

Case Report

A Case of Takotsubo Cardiomyopathy Following Postpartum Hemorrhage in a Patient with Concurrent Influenza A

Iona Palmer, B.A.¹, Michael Helou, D.O.², Aaron Adams, M.D.³, Callyn Samuel, M.D.³, Rongras Damrongwatanasuk, M.D.⁴, Tanya Franklin, M.D.³, Shahab Ghafghazi, M.D.⁴, Tiffany Tonismae, M.D.⁵

¹ School of Medicine, University of Louisville, ² Medicine, University of Louisville, ³ Obstetrics, Gynecology, and Women's Health, University of Louisville, ⁴ Department of Medicine, Division of Cardiovascular Medicine, University of Louisville, ⁵ Department of Obstetrics, Gynecology, and Women's Health, Division of Maternal-Fetal Medicine, University of Louisville

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Background

Takotsubo cardiomyopathy, also known as stress cardiomyopathy and broken heart syndrome, is a transient, non-ischemic cardiomyopathy marked by reversible left ventricular dysfunction with a unique apical ballooning appearance (Amin, Amin et al. 2020). It can occur any time, is typically triggered by physical or emotional stress and mimics myocardial infarction (MI) in nonexistence of coronary artery disease (CAD) (Amin, Amin et al. 2020). The prevalence is 1-2.5% and most commonly affects postmenopausal women (Gianni, Dentali et al. 2006, Sharkey, Lesser et al. 2011). In contrast, peripartum cardiomyopathy is a disease of ventricular dysfunction (left ventricular ejection fraction <45% or fractional shortening <30%, or both) that lacks the characteristic echocardiographic findings of Takotsubo and develops in the last month of pregnancy or up to 5 months postpartum (Honigberg and Givertz 2019, Arany 2024). Although both conditions present with acute systolic dysfunction, they differ in etiology and affected populations. Takotsubo cardiomyopathy is rarely seen in postpartum women, making such cases diagnostically challenging and clinically important when they arise.

Objective

This report presents a rare case of Takotsubo cardiomyopathy in a 24-year-old postpartum patient following significant hemorrhage due to uterine atony. Concurrent influenza A infection may have further contributed to development of Takotsubo cardiomyopathy in this patient. As cardiovascular disease remains a leading cause of maternal mortality, increasing recognition of stress-induced cardiomyopathy in obstetric patients is essential for prompt clinical diagnosis and management.

Study Design

This case report details the clinical presentation and multidisciplinary management of a patient with Takotsubo cardiomyopathy in the setting of postpartum hemorrhage and influenza A infection.

Results

A 24-year-old gravida 1 para 1 presented via transfer from a rural community hospital following a primary low transverse cesarean section performed at 39 weeks and 4 days. The operation was performed after attempted vaginal delivery due to arrest of descent in the setting of fetal macrosomia and was complicated by blood loss of greater than 3 liters in the setting of uterine atony. Additionally, influenza A infection was confirmed by positive upper respiratory panel results at both the referring hospital and our facility. On presentation to our hospital, the patient was clinically stable. However, a post-hemorrhage echocardiogram was significant for apical ballooning and akinesis with preserved basal wall motion, and LVEF of 10-15%. These findings are characteristic for a diagnosis of Takotsubo cardiomyopathy. At the time of cardiac consultation, the patient's

only symptoms were tachycardia, fatigue, nausea, and mild abdominal discomfort. She was started on metoprolol 12.5 mg twice daily, which resolved the tachycardia. A couple of days prior to discharge, the patient's LVEF had improved to approximately 34% and her metoprolol was discontinued. Outpatient follow-up echo and consultation one month after discharge found an ejection fraction of 57% and complete resolution of the apical ballooning and left ventricular wall motion abnormalities.

Discussion

This case underscores the unusual presentation of Takotsubo cardiomyopathy in a previously healthy 24-year-old woman with a recent influenza A infection who developed symptoms following postpartum hemorrhage. Most literature describes Takotsubo cardiomyopathy in older, often postmenopausal women, and its pathophysiology remains poorly understood. Notably, some studies have suggested a possible link between Takotsubo cardiomyopathy and recent influenza A infection, though such cases are rare and typically reported in older women. In this patient, the presence of multiple concurrent stressors – including viral illness, significant postpartum hemorrhage, and a possible familial predisposition (evidenced by a recent diagnosis of Takotsubo cardiomyopathy in her grandmother) – created several potential contributing factors for the development of Takotsubo cardiomyopathy, making it difficult to identify a single, definitive cause. This case challenges current assumptions about the demographics and triggers of Takotsubo cardiomyopathy and highlights the need for more inclusive research to better understand its mechanisms and long-term outcomes.

