



TRANSFUSION-ASSOCIATED CIRCULATORY OVERLOAD COMPLICATED BY SEPTICEMIC SHOCK FOLLOWING SEPTIC ABORTION: A RARE CASE REPORT.

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Abstract

Transfusion-associated circulatory overload (TACO) is a serious transfusion reaction characterized by acute respiratory compromise and pulmonary edema developing within hours of blood component administration. Although commonly associated with cardiac or renal comorbidities, TACO may also occur in previously healthy individuals exposed to rapid or high-volume transfusions, particularly in the context of systemic inflammation. We describe a rare case of TACO complicated by septicemic shock following an unsupervised medical abortion. A 30-year-old woman presented with septic abortion and severe anemia after self-administering abortifacients. She underwent emergency uterine evacuation and received multiple blood products for hemorrhage control. Shortly thereafter, she developed acute dyspnea, hypertension, elevated central venous pressure, and hypoxia. Radiographic evaluation demonstrated bilateral pulmonary edema, and serum BNP was markedly elevated. Simultaneously, features of septic shock with hypotension, elevated lactate, and leukocytosis were noted. She was managed with cautious fluid restriction, intravenous diuretics, vasopressor support, non-invasive ventilation, and broad-spectrum antibiotics. Gradual clinical improvement was observed with resolution of pulmonary edema and stabilization of hemodynamics. She was discharged in stable condition and received contraceptive counselling. This case underscores the diagnostic challenges in differentiating TACO from transfusion-related acute lung injury (TRALI) and acute respiratory distress syndrome (ARDS), particularly in the presence of sepsis where clinical features overlap. Prompt recognition of TACO features—post-transfusion pulmonary edema, volume overload signs, and elevated BNP—enables targeted management. The report also highlights the risks of unsupervised medical abortion, emphasizing the importance of safe abortion practices, early medical evaluation, and post-procedural counselling. Multidisciplinary management and individualized transfusion strategies are crucial to optimizing outcomes in such complex presentations.

Keywords: Transfusion-associated circulatory overload; Septic shock; Septic abortion; Pulmonary edema; Transfusion reaction; Blood transfusion; Critical care

Introduction

Transfusion-associated circulatory overload (TACO) is a potentially fatal transfusion reaction characterized by acute or worsening respiratory compromise and/or pulmonary edema occurring during or within 12 hours after blood product transfusion. According to the International Society of Blood Transfusion (ISBT) 2018 revised definition, TACO diagnosis requires three or more criteria including respiratory distress, clinical or radiographic evidence of pulmonary edema, signs of fluid overload, and supportive biomarkers such as elevated brain natriuretic peptide (BNP). The syndrome is precipitated by volume overload in susceptible patients, especially those with cardiovascular or renal comorbidities. However, TACO can occur in previously healthy individuals when blood transfusion volumes and rates are excessive or in the presence of concomitant infection or inflammation that increases vascular permeability.[1,2]

Septic shock is a life-threatening subset of sepsis defined by profound circulatory and cellular/metabolic abnormalities, leading to persistent hypotension requiring vasopressor support to maintain a mean arterial pressure (MAP) ≥ 65 mmHg, and elevated serum lactate (>2 mmol/L) despite adequate fluid resuscitation. Septic abortion, a grave complication of unsafe or inadequately managed pregnancy termination, often precipitates severe infection leading to sepsis and multi-organ dysfunction.[3-5]

The coexistence of TACO and septicemic shock poses exceptional diagnostic and management challenges, as both conditions may manifest with respiratory distress, hemodynamic instability, and radiographic pulmonary changes. Distinguishing TACO from other transfusion-related lung injuries such as transfusion-related acute lung injury (TRALI) or acute respiratory distress syndrome (ARDS) is essential to guide therapy.[6-8] This case report describes the rare occurrence of TACO complicated by septic shock following a septic abortion, emphasizing the need for early recognition, balanced fluid and transfusion management, and multidisciplinary critical care interventions.

Case Presentation

A 30-year-old woman, a housewife from Chembur, Mumbai, was brought to the emergency department of Sir JJ Hospital by her husband with a 5-day history of per-vaginal bleeding and 2 days of generalized weakness and fatigue. She reported a missed menstrual period of approximately 6 weeks and had self-administered an over-the-counter medical termination of pregnancy (MTP) kit (Mifepristone 200 mg followed by Misoprostol 800 μ g) without medical supervision. A urine pregnancy test performed at home was positive. Two days later, she developed bright-red per-vaginal bleeding with passage of fleshy tissue, soaking 6–7 pads/day with clots. Bleeding was intermittent. She experienced progressive weakness, exacerbated by exertion and relieved by rest, lower abdominal pain of mild to moderate intensity that increased before tissue expulsion, and mild continuous fever with chills for one day. She denied respiratory symptoms, joint pain, rashes, urinary complaints, gastrointestinal disturbance, or neurological symptoms.

