

From Cesarean Section to Median Sternotomy in 24hrs: A Post Partum Catastrophe with Saddle Pulmonary Embolism and Thrombi in Right Atrium and Inferior Vena Cava

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DOI: <https://doi.org/10.36347/sasjs.2025.v11i11.004>

| Received: 18.09.2025 | Accepted: 03.11.2025 | Published: 12.11.2025

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Abstract

Case Report

Massive pulmonary embolism (PE) in the immediate postpartum period is rare but life-threatening. We report a 31-year-old primigravida with gestational diabetes who developed sudden severe shortness of breath, dizziness, and hypotension on postoperative day one following an elective lower segment caesarean section. Initial evaluation revealed a saddle PE with large thrombi in the right atrium and inferior vena cava. The patient was first referred to a private centre but surgical intervention was deferred due to high operative risk. She was transferred to a tertiary government hospital and underwent urgent surgical pulmonary embolectomy and RA/IVC thrombectomy on cardiopulmonary bypass. Postoperatively, she was successfully extubated, anticoagulated with warfarin, and discharged in stable condition. This case highlights the importance of early recognition, rapid transfer to specialised centres, multidisciplinary management, and prompt surgical intervention in postpartum patients with massive PE and intracardiac thrombi. Postoperative anticoagulation and imaging surveillance remain essential to prevent recurrence.

Keywords: Cardiothoracic surgery, postpartum pulmonary embolism, saddle embolism, right atrial thrombus, IVC thrombosis, emergency pulmonary embolectomy.

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INTRODUCTION

Pulmonary embolism (PE) is a significant cause of maternal morbidity and mortality, accounting for approximately 10–15% of maternal deaths worldwide [1]. The risk of venous thromboembolism (VTE) increases markedly during pregnancy and the puerperium due to physiological hypercoagulability, venous stasis, and endothelial injury [2]. Massive PE with right atrial (RA) and inferior vena cava (IVC) thrombus is exceedingly rare, with high mortality if untreated [3]. While thrombolysis and anticoagulation remain first-line therapies, surgical pulmonary embolectomy offers a life-saving option in haemodynamically unstable patients or when there is intracardiac thrombus extension [4]. We present a case of massive postpartum PE with RA and IVC thrombi occurring 24 hours after caesarean section, successfully managed with emergency surgical embolectomy.

CASE REPORT

A 31-year-old postpartum mother was referred urgently after being diagnosed with massive pulmonary

embolism with right atrium and inferior vena cava (IVC) thrombi following an elective caesarean section. She was a primigravida with a history of gestational diabetes mellitus on diet control. Her pregnancy was otherwise uneventful, with no prior thromboembolic events, prolonged immobilization, or family history suggestive of thrombophilia. She underwent an elective Lower Segment Caesarean Section (LSCS) on 25th September 2025 for suspected fetal macrosomia. The procedure was uneventful, and she remained hemodynamically stable in the immediate postoperative period. On postoperative day 1 (26th September 2025), shortly after ambulating to the toilet, she experienced a sudden onset of severe shortness of breath accompanied by dizziness, diaphoresis, and near-syncope, prompting immediate medical evaluation. On examination, she was in severe respiratory distress, with a blood pressure of 70/50 mmHg, heart rate of 143 beats per minute, and oxygen saturation of 80% on room air, which improved with High-Flow Nasal Cannula (HFNC).

Electrocardiography (ECG) showed sinus tachycardia, right axis deviation, and ST-segment

Citation: K. Rao & S. Karupiah. From Cesarean Section to Median Sternotomy in 24hrs: A Post Partum Catastrophe with Saddle Pulmonary Embolism and Thrombi in Right Atrium and Inferior Vena Cava. SAS J Surg, 2025 Nov 11(11): 1055-1059.

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depression in leads II, III, and aVF. Transthoracic echocardiography (TTE) revealed preserved left ventricular systolic function but marked dilatation of the right atrium (RA) and right ventricle (RV) with McConnell sign. The Tricuspid Annular Plane Systolic Excursion (TAPSE) was 1.3 cm, indicating impaired right ventricular contractility. A mobile right atrial thrombus measuring 2.6×3.0 cm was visualized, prolapsing into the tricuspid valve during diastole. D-dimer levels were raised. Urgent CT Pulmonary Angiogram (CTPA) showed saddle pulmonary artery embolism involving the right and left main pulmonary arteries with extension to the bilateral segmental arteries. Bedside ultrasound demonstrated no evidence of deep vein thrombosis (DVT).

