A rare case of pulmonary embolism in a postpartum mother with MTHFR heterothrophic allele

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Introduction

An embolus is defined as an intravascular detached, undissolved solid, liquid, or gaseous material that is transported by the bloodstream to a site distant from its point of origin and becomes impacted at that site often causing tissue dysfunction or infarction. Pulmonary embolism is when a thrombus from deep venous thromboses becomes lodged in the pulmonary vasculature, and is responsible for the most common form of thromboembolic disease\textsuperscript{1}. Pulmonary embolism (PE) is one of the major causes of maternal mortality, and clinical diagnosis of pulmonary thromboembolism remains difficult because pregnancy-associated physiological symptoms and signs can mimic those of PE\textsuperscript{2}. Hence all members of the obstetric team must be aware of risk factors, common presentations, prevention, assessment, and treatment strategies to ensure the best possible outcomes.

Case report

A 32-year-old gravida 14 days postpartum following her second pregnancy presented to the Castle Street Hospital for Women (CSHW) complaining of sudden onset chest tightness, excessive sweating, and shortness of breath (SOB). She had obstetric complications in both of her pregnancies. The first baby was delivered by an emergency lower segment caesarean section (EM/LSCS) at a POA of 36 weeks due to preeclampsia in 2016 and postpartum period was complicated by venous thromboembolism on day 04. During the evaluation L/S frontoparietal middle cerebral artery infarction was diagnosed, however her thrombophilia screening was normal. She recovered completely following medical therapy and was discharged on aspirin and atorvastatin.

During her second pregnancy, aspirin 150mg was continued throughout the pregnancy and underwent EM/LSCS on 07\textsuperscript{th} of January 2021 at POA 36+1 due to past section in pain. She was started on S/C enoxaparin 40 mg daily postpartum and was discharged with aspirin 75mg nocte along with LMWH for 6 weeks duration.

On postpartum D14 she presented to the CSHW with chest tightness, SOB, and sweating. On examination...
she was sweaty, PR- 118 bpm, BP-103/78mmhg, no calf tenderness. The clinical diagnosis of pulmonary embolism was made. The management started with O2 via face mask 5l/min, immediate IV access, blood was sent for investigations including FBC, PT/INR, RFT, and Urgent ECG, USS Doppler B/L LL was performed. Consultant resident physician opinion was taken and a decision was taken to arrange urgent CTPA for suspected PE.

Her investigations revealed Hb-14.3 g/dL, PCV 42.6, serum creatinine- 69 mmol/L, ECG HR-120 bpm, RBBB, S1Q3T3 pattern, USS Doppler B/L LL- No evidence of B/L LL DVT, 2D echo- EF-55%, good LV function, moderate TR, D shaped LV, mildly impaired RV function, Chest x-ray marginal cardiomegaly, no pulmonary oedema. Her CTPA concluded acute pulmonary embolism involving B/L distal main pulmonary arteries and lobar branches having occlusion more than 90% of the internal lumen with preserving distal runoff, no evidence of pulmonary infarction, evidence of pulmonary hypertension. (Figure 1, 2).

Figure 1. Computed Tomography Pulmonary Angiogram showing pulmonary embolism involving B/L distal main pulmonary arteries and lobar branches and response following intervention.

Figure 2. Pulmonary Angiogram showing pulmonary embolism involving B/L distal main pulmonary arteries and lobar branches and response following intervention.
Following CTPA she was admitted to the ICU CSHW and started IV heparin 80IU/kg bolus followed by 18IU/Kg/hr infusion with target APTT 1.5-2 of baseline (45s-60s) along with other supportive management.

Following confirmation of pulmonary embolism, a multidisciplinary team (MDT) was held including an obstetrician, anesthetist, hematologist, cardiologist, radiologist, resident physician, and concluded that the best-suited management is percutaneous catheter-directed thrombolysis. The decision was taken to continue anticoagulation with IV heparin until thrombolysis is arranged.