Her obstetric history included three previous full-term normal vaginal deliveries; this pregnancy was spontaneous. She had no prior history of hypertension, diabetes, thyroid disease, tuberculosis, or asthma. Family history was unremarkable.

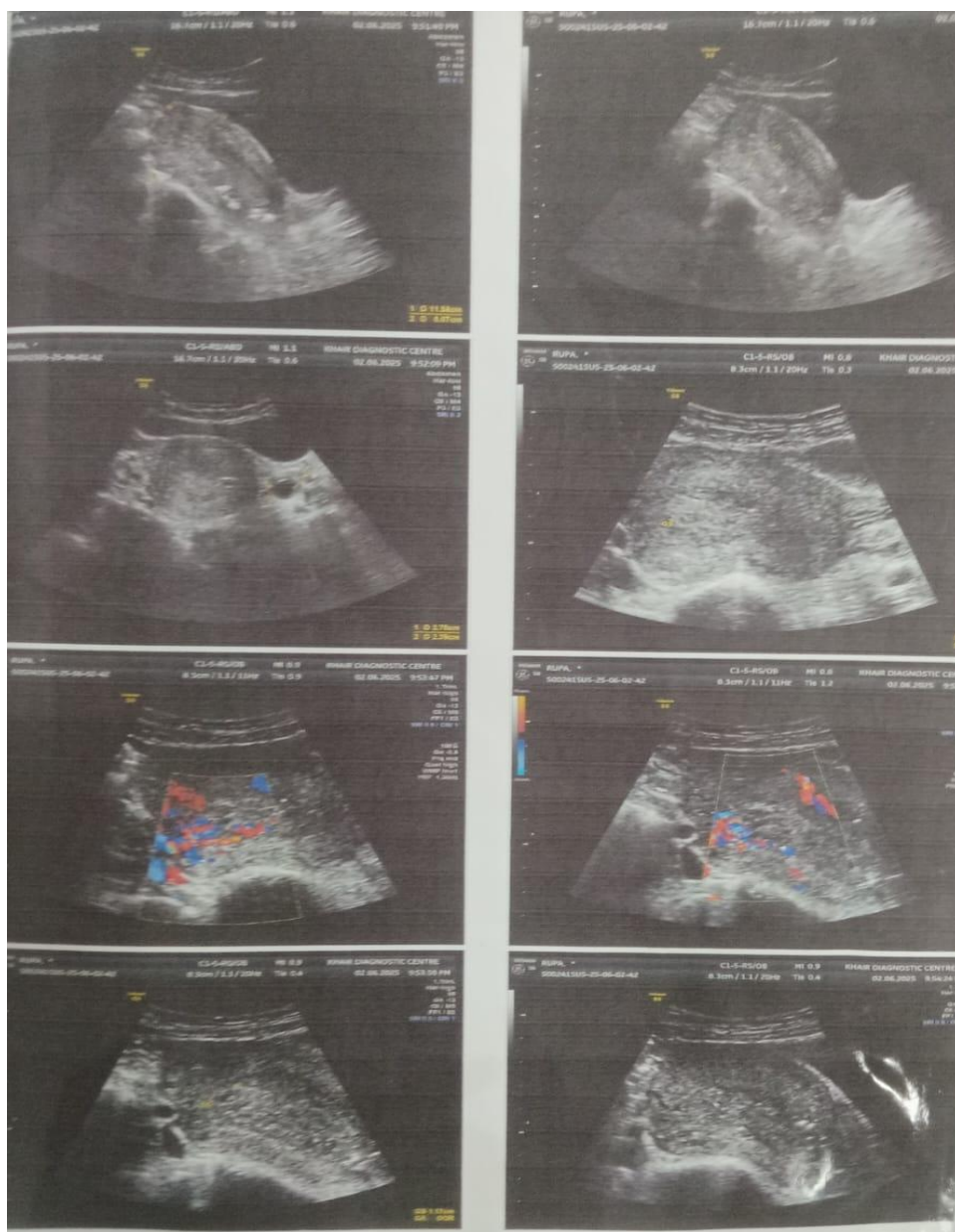
On arrival, she was febrile (101°F), pale, and hemodynamically unstable. Her vitals showed blood pressure 88/50 mmHg, pulse rate 110/min, and SpO₂ 99% on room air. Cardiovascular and respiratory examinations were unremarkable. Abdominal examination revealed a soft, non-tender abdomen. Per speculum examination demonstrated products of conception at the cervical os with active bleeding; per vaginum examination noted a partially open os.

