Contents lists available atIOCS

Science Midwifery

journal homepage:www.midwifery.iocspublisher.org

Short-term care strategy in a cesarean section patient with pulmonary hypertension, EF 25% and intraventricular thrombus: A case report

Novella Syafrita[1]*, Vera Muharrami[2], Novita Anggraeni[3], Nopian Hidayat[4]

[1]Departemen Anestesiologi dan Terapi Intensif, Fakultas Kedokteran, Universitas Riau, RSUD Arifin Achmad, Pekanbaru, Riau, Indonesia

[2,3,4]Staff Departemen Anestesiologi dan Terapi Intensif, Fakultas Kedokteran, Universitas Riau, RSUD Arifin Achmad, Pekanbaru, Riau, Indonesia

ARTICLEINFO

Article history:

Received Mar 7, 2026
Revised Mar 16, 2026
Accepted Mar 24, 2026

Keywords:

Caesarean Section
Interventricular Thrombus
Multidisciplinary Care
Perinatal Management
Pulmonary Hypertension

ABSTRACT

Cesarean section in patients with pulmonary hypertension and interventricular septal thrombus is a high-risk condition that requires an integrated care strategy and multidisciplinary preparation. The primary goals of care are to ensure hemodynamic stability, control pulmonary artery pressure, and prevent thromboembolic complications during and after surgery. Prior to the procedure, patients are prepared with careful anticoagulation therapy using heparin, strict fluid management, and oxygenation support. The choice of anesthetic is made considering its impact on pulmonary pressure and right heart function. Invasive monitoring, such as arterial lines and central venous pressure (CVP), is used intraoperatively for close monitoring. Collaboration between the obstetrics, anesthesia, cardiology, and intensive care teams is crucial to minimize maternal and fetal risks and ensure a safe cesarean section.

Corresponding Author:

Novella Syafrita,
Departemen Anestesiologi dan Terapi Intensif,
Universitas Riau,
Jl. Kampus Bina Widya, Simpang Baru, Kec. Binawidya, Kota Pekanbaru, Provinsi Riau, 28293, Indonesia
Email: dr.novellasyafrita@gmail.com

INTRODUCTION

Caesarean section (CS) or cesarean delivery is defined as the act of giving birth to a fetus through an incision in the abdominal wall (laparatomy) and uterine wall (hysterotomy).(Sirait, 2021),(Nisa, Saputri, Fadila, Piningit, & Hasyim, 2022)This procedure is performed to prevent complications that could threaten the safety of the mother and baby if vaginal delivery is performed. Caesarean sections are generally chosen to prevent the risk of maternal and infant death related to various factors, such as abnormal fetal position, difficulties during labor, or certain medical conditions in the mother that require special treatment (Siagian, Anggraeni, & Pangestu, 2023),(Sidabukke & Etty, 2025).

Pregnancy itself is associated with significant physiological hemodynamic changes, including a 30-50% increase in cardiac output and blood volume, which continues with

fluctuations in cardiac output during labor and postpartum (Ardiana, 2024),(Ratnasari, Melisa, Oktavia, Mandiri, & Susanti, 2025). These changes have a significant impact on women with heart disease. Therefore, risk recognition and appropriate management are essential for patients with this condition, particularly during the early third trimester, during labor, and immediately after delivery (Putri, Keb, & Keb, 2025),(Astuti, Porouw, & Arbie, 2024).

Heart disease in pregnant women is a growing problem worldwide, as the number of women with structural heart conditions reaches childbearing age increases (Hikmandayani, Mardhani, & Aisa, 2024),(FARDILLA, 2024). In addition, pregnancy can maintain existing heart conditions, especially in women with pulmonary hypertension. Therefore, safe pregnancy management for women with heart disease requires close coordination between anesthetic, cardiac, and obstetric care (Saragih, nd),(Sismanto et al., 2025). Decisions about the appropriate location and type of hospital for delivery, as well as the type of anesthesia used, must take into account the patient's cardiac condition. Closer hemodynamic monitoring during the intrapartum process is often necessary to ensure the safety of both mother and baby (Citra, 2025),(Syafitri, 2025).