Conclusion

This case highlights the importance of including Takotsubo cardiomyopathy as part of the differential diagnosis in young, postpartum patients following acute physiological and emotional stress. It is essential to recognize that Takotsubo cardiomyopathy is a distinct condition from peripartum cardiomyopathy; although the two share overlapping features, they differ in etiology, prognosis, and management.

CONDENSATION

This is a case describing the diagnosis and management of a 24-year-old, influenza A-positive patient with postpartum Takotsubo following cesarean section complicated by intra-operative hemorrhage. The patient was transferred to our institution due to recalcitrant hemorrhage after delivery at a rural community hospital. Upon arrival, the patient had an estimated ejection fraction (EF) of 10-15%, and echocardiogram was suggestive of Takotsubo cardiomyopathy. By 1 month postpartum, the patient had regained normal ventricular wall motion and an ejection fraction of 57%.

BRIEF DESCRIPTION

This case is reported due to the rarity of Takotsubo cardiomyopathy development in a young obstetric patient. Through this paper, we aim to emphasize the significance of identifying cardiomyopathies in the postpartum period, as well as the key differences in diagnosis and management between Takotsubo cardiomyopathy and peripartum cardiomyopathy.

KEY FINDINGS

- During a cesarean for failure of descent and infant macrosomia, our patient was noted to have an es-

timated blood loss of 3000 milliliters secondary to uterine atony.

- Despite the administration of uterotonic medications, packed red blood cells, fresh frozen plasma, and placement of a Bakri balloon, the patient continued bleeding. As such, she was transferred from the outside hospital to our institution.
- On arrival at our hospital, the patient was clinically stable, but had an echocardiogram significant for an estimated ejection fraction of 10-15% .
- Notably, our patient was positive for influenza A. Some studies have found an association between influenza A infection and Takotsubo cardiomyopathy, though no known literature exists connecting influenza A infection and Takotsubo cardiomyopathy in a young obstetric patient.
- By the time a follow-up echocardiogram was obtained six weeks postpartum, our patient had recovered left ventricular systolic function.

TEACHING POINTS

- To highlight the importance of evaluating cardiac function following peripartum hemorrhage, regardless of patient age.
- To discuss the differences in clinical history, presentation, imaging findings, diagnosis, and treatment of postpartum cardiomyopathy versus Takotsubo cardiomyopathy.

- To consider the morbidity and mortality of Takotsubo cardiomyopathy, and how that may differ in gravid and antepartum patients.

CASE

BACKGROUND

Takotsubo cardiomyopathy, also known as stress-induced cardiomyopathy or “broken heart syndrome,” is a transient, non-ischemic cardiomyopathy that can mimic acute myocardial infarction. It is characterized by reversible regional systolic dysfunction of the left ventricle in the absence of obstructive coronary artery disease. Echocardiography typically reveals apical akinesis with left ventricular “ballooning” and hypokinesis extending into the mid-left ventricular wall (Komamura et al. 2014; Oindi et al. 2019). The syndrome is most often precipitated by acute emotional or physical stress, though a small number of cases have been reported secondary to respiratory infection – most frequently in individuals in their sixth decade of life or older (Faircloth and Memon 2019). Despite marked impairment in myocardial contractility, laboratory findings are often unremarkable aside from mild elevations in cardiac biomarkers. Although the immediate clinical course is generally favorable, serious complications such as heart failure, hypotension, left ventricular thrombus, and life-threatening arrhythmias have been reported (Komamura et al. 2014). Long-term follow-up studies have reported major adverse cardiac and cerebrovascular event rates as high as 9.9% per patient-year, with mortality rates reaching up to 5.6% per patient-year (Templin et al. 2015). It is important to note, however, that these findings primarily reflect outcomes in older adults, particularly around the sixth decade of life, as Takotsubo cardiomyopathy predominantly affects postmenopausal women. According to data from the International Takotsubo Registry, 89.8% of cases between 2004 and 2021 occurred in women, with a mean age of 66.8 years (Templin et al. 2015; Ahmad, Khalid, and Ibrahim 2025). Although rare, Takotsubo cardiomyopathy has been documented during the antepartum period. While outcomes in these cases are generally favorable, the scarcity of reported cases and limited long-term follow-up data make it difficult to draw definitive conclusions. Moreover, even when cardiac function eventually normalizes, a diagnosis of Takotsubo during hospitalization often results in an extended postpartum stay (Mogos et al. 2023).