The patient was initially managed in a private centre but due to the high-risk nature of the case and the concern of post-partum mortality, the patient was urgently transferred to Hospital Queen Elizabeth II, a government cardiothoracic centre for definitive management. She was started on heparin infusion and was planned for urgent surgery upon arrival. A multidisciplinary team (MDT) comprising of Cardiothoracic Surgery, Anesthesiology, and Obstetrics and Gynecology (O&G) were convened. Upon O&G team review, she was deemed fit for Cardiopulmonary Bypass (CPB), and the potential risks of postpartum hemorrhage and uterine atony during CPB were discussed with the family. The patient understood the high-risk nature of the operation and consented to surgery.

She underwent median sternotomy, pulmonary embolectomy, and right atrial and IVC thrombectomy. After systemic heparinization and cooling to 34°C , partial CPB was first established via aortic and superior vena cava (SVC) cannulation. The IVC was approached through the right atrium, and thrombus removal was

performed under direct vision before instituting full CPB. Additional thrombi were extracted from the main and branch pulmonary arteries using Desjardins forceps and a 3F Fogarty catheter, followed by saline flushing. Both pulmonary arteries were closed with 5-0 Prolene sutures. The aorta was cross-clamped, and the patent foramen oval (PFO) was closed with 4-0 Prolene after confirming the absence of thrombus in the left atrium or ventricle. The patient was weaned off CPB with inotropic support, decannulated, and transferred to the CICU in stable condition.

Postoperatively, she was successfully extubated on postoperative day (POD) 1. Anticoagulation was resumed with intravenous unfractionated heparin, later transitioned to oral warfarin. She was referred to Interventional Radiology for IVC filter insertion; however, it was deferred as repeat CTPA revealed only residual segmental pulmonary emboli without filling defects in the IVC. She was reviewed by the Hematology team, who advised thrombophilia and antiphospholipid antibody testing six weeks after cessation of anticoagulation. The patient made a satisfactory recovery and was discharged home on 1st October 2025 (POD 5) in stable condition on warfarin therapy, with plans for three months of anticoagulation and repeat CTPA assessment at that time.

Study Area & Ethical Considerations

This case was managed at the Cardiothoracic Surgery Department, Hospital Queen Elizabeth II, Kota Kinabalu, Sabah, Malaysia. The case information was obtained through review of clinical records and multidisciplinary team documentation. Written informed consent was obtained from the patient for publication of this case report and accompanying clinical data. All patient identifiers have been removed to ensure confidentiality.

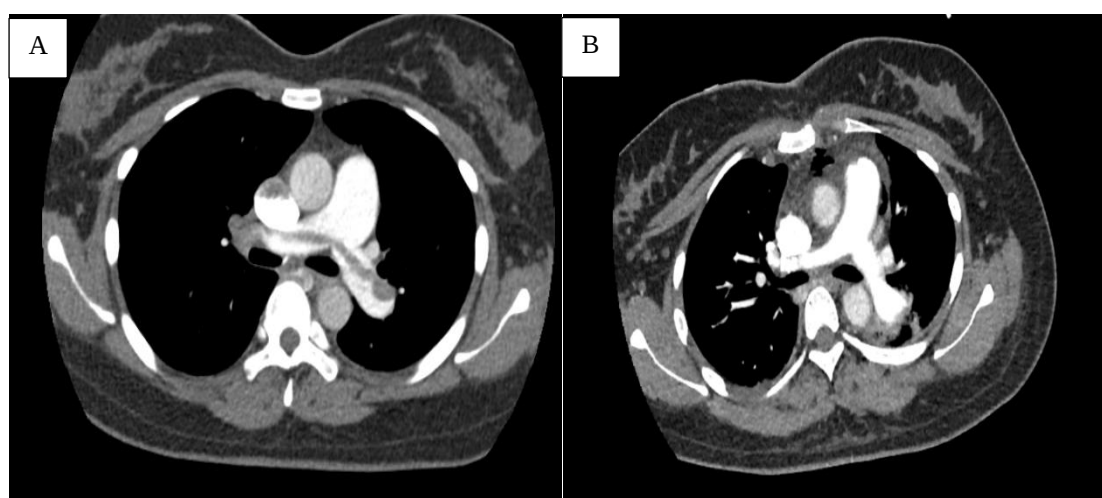


Figure 1. CT Pulmonary Angiogram. (A, right) Axial section demonstrating thrombi at the bifurcation of the right and left main pulmonary arteries with oligemic lung fields, indicative of a high clot burden. (B, left) Postoperative axial CT showing complete thrombus removal and restoration of bilateral pulmonary blood flow



Figure 2: The image shows the extensive thrombi that was retrieved from the bilateral pulmonary branches, right atrium and inferior vena cava

DISCUSSION

Massive pulmonary embolism (PE) remains a rare but catastrophic cause of maternal morbidity and mortality, particularly in the immediate postpartum period, where the physiological hypercoagulable state and endothelial injury from delivery increase thrombotic risk. The incidence of postpartum PE is approximately 0.05–0.2% of all pregnancies, with the risk peaking within the first six weeks after delivery, especially within the first 24–48 hours. [10] However, the occurrence of a massive saddle PE on postpartum day one—as seen in our case—is exceptionally uncommon and scarcely reported in existing literature.

