

CASE REPORT

Unexpected bleeding site post thrombolytic therapy for massive pulmonary embolism

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ABSTRACT

Background: Massive pulmonary embolism (PE) is a deadly disease that can be managed by thrombolytic therapy to save patients' lives. A case of postpartum woman who presented to the emergency department (ED) with cardiac arrest due to massive PE.

Case presentation:

We report a case of 34-year-old woman who presented to the ED with cardiac arrest due to massive PE 2 weeks post-uncomplicated spontaneous vaginal delivery. She was managed by a comprehensive multidisciplinary team approach, cardio-cerebral resuscitation (CCR), and systemic thrombolysis. The thrombolysis resulted in massive vaginal bleeding, which led to a prolonged cardiac arrest. This was recognized timely and managed adequately. The patient survived and was discharged home with a good neurological and cardiovascular outcome.

Conclusion: Vaginal bleeding may occur post thrombolysis in post-partum life-threatening PE, which can be resolved by a multidisciplinary team-based approach coupled with CCR.

Keywords: Pulmonary embolism, thrombolysis, team approach, cardio-cerebral resuscitation.

Introduction

Massive pulmonary embolism (PE) is a deadly disease that can be managed by thrombolytic therapy to save patients' lives [1]. According to the advanced cardiac life support, PE is considered as one of the reversible causes of cardiac arrest and systemic thrombolysis should be considered in the treatment of cardiac arrest due to confirmed or suspected PE [1]. On the other side, bleeding is one of the risky complications of thrombolytic therapy, though it most likely occurs in high-risk populations with recent surgical procedures or bleeding tendencies [1]. A case of postpartum woman was presented to the emergency department (ED) with cardiac arrest due to massive PE.

Case Presentation

A 34-year-old woman, previously healthy, had uncomplicated spontaneous vaginal delivery 14 days prior to presentation to the ED with cardiac arrest. She had a visit to the ED 2 days before her presentation because of left lower leg pain and swelling. Compression ultrasound and Doppler of bilateral lower limbs showed

superficial thrombophlebitis of the right great saphenous vein, the patient was discharged with compression stockings.

Emergency medical services reported a history of shortness of breath and dizziness in the course of 1 day by the patient. She looked pale, in respiratory distress and unresponsive though there was pulse, which was lost on the way to the hospital 5 minutes before arrival to the ED. Cardiopulmonary Resuscitation (CPR) was started immediately as per basic life support protocol. In the ED, patient was found to have pulseless electrical activity (PEA) with organized narrow complex tachycardia and

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Received: 02 January 2021 | **Accepted:** 03 July 2021



she was managed as per cardio-cerebral resuscitation (CCR) principles. During the arrest, point of care ultrasound (POCUS) showed dilated right ventricle (RV), hence a massive PE diagnosis was highly suspected. The patient's initial blood gas during arrest showed a PH of 6.89 with lactate >20 mmol/l. D-Dimer was done 2 days before the event and was 4.1 ug/ml.

The decision was taken to give the patient thrombolytic therapy, by administering 10 mg (2 ml) intravenous tenecteplase bolus, followed by 35 mg (7 ml) over 1 hour. The patient remained in PEA 20 minutes post thrombolysis; however, the rate of the organized rhythm had changed from 120 to below 100. The team kept reviewing the differential diagnosis of her profound shocked state. An abdominal ultrasound was performed to rule out intrabdominal hemorrhage as a possible complication of thrombolysis and was unremarkable. She returned to spontaneous circulation (ROSC) after 30 minutes of initiating thrombolysis while going in and out of PEA for a few minutes. Cardiology and vascular surgery were consulted to evaluate the patient to consider embolectomy given that thrombolysis did not help her sustain ROSC. An hour after administering Tenecteplase, while the team was still exploring possible causes of refractory cardiac arrest, the nurse noticed a pool of blood under the patient's pelvis coming from the vaginal vault. Massive transfusion protocol was activated, and the patient received 4 units of packed RBC, 4 units of fresh frozen plasma, 4 units of platelets, and 6 units of cryoprecipitate. The obstetrics team had performed uterine packing with Bakri tube. ROSC was maintained after the bleeding was controlled and blood loss was replaced. Computed tomography angiography of the chest showed contrast filling defects within the segmental branches of both lower pulmonary arteries consistent with the diagnosis of PE. Post ROSC care was initiated and the patient was shifted to the intensive care unit for further management. The patient was discharged from the hospital on day 8 with a Glasgow coma scale of 15 and a mini mental status examination of 23.