This case report will discuss the brief care strategy for a post-cesarean section patient with pulmonary hypertension and intraventricular thrombus, with emphasis on the importance of coordinated and appropriate care to effectively manage these conditions.

RESEARCH METHOD

A descriptive case report describing the anesthetic management of a pregnant patient with severe rheumatic heart disease undergoing elective cesarean section. This case report uses an observational approach, where data collected directly include the patient's clinical characteristics, physical examination results, supporting examination results, anesthetic management strategies, and hemodynamic conditions during the perioperative to recovery period. Case identification begins with a 38-year-old female patient with obstetric status G3P2A0H2, gestational age 36–37 weeks, who was admitted with a diagnosis of rheumatic heart disease with severe mitral stenosis, severe mitral regurgitation, and moderate tricuspid regurgitation accompanied by non-ventricular atrial fibrillation response (AF NVR), left ventricular thrombus, and decreased left ventricular function (EF 25%).

Initial clinical data were obtained through a focused history that assessed the chief complaint and medical history, including progressive shortness of breath on exertion, orthopnea, paroxysmal nocturnal dyspnea, and leg edema. A comprehensive physical examination was then performed, assessing vital signs, respiratory status, and signs of systemic congestion. Ancillary examinations analyzed in this report included a chest x-ray to assess heart size, an electrocardiogram (ECG) to identify arrhythmias, and an echocardiogram to evaluate cardiac structure and function, including ejection fraction, valvular abnormalities, and pulmonary pressures. These findings were used to determine the patient's New York Heart Association (NYHA) functional cardiac classification and to assess perioperative risk.

Perioperative management data was systematically collected from the preoperative, intraoperative, and postoperative phases. In the preoperative phase, anticoagulant therapy administered during pregnancy and any modifications to therapy prior to surgery were recorded. In the intraoperative phase, the type of anesthesia, induction technique, anesthetic agents used, mechanical ventilation strategy, fluid therapy, and cardiovascular medication use during surgery were recorded. Hemodynamic parameters such as blood pressure, pulse rate, oxygen saturation, and heart rhythm were continuously monitored using an anesthesia monitor and documented in the anesthesia record.

In the postoperative phase, the patient's hemodynamic condition was observed in the recovery room, including evaluation of cardiovascular stability, the need for additional therapy, and the length of stay until the patient was declared stable and discharged. All data were then analyzed descriptively to illustrate the relationship between the patient's clinical condition, the

chosen anesthetic strategy, and perioperative outcomes. This case report uses anonymized clinical data without including patient identification. This writing is solely for scientific and educational purposes, maintaining patient confidentiality.

RESULTS AND DISCUSSIONS

A 38-year-old woman, the patient was diagnosed with G3P2A0H2, 36-37 weeks pregnant, 1 previous CS (IDT 14 years), HFpEF 25% ec RHD (Severe MS, Severe MR, moderate TR ec RHD) NYHA 1-2, AF NVR, LV thrombus, came with complaints of shortness of breath that worsened when the patient was active. As time went on, the patient said that shortness of breath could occur even when lying down. The patient had woken up at night because of shortness of breath. Sleeping was better using more than one pillow. The patient did not experience shortness of breath when exposed to dust or cold weather. The patient said that her legs often swelled.

Physical examination revealed a respiratory rate of 24 breaths/minute and oxygen saturation of 98%. Supporting examinations revealed cardiomegaly on chest X-ray, non-ventricular atrial fibrillation (AF NVR) on ECG, and pulmonary hypertension with left ventricular function (EF 25%) on echocardiography.