Pulmonary angiogram and suction thrombectomy followed by catheter-directed thrombolysis with rTPA 20mg over 1 hour done on 22/01/2021. Her symptoms and hemodynamic parameters were significantly improved and repeat CTPA following thrombolysis on 23/01/2021 revealed clots involving B/L pulmonary arteries, extensions are the same as previous CTPA, the size of the clots are moderately reduced, no pulmonary infarction noted. Repeat 2D echo on 25/01/2021 showed EF-55%, dilated RA/RV, impaired RV function. Following the procedure, she was started on s/c enoxaparin 75mg bd along with aspirin and warfarin therapy. After recovering from the acute stage and achieving targeted INR (2-2.5) she was discharged with aspirin and warfarin therapy awaiting hematology, cardiology review, and levonorgestrel implant was introduced as contraception.

Discussion

Pregnancy is a hypercoagulable state as a result of changes in the blood flow (venous stasis), and changes in the coagulation factors (increased levels of Factor I, II, VII, VIII, IX, XII, plasminogen activator inhibitors I and II) and decreased activity of naturally occurring anticoagulants (Protein S) 3. The rate of VTE during the third trimester was six times higher than the non-pregnant state, and both the first and second trimesters conferred little increase in risk, while the first six weeks of the postpartum period have a 22-fold increase in risk, with the peak occurring in the first three weeks 4.

Since our patient is known to have a previous VTE, her management begins from the pre-conceptional period. Women with previous VTE should be offered preconception counseling and a prospective management plan for thromboprophylaxis in pregnancy should be made 5. Antenatally management by a multidisciplinary team including obstetrician, hematologist, and anesthetist is required focusing on risk assessment, thromboprophylaxis, and a delivery plan. Since she is known to have a prior VTE which was provoked by major surgery with no other risk factors, thromboprophylaxis with LMWH can be started at 28 weeks 6. LMWH thromboprophylaxis decreases the recurrence of VTE among pregnant women with one prior VTE, resulting in a relative risk reduction of 88% 6. Following an emergency cesarean section, it is recommended to continue LMWH for at least 6 weeks postpartum regardless of the mode of delivery in women with a previous history of confirmed VTE and a risk assessment should be performed at least once following delivery and before discharge and it is seen recurrence risk of VTE after pregnancy and immediately after termination of thromboprophylaxis was increased 28-fold 5,6. It is recommended to perform a ventilation/perfusion (V/Q) lung scan or a computerized tomography pulmonary angiogram (CTPA) for suspected PE without symptoms and signs of DVT 7. On admission to the CSHW, a timely diagnosis of pulmonary embolism was made with CTPA and she was subjected to suction thrombectomy followed by catheter-directed thrombolysis with rTPA. She was discharged with aspirin and warfarin with arranged cardiology and hematology review. Treatment with oral anticoagulants should be continued at least 6 weeks postnatally and until at least 3 months of treatment has been given in total and before discontinuing treatment, a risk assessment should be performed 8. Suitable contraception and future fertility wishes should be addressed before discharge and it is important to maintain continuity of care. For patients with current VTE on anticoagulant therapy most suited contraception method is with Cu-IUD (UK medical eligibility criteria; UKMEC 1) while LNG-IUS, IMP, DMPA, and POP are the next options available (UKMEC 2) 8.

Conclusion

Since pregnancy is a hypercoagulable state, all pregnant women should undergo a documented risk assessment for VTE in prepregnancy, antenatal, intrapartum, and postpartum periods. Women who have experienced VTE in the past should receive preconception counselling, risk assessment, and a delivery plan tailored to their unique situation. It is important to identify women who are at increased risk of VTE early and start thromboprophylaxis with LMWH. A multidisciplinary approach
from obstetrician, hematologist, and anesthetist will have a positive impact on the maternal outcome.

Conflicts of interest
The authors have no competing interests to declare.

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