Discussion

PE is a life-threatening condition that requires immediate recognition and treatment if suspected [2]. The patient had a cardiac arrest, most likely secondary to PE at that time. Many tools can be used to diagnose PE; however, POCUS is an appropriate diagnostic tool for unstable patients. RV dilatation has a 31% sensitivity and 94% specificity in PE. RV dilatation in massive PE may lead to flattening of the interventricular septum, which can be seen in the parasternal short-axis view making the appearance of LV as D-shaped [3]. McConnell's sign, the appearance of an akinetic free wall with normal motion at the apex, has a 77% sensitivity and specificity of 94% [4]. The combination of POCUS with lower limb compressional ultrasound to check for RV dilatation and deep vein thrombosis, respectively, may further increase the specificity with a negative predictive value of 96% if both are normal [1]. In patients with suspected PE who develop cardiac arrest, thrombolytic therapy can increase the chances of ROSC [1]. Tenecteplase was used as it was available and alteplase was not. Alteplase is the

recommended thrombolytic agent for PE in addition to streptokinase and urokinase, while Tenecteplase is third generation thrombolytic and has more bleeding risk when given to PE patients in comparison to alteplase, hence alteplase has been the most commonly used thrombolytic in PE and Tenecteplase is acceptable alternative when alteplase is not available [3].

Cardio cerebral resuscitation (CCR) with CPR prioritize brain perfusion, while CPR alone prioritizes oxygenation to all vital organs [5]. In CCR, the healthcare provider gives 100 chest compressions per minute for two uninterrupted minutes, and the definitive airway is delayed until ROSC is achieved to minimize interruptions to chest compressions. CCR has been reported to improve survival to hospital discharge and improved neurological outcomes [6]. In the present patient, intubation was performed without interruption to CPR and CPR was minimally interrupted to change rescuer with checking for a pulse every 2 minutes in order to keep interruption of chest compression to the lowest possible, unless ET_{CO2} was noted to increase which is a good indication of ROSC [7]. The routine pulse checks every 2 minutes during CPR has no evidence neither it has any physiological justification, the main value of stopping every 2 minutes to check pulse and changing rescuer is to reduce rescuer fatigue and improve CPR quality, on the other hand, manual pulse check has been found to be inaccurate in detecting ROSC [7,8]. Minimizing interruption in CPR to maintain brain and vital organs perfusion is vital in all cardiac arrest patients, more so in cardiac arrest due to massive PE, the CPR duration usually is long after administration of thrombolysis and reported to extend up to 100 minutes [9].

Uncomplicated spontaneous vaginal delivery is not a contraindication to administering thrombolytics [3]. The present patient was 2 weeks post spontaneous vaginal delivery that did not require episiotomy neither she had any significant vaginal trauma during delivery and yet had profuse vaginal bleeding post-thrombolysis, which required activating massive transfusion protocol and controlling bleeding site by placing uterine packing. The multidisciplinary team approach, constant assessments, and re-assessment of her hemodynamic status helped us recognize this complication early and manage it in a timely fashion. A multidisciplinary team approach has proven to improve patient safety and outcome [10]. PE response team is a concept that began in 2012 at Massachusetts General Hospital. It is expanding worldwide and believes in facilitating access to advanced therapy; however, there is no data yet if it improves outcomes [11].

In general, risk factors for postpartum hemorrhage from the first 24 hours and up to 3 months include gestation <37 weeks, use of instruments for vaginal delivery, cesarean section, duration of labor, and blood loss delivery >500 ml of blood [12]. The present patient had none of these factors. All cases reported related to uterine or vaginal bleeding post thrombolysis in the postpartum period had an operative procedure performed within 48 hours of the thrombolysis or were post-cesarean section [13]. On the other hand, some of the risk factors for major bleeding after thrombolytic treatment for PE related to the present patient were female gender

and CPR of more than 10 minutes. This patient had no specific risk factors for postpartum hemorrhage [14]. The American College of Chest Physicians guidelines suggested systemic thrombolysis in massive PE if the benefit outweighs the major bleeding risks. The present patient had the intervention to save her from imminent death as the doctors believed it was more risk of dying versus bleeding that had to be sought [9,14]. A reduced dose of alteplase (0.6 mg/kg to a maximum of 50 mg) over 15 minutes in massive PE or as a bolus during cardiac arrest showed significant benefit with a lower risk of major bleeding. The mortality, major bleeding, and intracranial bleeding risks are 2.17%, 9.24%, and 1.46%, respectively, if systemic thrombolysis is given. If the improvement outweighs the risks, then thrombolytics would be the right choice [15].

Conclusion

Vaginal bleeding may occur post thrombolysis in postpartum life-threatening PE. A multidisciplinary team-based approach coupled with CCR contributed to this patient's survival with a good neurological outcome despite the prolonged resuscitation for cardiac arrest due to massive bleeding post-thrombolysis from an unexpected site.

List of Abbreviations

CCR	Cardio-cerebral resuscitation
CPR	Cardiopulmonary resuscitation
ED	Emergency department
PE	Pulmonary embolism
POCUS	Point of care ultrasound
ROSC	Returned to spontaneous circulation

Conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this case report.

Funding

None.

Consent for publication

Informed consent was obtained from the patient.

Ethical approval

Ethical approval is not required at our institution to publish an anonymous case report.

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