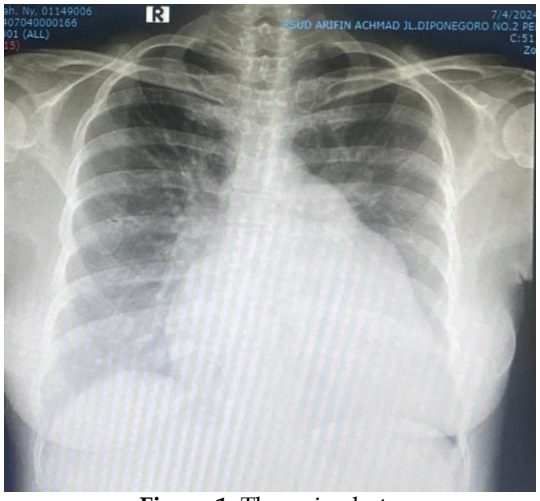

Figure 1. Thoracic photo

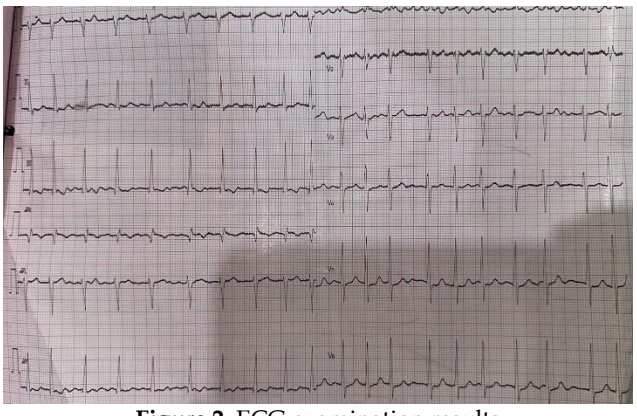

Figure 2. ECG examination results

Transthoracic echocardiography with an apical four-chamber view showed left ventricular dilatation with a rounded apex shape accompanied by segmental contractility disorders in the

form of hypokinesia to akinesia in the apical segment. In the apex area, an echogenic mass was seen attached to the endocardium, consistent with suspicion of left intraventricular thrombus. Visually, left ventricular systolic function appeared to be decreased with an estimated reduced ejection fraction, indicating moderate to severe systolic dysfunction.

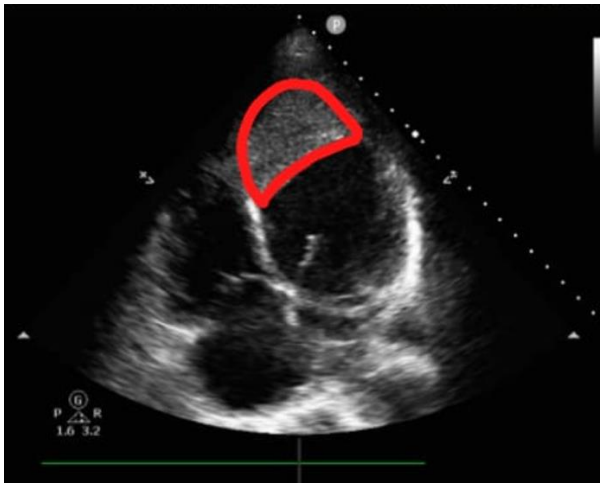

Figure 3. Echocardiography examination results

In the preoperative period, the patient received anticoagulant therapy in the form of warfarin 2 mg once daily until 36 weeks of gestation, then replaced with heparin 5,000 IU subcutaneously twice daily which was discontinued 6 hours before surgery. The patient was scheduled to undergo an elective cesarean section under general anesthesia. Anesthesia preparation began with premedication of midazolam 1 mg, followed by preoxygenation and rapid induction using sufentanil 10 µg, atracurium 30 mg, and maintenance with sevoflurane 2 MAC. Mechanical ventilation was regulated in assist control–volume control (AC-VC) mode, with a tidal volume of 400 mL, PEEP 4 cmH_2O, and FiO_2 40%. The patient was given furosemide 20 mg intravenously after intubation.