It is plausible that thrombus formation began during the late antenatal period, given the progressive venous stasis and hypercoagulability of pregnancy.[11] the patient's extensive thrombi involving the right atrium (RA) and inferior vena cava (IVC) suggest an ongoing thrombotic process rather than an acute event immediately after delivery.

Of note, this patient was initially referred to a private medical centre where a cardiothoracic surgeon was available, but surgical intervention was declined due to the extremely high maternal risk. The delay between diagnosis and definitive treatment highlights the importance of established referral networks and cross-institutional collaboration between private and government centres to optimise survival in such time-sensitive emergencies.[12]

According to the 2019 European Society of Cardiology (ESC) guidelines, emergency surgical embolectomy should be performed without unnecessary delay in patients with haemodynamic instability or

contraindications to thrombolysis.[13] In our case, intravenous heparin was discontinued approximately three hours before surgery. Although some centres recommend a 6–12-hour interval to reduce bleeding risk, delaying surgery in a haemodynamically unstable postpartum patient could be fatal. The decision to proceed on cardiopulmonary bypass (CPB) was appropriate due to the need for right atrial exploration and exclusion of left-sided thrombi. While off-pump embolectomy may reduce bleeding risk and improve postoperative recovery, it is only feasible in cases without extensive intracardiac clot burden.[14]

Intraoperative management must balance the need for adequate anticoagulation with the heightened risk of postpartum haemorrhage. Standard heparinisation (300–400 IU/kg) is typically required to maintain an activated clotting time (ACT) >480 seconds on CPB.[15] Lower-dose heparin protocols are not advisable in massive PE due to the risk of incomplete thrombectomy and circuit thrombosis. Postoperatively, early reinstitution of heparin followed by warfarin or low molecular weight heparin (LMWH) is crucial, with the target INR maintained between 2.0–3.0 for at least six months.[16]

Repeat imaging, preferably with CTPA or echocardiography, is recommended within one to three months post-surgery to ensure thrombus resolution and assess right ventricular recovery.[17] In our patient, the decision not to insert an IVC filter was justified as postoperative CTPA showed complete clearance of thrombi. However, given that the postpartum state remains prothrombotic for several weeks, strict adherence to anticoagulation and early mobilisation remain vital preventive strategies.[18]

Minimally invasive or catheter-based approaches, while promising, are less suitable in immediate postpartum cases due to recent uterine surgery, high bleeding risk, and the extensive clot load seen in this patient. Left atrial (LA) thrombi, if present, could result in systemic embolisation and carry a poorer prognosis, thereby warranting complete surgical exploration under CPB.[19]

Overall, this case underscores the importance of rapid recognition, multidisciplinary coordination, and equitable access to tertiary cardiothoracic facilities in managing postpartum PE with intracardiac extension. Early diagnosis, decisive surgery, and vigilant postoperative anticoagulation can lead to excellent outcomes, even in critically ill postpartum patients.

CONCLUSION

Massive pulmonary embolism in the immediate postpartum period is a rare but life-threatening condition, with the highest risk within the first 24–48 hours after delivery. This case illustrates that thrombus formation may begin antenatally and extend into the right atrium and IVC, highlighting the need for high clinical vigilance in high-risk patients. Rapid recognition, timely inter-hospital transfer, and multidisciplinary coordination are critical. Emergency surgical embolectomy with cardiopulmonary bypass remains the definitive treatment for extensive intracardiac thrombi, while careful perioperative anticoagulation balances bleeding and thrombosis risks. Postoperative anticoagulation and follow-up imaging are essential to prevent recurrence, and minimally invasive approaches are generally limited in immediate postpartum patients. Early, decisive intervention can lead to favorable outcomes even in critically ill postpartum women.

Acknowledgements

The authors would like to sincerely thank the visiting cardiothoracic surgeons from Peninsular Malaysia for their expert surgical intervention and guidance, which were instrumental in achieving a favorable outcome for this postpartum patient with massive pulmonary embolism. Their dedication and timely involvement exemplify the vital importance of specialist cardiothoracic support in regions with limited in-house surgical services. The authors also extend their gratitude to the Obstetrics and Gynecology, Anesthesiology teams in Sabah for their prompt coordination, stabilization, and multidisciplinary collaboration that ensured the patient's survival.

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