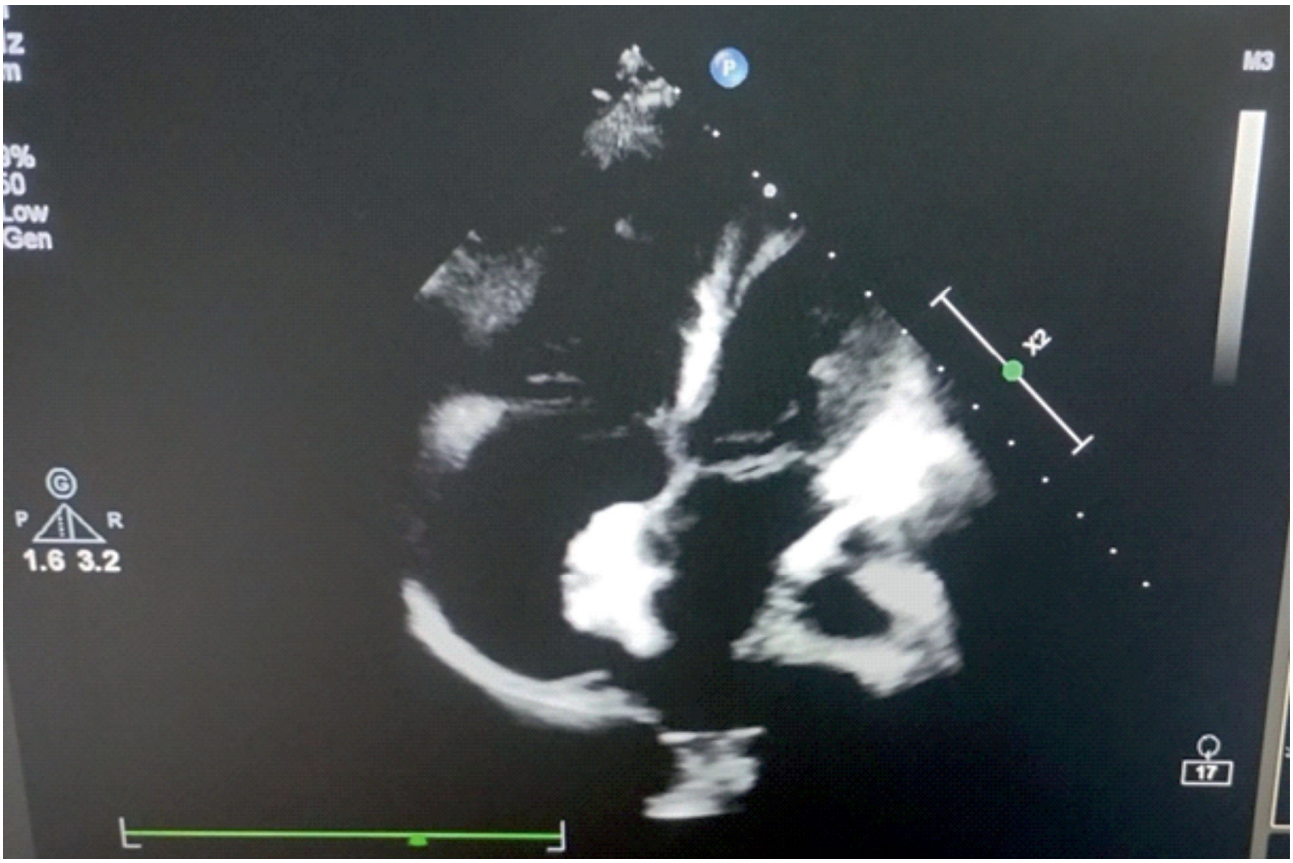



**Figure 2:** Preoperative transthoracic echocardiographic apical four chamber (A4C) view demonstrating the secundum atrial septal defect within an atrialseptal aneurysm type1R shows significant left to right shunt.