Emergency management was initiated. Two wide-bore (16/18G) IV lines were secured, blood samples collected, and resuscitation commenced with IV normal saline. Paracetamol, pantoprazole, and ondansetron were administered. Broad-spectrum IV antibiotics (Ceftriaxone 2 g and Metronidazole 500 mg) were started within 1 hour. A Foley catheter was inserted for urine output monitoring. Baseline investigations included CBC, renal and liver function tests, coagulation profile,

serum lactate, ABG, β -hCG, serum electrolytes, urine analysis and culture, blood cultures, D-dimer, fibrinogen, chest radiography, and pelvic ultrasonography. Type and crossmatch was sent, and PRBC, FFP, and RDP were arranged.

Pelvic ultrasonography revealed a thickened endometrium (18 mm) with an irregular cystic structure suggestive of retained products of conception.(Figure 1) After counseling, high-risk consent was obtained. The patient underwent emergency suction and evacuation under intravenous anesthesia, followed by blunt curettage. Products of conception were sent for histopathological examination.

Figure 1: Pelvic ultrasonography showing a thickened endometrium with irregular cystic areas suggestive of retained products of conception.



Intraoperatively, she received 2 units of whole blood and 4 units of fresh frozen plasma due to significant bleeding. Within 14 hours of admission, she received an additional 2 units of packed red cells. Following the procedure, bleeding per vaginam decreased. Subsequently, she developed acute hypertension (138/90 mmHg) with raised central venous pressure (10–12 cm H₂O). Intravenous

furosemide (40 mg) was administered, after which her blood pressure dropped, necessitating norepinephrine infusion for hemodynamic stabilization.

Postoperatively, she developed acute shortness of breath, pleuritic chest pain, and exertional dyspnea. She was shifted to the Critical Care Unit (CCU). Examination showed tachycardia (130/min), hypotension (80/50 mmHg) on vasopressor support, and SpO₂ 87% on room air (96% with 8 L/min oxygen via face mask). Bilateral basal crepitations were noted. Chest X-ray revealed bilateral perihilar haziness with obliterated costophrenic angles, suggestive of pulmonary edema.(Figure 2) CECT thorax showed smooth interlobular septal thickening with bilateral pleural effusions (R>L) and passive atelectasis, consistent with early pulmonary edema.(Figure 3)

Figure 2: Chest X-ray Showing Bilateral Pulmonary

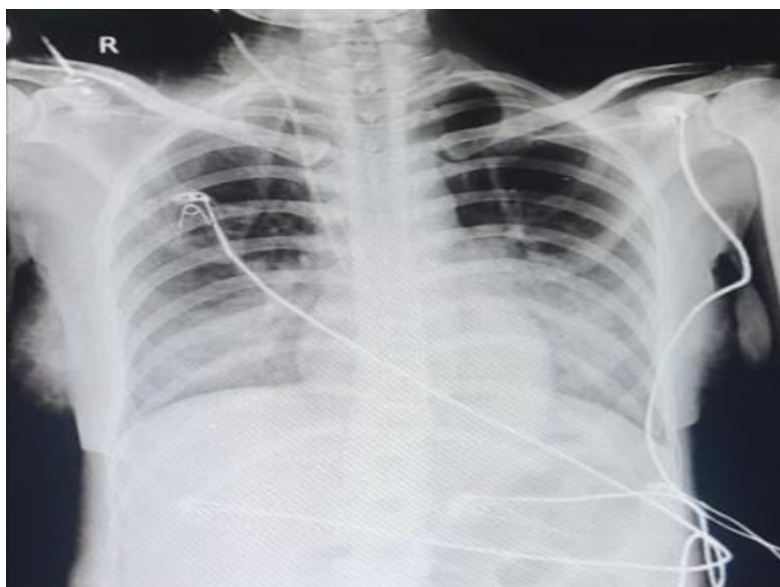
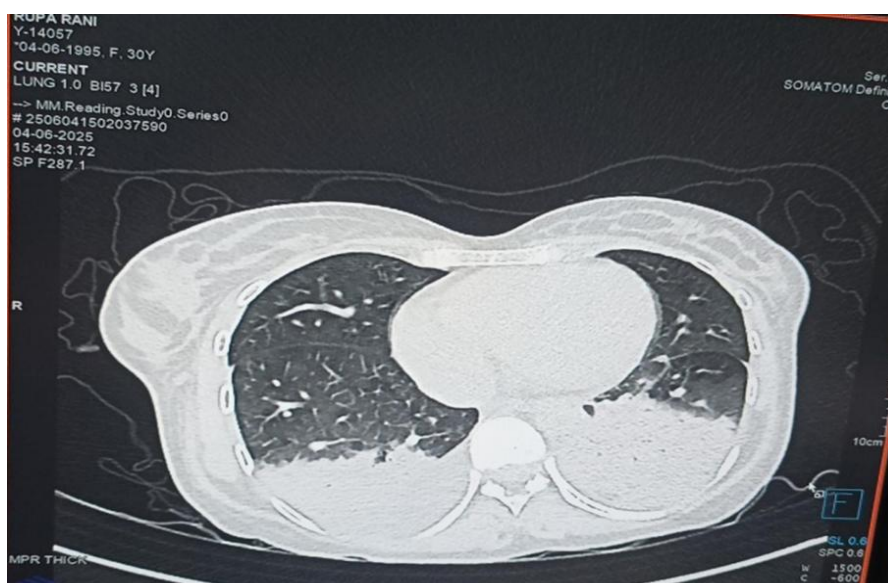