In contrast, the more common cardiomyopathy of the obstetric patient population is peripartum cardiomyopathy (PPCM), a rare but potentially life-threatening cause of heart failure in women during late pregnancy or the early postpartum period (Arany 2024). In 2019, the European Society of Cardiology Working Group outlined three main criteria for diagnosing PPCM: the onset of heart failure near the end of pregnancy or shortly after childbirth, the absence of an alternative explanation for heart failure, and evidence of left ventricular systolic dysfunction with an ejection fraction below 45%, regardless of whether the left ventricle is dilated. Since then, the definition has been

broadened to include two additional categories: early-onset PPCM, occurring between the first and ninth month of pregnancy, and late-onset PPCM, which presents between six and twelve months postpartum (Rodriguez Ziccardi and Siddique 2025). While over half of patients affected by PPCM recover cardiac function, a significant number may progress to advanced heart failure requiring mechanical circulatory support or cardiac transplantation (Davis et al. 2020; Arany 2024).

Although both Takotsubo cardiomyopathy and peripartum cardiomyopathy can present with acute left ventricular systolic dysfunction, they differ markedly in etiology, demographic distribution, prognosis, and management. Takotsubo cardiomyopathy is rarely observed in the immediate postpartum period, making its occurrence in young, recently postpartum women, such as the patient in this case, both uncommon and diagnostically challenging (Komamura et al. 2014; Schaufelberger 2019). An additional layer of complexity in this case was the patient’s concurrent influenza A infection, which may have contributed to the physiological stress precipitating Takotsubo cardiomyopathy, as some case reports have alluded to a possible association between recent influenza A infection and Takotsubo cardiomyopathy (Faircloth and Memon 2019). Influenza A is a well-established cause of viral myopericarditis across the age spectrum, from pediatric to geriatric populations, further underscoring its potential role in cardiac dysfunction in this patient (Faircloth and Memon 2019; Baral et al. 2020).

METHODS

This case report presents the clinical course of a 24-year-old postpartum woman diagnosed with Takotsubo cardiomyopathy following a cesarean section complicated by hemorrhage exceeding 3 liters. Her history, presentation, and inpatient management are detailed, with additional chart review conducted after her outpatient follow-up to monitor any post-discharge complications in the months following her discharge.

RESULTS

A 24-year-old Gravida 1 Para 1001 woman presented to the University of Louisville Hospital via transfer from a rural community hospital following a primary low transverse cesarean section (PLTCS) performed at 39 weeks and 4 days. The patient initially underwent cesarean section following a failed vaginal delivery due to arrest of descent in the setting of fetal macrosomia. The patient’s preoperative hemoglobin was 8.2 g/dL, and she received two units of packed red blood cells (pRBCs) intraoperatively. The procedure was complicated by an estimated blood loss of 3000 mL secondary to uterine atony. Despite administration of multiple uterotonics – including intravenous and intrauterine oxytocin, intramuscular methylergonovine, carboprost, rectal misoprostol, and intravenous tranexamic acid – as well as placement of a Bakri balloon inflated to 75 mL and vaginal packing – hemorrhage persisted. She received an additional

unit of pRBCs and one unit of fresh frozen plasma (FFP) postoperatively but was ultimately transferred to our institution for evaluation and consideration of surgical or interventional radiology management due to ongoing bleeding.

Upon arrival, our patient was triaged by the obstetric team and noted to be alert and oriented. A physical exam revealed a firm uterine fundus 1 cm above the umbilicus, intact cesarean bandage without signs of infection, and no active vaginal bleeding. Vital signs were notable for sinus tachycardia to 128 bpm with a stable blood pressure of 113/84 mmHg. Initial laboratory results drawn at our institution demonstrated that her hemoglobin level had risen to 13 g/dL following the transfusions administered at the outside hospital. A respiratory viral panel also indicated that the patient was positive for influenza A, which was consistent with our patient's symptoms of nausea and vomiting prior to and following delivery. A CT abdomen/pelvis with contrast was obtained and consequently revealed a small pericardial effusion and left ventricular dilation. A follow-up echocardiogram showed severe hypokinesis of the mid-to-apical segments of the left ventricle with an akinetic apex and severely reduced left ventricular ejection fraction (LVEF) of 10–15% with preserved basal wall motion—findings consistent with Takotsubo cardiomyopathy. Of note, there was also mild right ventricular dysfunction and a small pericardial effusion without tamponade physiology. In light of these results, the general obstetrics team consulted the cardiology and maternal-fetal medicine services.