After a multidisciplinary discussion, transcatheter ASD device closure was planned. As the patient declined general anaesthesia and invasive monitoring, monitored anaesthesia care with conscious sedation was chosen with THRIVE. THRIVE was used to maintain adequate oxygenation and preserve spontaneous ventilation during prolonged TEE-guided conscious sedation. The oral cavity was topically anaesthetised with 10% lignocaine spray before TEE. Intravenous midazolam (1 mg), fentanyl (50 µg), and titrated propofol infusion (cumulative dose 100 mg over 120 min) were administered while maintaining spontaneous ventilation with supplemental oxygen via THRIVE. Continuous ECG, Invasive blood pressure, Pulse oximetry, and clinical assessment of sedation depth using verbal and motor responses to verbal commands were performed throughout the procedure. The TEE-guided device deployment was completed successfully without haemodynamic instability, airway intervention, or conversion to general anaesthesia. The recovery was uneventful. Follow-up echocardiography confirmed a well-seated device, complete defect closure without residual shunt or pericardial effusion, and preserved left ventricular function (ejection fraction, 60%). The patient remained comfortable and expressed satisfaction with both the anaesthetic and procedural management.

## DISCUSSION

This case describes the successful transcatheter closure of a haemodynamicaly significant ASD in a 21-year-old lactating woman with an associated ASA under monitored anaesthesia care and conscious sedation. The patient became symptomatic during the postpartum period, despite having an uneventful pregnancy. Continuous

TEE allowed successful device deployment without airway intervention, haemodynamic instability, or conversion to general anaesthesia. The combination of a mobile aneurysmal septum, prolonged TEE guidance, patient refusal of general anaesthesia, and the need to support early maternal recovery makes this case clinically relevant.

ASA increases septal mobility and can make catheter manipulation and device positioning more difficult. In this patient, the aneurysmal excursion measured 10 mm, and the 1.8-cm secundum ASD produced a significant left-to-right shunt (Qp:Qs 2.5:1) with right heart dilatation, indicating the need for closure. Previous reports have shown that ASA may increase the risk of residual shunting, device embolisation, thrombus formation, atrial arrhythmias, and erosion, although the evidence is mainly limited to case reports and small series.[10] A recent report of device embolisation with cerebrovascular complications further highlights the importance of careful procedural planning and continuous imaging.[11] In our case, uninterrupted TEE guidance was important for confirming stable device positioning and complete defect closure.

General anaesthesia remains the standard approach for TEE-guided structural heart procedures because it provides airway protection and complete immobility. However, it may prolong recovery and increase the need for airway-related interventions. Recent studies suggest that conscious sedation is a safe alternative for carefully selected patients. Lipiec et al. reported a procedural success rate of 98.4% using conscious sedation for TEE-guided ASD closure, while Wang *et al.* achieved a 98.2% success rate with stable haemodynamics and improved patient satisfaction.[12,13] These studies support the selective use of conscious sedation with appropriate monitoring and immediate availability of airway rescue.

Another important factor is TEE tolerance. Yamano et al. reported that successful ASD closure depends not only on defect anatomy but also on the patient's ability to tolerate prolonged TEE.[14] Our patient had preserved ventricular function, normal sinus rhythm, mildly elevated pulmonary artery pressure, and tolerated TEE well, allowing for uninterrupted imaging throughout the procedure. Lactation requires additional consideration. Current recommendations suggest that breastfeeding can usually resume once the mother is awake and clinically stable without routinely discarding breast milk.[15] The use of low-dose midazolam, fentanyl, and carefully titrated propofol allowed rapid recovery while maintaining spontaneous ventilation and haemodynamic stability throughout the 120-minute procedure.

The use of THRIVE was advantageous because the procedure required prolonged TEE manipulation and precise device positioning in the presence of a mobile aneurysmal atrial septum.[16] Avoiding airway instrumentation while maintaining adequate oxygenation reduced the need for escalation of respiratory support and allowed the procedure to be completed under conscious sedation.

## CONCLUSION

This case shows that carefully planned, monitored anaesthesia care with conscious sedation with THRIVE can help in successful transcatheter closure of a haemodynamically significant secundum ASD associated with an atrial septal aneurysm in a lactating patient. THRIVE provided continuous oxygenation while preserving spontaneous ventilation during prolonged TEE-guided device deployment. Careful patient selection, sedation titration, continuous monitoring, uninterrupted TEE guidance and multidisciplinary planning were essential to the successful outcome. THRIVE-assisted conscious sedation may be a useful anaesthetic strategy for transcatheter ASD closure.

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