Figure 3: Contrast-Enhanced CT Thorax Demonstrating Early Pulmonary Edema



Investigations showed Hb 6.9 g/dL on admission, improving to 10 g/dL by day 7; elevated TLC (peak 32,100/mm³); rising CRP; serum BNP 1247 pg/mL; and lactate 3.0–3.2 mmol/L. Coagulation profile, renal and liver parameters remained stable.(Table 1)

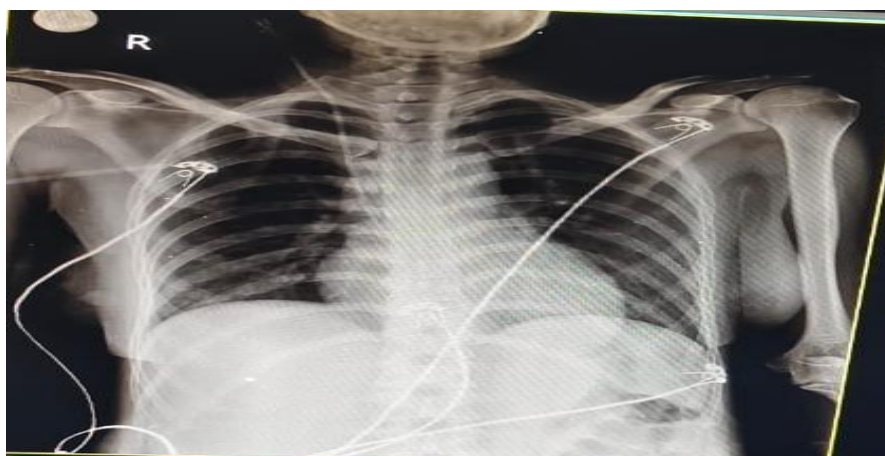
Table 1: Serial Laboratory Parameters

Parameter	Day 1	Day 2	Day 4	Day 5	Day 7
Hemoglobin (g/dL)	6.9	8.6	9.2	9.8	10.0
Total Leukocyte Count (/ μ L)	28.6×10^3	32.1×10^3	28.1×10^3	17.6×10^3	13.6×10^3
Platelet Count (/ μ L)	289×10^3	290×10^3	295×10^3	291×10^3	290×10^3
CRP (mg/dL)	+ve (4.6)	4.8	—	2.4	—
β -hCG (mIU/mL)	568	—	186	—	—
LFT: Bilirubin (mg/dL) / AST / ALT (U/L)	0.9 / 38.6 / 33.6	1.0 / 77 / 42	0.9 / 42 / 22	—	—
Creatinine (mg/dL) / Blood Urea (mg/dL)	0.6 / 18	0.9 / 18	0.7 / 25	0.7 / 16	—
Na / K / Cl (mmol/L)	135 / 3.6 / —	134 / 2.7 / 103	143 / 3.49 / 96	141 / 3.8 / 93	—
Calcium / Magnesium (mg/dL)	8.7 / 1.3	—	—	—	—
T3 / T4 / TSH	4.7 / 15.1 / 0.32	—	—	—	—
Total Protein (g/dL)	5.4	—	6.2	—	—
Albumin (g/dL)	3.2	—	3.4	—	—
LDH (U/L)	766	1025	—	—	—
Bleeding Time / Clotting Time	1'30" / 3'30"	—	—	—	—
PT (sec)	14.2	14.1	12.4	13.4	—
INR	1.04	1.05	0.90	1.00	—
HbA1c (%)	6	—	—	—	—
BNP (pg/mL)	1247	—	—	—	—