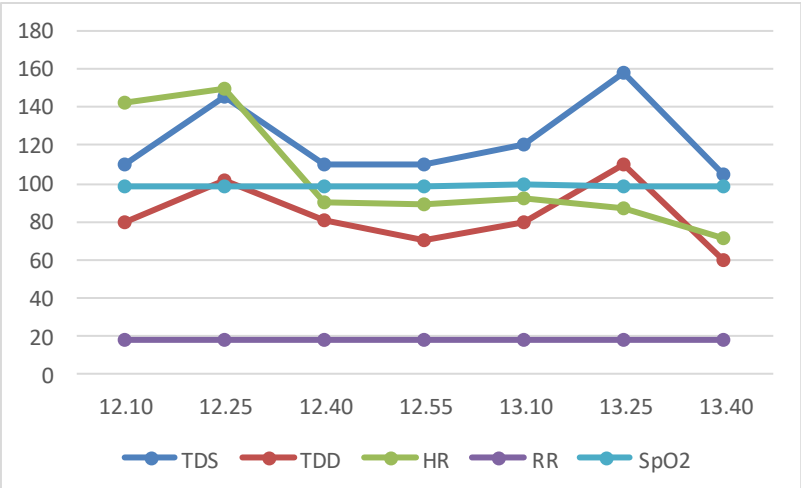

Figure 4. Vital signs during surgery

The ECG monitor showed atrial fibrillation with a normal ventricular response (AF NVR) intraoperatively, so digoxin 0.25 mg was administered twice after delivery. Fluid therapy was carefully administered to prevent overload, and vasopressors such as phenylephrine were prepared to anticipate intraoperative hypotension. The surgical procedure was stable without major complications. The patient was given another 20 mg of furosemide before extubation. The patient was then observed in the recovery room for two hours with stable hemodynamics. The patient was then cared for in the regular ward for two days and was discharged in good condition.

Discussion

The patient in this case was a pregnant woman with a history of pulmonary hypertension that had progressed to heart failure, requiring a cesarean section. Pulmonary hypertension causes increased pulmonary vascular resistance (PVR), which increases the workload of the right ventricle (Sarwowibowo, nd),(Prakoso, Azizah, & Akbar, 2022). An increase in PVR can decrease effective pulmonary blood flow, thereby reducing left ventricular filling and ultimately decreasing cardiac output. The subsequent impact of this condition is the risk of hypoxemia and hemodynamic instability, which can be dangerous for both the mother and the fetus. Therefore, the main principle of anesthetic management in this condition is to suppress the increase in PVR as much as possible while maintaining systemic vascular resistance (SVR) to ensure adequate perfusion of vital organs (Soefviana & Zulfariansyah, nd),(Hartono & Rahardjo, 2023).

Adequate cardiac output is a very determining factor in the context of pregnancy because uteroplacental blood flow is completely dependent on maternal perfusion pressure (Ratnasari et al., 2025),(VI, 2024). The anesthesia administered must be able to maintain this balance by ensuring optimal oxygenation and preventing conditions that can worsen pulmonary hypertension, such as hypoxia, hypercapnia, acidosis, and hypotension. 5,8,11,14 In patients with heart disease, even minor hemodynamic disturbances can reduce uteroplacental perfusion and directly impact fetal well-being. In addition, the left lateral position is important to maintain during the perioperative period to reduce uterine pressure on the inferior vena cava, thereby maintaining venous return to the heart and improving uteroplacental perfusion (Ahmad, An-TI, Harahap, & An-TI, 2024).

If intraoperative hypotension occurs, careful consideration should be given to the choice of vasopressor. Phenylephrine is generally preferred because its primary effect is to increase SVR without causing a significant increase in heart rate, and it is relatively safer for fetal acid-base balance than ephedrine. 15 Ephedrine can increase blood pressure through beta-adrenergic stimulation, but its use is associated with an increased risk of fetal acidosis due to increased metabolism. Caution is also required in general anesthesia, as induction and positive-pressure ventilation can potentially decrease venous return and cardiac output. In this context, agents with minimal hemodynamic impact, such as opioids and etomidate, are often preferred to reduce fluctuations in blood pressure and heart rate (Maulida, Khoeriyah, & Khaira, 2025),(Mebrina, 2015).