During initial cardiology evaluation, the patient denied chest pain, dyspnea, or orthopnea and had no personal history of cardiac disease. Notably, her family history was significant for a maternal grandmother previously diagnosed with Takotsubo cardiomyopathy and a mother who had developed an unspecified cardiac disease in her early 40s. Initial laboratory evaluation revealed an elevated troponin level, peaking at 4,591 ng/L, which trended downward over the subsequent 24 hours. Given the patient's hemodynamic stability and persistent sinus tachycardia in the context of severely reduced left ventricular function, she was started on Metoprolol 12.5 mg twice daily.

A repeat echocardiogram performed seven hours after the initial study demonstrated persistent severe hypokinesis of the left ventricular and apical segments with a left ventricular ejection fraction (LVEF) of 15–20%. Throughout her hospital admission, the patient remained hemodynamically stable and largely asymptomatic from a cardiac standpoint. By hospital day five, an echocardiogram showed her LVEF had improved to 34%. The patient was discharged after discontinuation of beta-blocker therapy with plans for close outpatient follow-up.

At her one-month cardiology clinic visit, a follow-up transthoracic echocardiogram demonstrated full recovery of systolic function, with a normal LVEF of 57% and complete resolution of all prior wall motion abnormalities. The patient reported no cardiovascular symptoms since discharge, and no heart failure medications were restarted. She was advised to follow up annually given her full cardiac recovery.

DISCUSSION

This case describes Takotsubo cardiomyopathy in an influenza A positive but otherwise young, healthy woman in the immediate postpartum period following a traumatic birth experience marked by failed labor, primary cesarean delivery, and severe postpartum hemorrhage. While Takotsubo cardiomyopathy is classically associated with postmenopausal women, this patient highlights a less common but clinically significant presentation in younger, reproductive-aged women under acute physical and emotional stress. In this case, potential physical triggers included major hemorrhage with hemodynamic instability and anemia, as well as being positive for influenza A. Emotional stressors included a complicated delivery, separation from her newborn upon transfer to our institution, and a history of anxiety and psychosocial instability.

Cardiovascular disease remains one of the leading causes of maternal morbidity and mortality in the United States. Although Takotsubo cardiomyopathy has historically been regarded as a transient and relatively benign condition, cases of persistent systolic dysfunction, the development of new arrhythmias, and other complications have been noted (Komamura et al. 2014). For this reason, early identification and close clinical monitoring are crucial, particularly in patients at an increased risk of complications. Known predictors of poor in-hospital outcomes include physical stressors such as hemorrhage, the presence of acute psychiatric conditions, markedly elevated troponin levels, and an admission left ventricular ejection fraction below 45% (Templin et al. 2015). All of these characteristics were present in our patient's clinical presentation. Furthermore, our patient's influenza A infection at the time of delivery may have heightened her susceptibility to developing Takotsubo cardiomyopathy, as some studies suggest a potential link between influenza A and increased risk for this condition (Faircloth and Memon 2019). Previously proposed mechanisms for influenza A-induced cardiac dysfunction include systemic inflammation and direct myocardial injury (Baral et al. 2020). While more data on a specific association between Takotsubo cardiomyopathy and influenza A are needed, and it is impossible to elucidate a single reason why our patient developed Takotsubo cardiomyopathy, influenza A infection may have been one physical stressor that compounded with a myriad of other physical and emotional adversities.

Although Takotsubo and peripartum cardiomyopathy share similar findings of LV dysfunction, it is crucial to differentiate between these two conditions since the prognosis of LV recovery is better in Takotsubo as compared with peripartum cardiomyopathy (Yang et al. 2020). Subsequent pregnancy in a previous history of peripartum cardiomyopathy increases risk of relapse and mortality in women (Wijayanto et al. 2024). Shared decision-making and counseling is strongly recommended to improve fetomaternal outcomes (Wijayanto et al. 2024).

CONCLUSION

Takotsubo cardiomyopathy, though classically seen as a disease of postmenopausal women, can also affect younger patients in the setting of acute physiological and emotional stress, including pregnant and postpartum individuals (Oindi et al. 2019; Mogos et al. 2023). This case underscores the importance of considering Takotsubo cardiomyopathy in the differential diagnosis of postpartum patients with new-onset cardiac dysfunction, especially when known risk factors such as hemorrhage, psychiatric history, and hemodynamic instability are present (Mogos et al. 2023). While influenza A infection is not a well-established

trigger for the development of Takotsubo cardiomyopathy, emerging data suggest systemic viral infections – including influenza A – may contribute to Takotsubo cardiomyopathy development via systemic inflammatory pathways and direct cardiomyocyte injury (Faircloth and Memon 2019; Baral et al. 2020). In our patient, influenza A may have exacerbated an already high-risk state. Regardless of precise cause, this case report seeks to emphasize that early recognition and management of peripartum cardiac disease are critical to improving maternal cardiovascular outcomes.

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