A provisional diagnosis of pulmonary edema—suspected transfusion-associated circulatory overload (TACO)—with septicemic shock secondary to septic abortion was considered. She was managed with CPAP support, fluid restriction, diuretics, norepinephrine infusion (titrated to maintain MAP $\geq$ 65 mmHg), and broad-spectrum antibiotics (piperacillin–tazobactam and amikacin). Electrolytes were corrected as needed. Strict input–output monitoring and hourly vitals were maintained.

Over 3 days, her oxygenation and hemodynamics improved. She remained afebrile, was weaned to nasal prongs, and vasopressors were tapered. She was transferred to the obstetrics ward, completed IV antibiotics, and was subsequently discharged on oral amoxicillin–clavulanate, iron and folic acid, and calcium. On discharge, chest radiography showed marked resolution of pulmonary edema.(Figure 4) Post-abortion contraceptive counseling was provided, and follow-up was advised after 7 days.

Figure 4: Chest X-ray at Discharge Revealing Improved Lung



Discussion

TACO remains the most frequently reported transfusion-related fatal adverse event, yet is often under-recognized and underreported in emergency and obstetric settings. The principal pathophysiology involves hydrostatic pulmonary edema triggered by acute circulatory volume overload following transfusion. Patients with anemia, bleeding, sepsis, and massive transfusion for obstetric hemorrhage represent a vulnerable group. The 2018 ISBT definition expanded diagnostic criteria for TACO to include cardiovascular signs like elevated central venous pressure and biomarker elevation, aiding differentiation from TRALI and ARDS, which result primarily from inflammatory injury rather than volume overload.[1-2,5-7] Septic abortion complicated by disseminated infection predisposes to septic shock characterized by vasoplegia, endothelial dysfunction, and increased capillary permeability leading to non-cardiogenic pulmonary edema. When combined with aggressive transfusion for hemorrhagic shock, the risk of TACO escalates. Our patient exhibited classical signs of both conditions: post-transfusion hypertension and elevated CVP indicative of fluid overload, alongside persistent hypotension and hypoxia consistent with septic shock.[3,4]

Management mandates early uterine source control including evacuation of retained products, prompt institution of broad-spectrum antibiotics, and vigilant hemodynamic monitoring. Fluid resuscitation must be judicious to avoid exacerbating pulmonary edema, with the use of diuretics and non-invasive ventilation when TACO is suspected.[8-10] Vasopressor support stabilizes systemic pressure, while oxygen therapy and CPAP counter respiratory distress. The balance between treating hypovolemia and preventing fluid overload underscores the critical complexity in these patients.[11-14]

This case also highlights the dangers of unsupervised medical abortion leading to incomplete abortion, severe bleeding, and life-threatening infection. Post-abortion counselling, access to safe abortion services, and contraception are key prevention strategies.[15-17]

Multidisciplinary approaches integrating emergency medicine, obstetrics, critical care, and transfusion medicine improve outcomes in this rare but serious scenario. Early recognition of TACO in the context of septicemia can guide tailored management and reduce morbidity and mortality.

Conclusion

This rare case emphasizes the coexistence of transfusion-associated circulatory overload (TACO) and septicemic shock in a patient with septic abortion, illustrating the challenges of managing hemodynamics in critically ill obstetric patients. Although TACO is typically associated with underlying cardiac or renal dysfunction, it may also occur in previously healthy individuals receiving rapid or high-volume transfusions, especially in sepsis where vascular permeability is increased. The overlapping presentation with septic shock and pulmonary edema necessitates careful differentiation from TRALI or ARDS to guide appropriate treatment. Early recognition of TACO signs, alongside management of septic shock with diuretics, cautious fluid therapy, vasopressors, non-invasive ventilation, and broad-spectrum antibiotics, enabled successful outcome. The case highlights the dangers of unsupervised medical abortion leading to severe infection and critical illness, reinforcing the need for safe abortion practices and counselling. Overall, timely multidisciplinary care and individualized transfusion strategies are key to improving survival in such complex scenarios.

Declarations

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