Fluid management is another crucial aspect, especially in patients with heart failure. Crystalloid fluid administration should be limited and gradual to prevent circulatory overload, which can worsen pulmonary congestion and ventricular dysfunction. 15,17 Hemodynamic response evaluation is necessary periodically to maintain a balance between perfusion and the risk of overload. If blood pressure decreases, vasopressors such as phenylephrine can be titrated according to clinical need, with close monitoring of maternal response and fetal condition (Ohorella et al., 2025),(Isngadi, 2024).

Overall, anesthetic management in pregnant women with pulmonary hypertension and heart failure requires careful planning, multidisciplinary coordination, and intensive monitoring. Every intervention should be aimed at maintaining hemodynamic stability, maintaining adequate oxygenation, and ensuring optimal uteroplacental perfusion for the safety of both mother and baby (Purwanti & Ners, 2024),(Ahmad et al., 2024).

CONCLUSION

Anesthetic management in pregnant women with pulmonary hypertension and heart failure requires a careful and multidisciplinary approach, with particular attention to hemodynamic maintenance, oxygenation monitoring, and avoidance of medications that can precipitate cardiac arrest. Appropriate anesthetic technique and agent selection, along with controlled fluid management, are crucial to ensure maternal and fetal safety during surgical procedures.

References

Ahmad, M. R., An-TI, S., Harahap, M. W., & An-TI, S. (2024). *Manajemen Anestesi Pada Kegawatdaruratan Obstetri*. Nas Media Pustaka.

Ardiana, M. (2024). *Skrining Penyakit Kardiovaskular Pada Kehamilan*. Airlangga University Press.

Astuti, E. R., Porouw, H. S., & Arbie, R. S. (2024). *Pengelolaan Hipertensi dengan Langkah CERDAS*. Penerbit NEM.

Citra, D. (2025). Hubungan Tingkat Kecemasan Dengan Peningkatan Tekanan Darah Pada Pasien Pre Operasi Sectio Caesarea Dengan Anestesi Spinal di RSUD R Syamsudin Sh Sukabumi. Universitas Bhakti Kencana.

FARDILLA, B. (2024). EFEKTIVITAS TERAPI AKUPRESUR DAN SPRITUAL EMOTIONAL FREEDOM TECHNIQUE DALAM PENURUNAN TEKANAN DARAH WANITA USIA SUBUR DENGAN HIPERTENSI DI PUSKESMAS YOSOMULYO. POLTEKKES KEMENKES TANJUNGKARANG.

Hartono, P., & Rahardjo, S. (2023). Manajemen anestesi pada pasien obstetri dengan kelainan jantung kongenital dan risiko hipertensi pulmonal. *Jurnal Anestesi Obstetri Indonesia*, *6*(2), 128–142.

Hikmandayani, H., Mardhani, D., & Aisa, S. (2024). the Edukasi Pengenalan, Pencegahan, Dan Deteksi Dini Risiko Penyakit Jantung Pada Wanita Usia Subur sebagai upaya pencegahan stunting Di Desa Motui Kabupaten Konawe Utara. *Jurnal Stunting Pesisir Dan Aplikasinya*, *3*(2), 27–34.

Isngadi, I. (2024). Vasopressor Pilihan Untuk Anestesi Obstetri. *Jurnal Anestesi Obstetri Indonesia*, *7*(1), 54–62.

Maulida, F. N., Khoeriyah, M., & Khaira, N. (2025). LITERATUR REVIEW PENGARUH PEMBERIAN MULTI MODAL ANALGESIA INTRA ANESTESI TERHADAP STABILITAS TEKNANAN DARAH PASIEN SELAMA OPERASI. *Jurnal Riset Multidisiplin Edukasi*, *2*(12), 851–869.

Mebrina, A. V. (2015). TESIS PEMBERIAN EFEDRIN 50 MCG/KGBB INTRAVENA PRAINDUKSI DAPAT MENURUNKAN INTENSITAS NYERI DAN MENJAGA STABILITAS HEMODINAMIK PASCAPEMBERIAN PROPOFOL INTRAVENA PROGRAM PASCASARJANA UNIVERSITAS UDAYANA DENPASAR 2014.

Nisa, A. H., Saputri, A. D., Fadila, A. N., Piningit, B. F. A., & Hasyim, F. (2022). EFEKTIFITAS TEKNIK RELAKSASI PERNAPASAN DAN TEKNIK FOOT AND HAND MASSAGE PADA PASIEN PASCA PERSALINAN SECTIO CAESAREA (SC) DI RUANG TERATAI RSUD dr. HARYOTO LUMAJANG.

Ohorella, S. A. V., Aisyah, A. P., Putri, R. A., Qoblianingtyas, A., Safrian, S., & Dewi, R. K. (2025). Scoping Review: Efektivitas Vasopresor terhadap Hipotensi Intraoperatif. *Jurnal Siti Rufaidah*, *3*(4), 242–253.

Prakoso, P. D., Azizah, L. M., & Akbar, A. (2022). Asuhan Keperawatan Pada Klien Decompensasi Cordis Dengan Masalah Penurunan Curah Jantung Di RSU Anwar Medika Sidoarjo. Perpustakaan Universitas Bina Sehat PPNI Mojokerto.

Purwanti, T. F., & Ners, M. K. (2024). MANAJEMEN ASUHAN. *Manajemen Asuhan Keperawatan Kehamilan Berisiko*, 45.

Putri, B. A. R. S., Keb, S. T., & Keb, M. (2025). PERUBAHAN FISIOLOGIS DAN PSIKOLOGIS PADA IBU HAMIL. *Manajemen Kehamilan Dan Persalinan*, 63.

Ratnasari, D., Melisa, M., Oktavia, N., Mandiri, A., & Susanti, A. I. (2025). *Buku Ajar Asuhan Kehamilan*. Penerbit NEM.

Saragih, E. (n.d.). Book Chapter Judul: Asuhan Keperawatan Kritis.

Sarwowibowo, E. (n.d.). PANDUAN TATALAKSANA PENYAKIT JANTUNG BAWAAN DEWASA (PJBD) KELOMPOK KERJA KARDIOLOGI PEDIATRIK DAN PENYAKIT JANTUNG BAWAAN PERHIMPUNAN DOKTER SPESIALIS KARDIOVASKULAR INDONESIA 2020.

Siagian, L., Anggraeni, M., & Pangestu, G. K. (2023). Hubungan antara letak janin, preeklampsia, ketuban pecah dini dengan kejadian sectio caesaria di RS Yadika Kebayoran Lama tahun 2021. *SENTRI: Jurnal Riset Ilmiah*, *2*(4), 1107–1119.

Sidabukke, I. R. R., & Etty, C. R. (2025). *ATASI NYERI PERSALINAN NORMAL DAN SECTIO CAESAREA*

DENGAN MEMBERIKAN PELAYANAN KESEHATAN BAGI IBU DAN ANAK SECARA OPTIMAL. Nuansa Fajar Cemerlang.

Sirait, B. I. (2021). Bahan Kuliah "Seksio Sesaria."

Sismanto, B. A., Saragih, S. B., Fitri, F. E., Megawaty, I., Sakitri, G., Sangadji, F., … Suryati, N. S. (2025). *Anatomi dan Fisiologi Dasar Keperawatan*. PT Bukuloka Literasi Bangsa.

Soefviana, S. B., & Zulfariansyah, A. (n.d.). Anestesi Umum pada Seksio Sesarea Wanita Hamil dengan Sindroma Eisenmenger.

Syafitri, Y. (2025). Gambaran Hemodinamik Blood Pressure Pra dan Intra Anestesi Regional pada Pasien Sectio Caesarea di RSUD Kota Bandung. Universitas Bhakti Kencana.

VI, B. A. B. (2024). Melalui pelayanan antenatal yang terpadu, ibu hamil akan mendapatkan pelayanan. Komponen dari pelayanan antenatal adalah. *Asuhan Kebidanan Kehamilan*, 117.