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Research Article

A Presenting with Highly Suspected Acute Pulmonary Embolism in a Woman Post Caesarean Section

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Abstract

Introduction: Pulmonary embolism is one of the major life-threatening emergencies that can occur before, during, or after parturition or caesarean section. It is characterised by dyspnoea, tachycardia, sudden chest pain and shock. Pulmonary embolism is often misdiagnosed, thus leading to higher mortality rate. Here is the first report of pulmonary embolism clinically diagnosed by transthoracic echocardiography combined with electrocardiograph, D-dimer and cardiac troponin I dynamically.

Case Presentation: The case of pulmonary embolism in our report is about a 25-year-old Chinese female patient who presented with shortness of breath with an oxygen saturation of 84% on room air. Transthoracic echocardiography showed a moderately dilated right atrium and ventricle and the pressure of pulmonary

artery was about 45mmHg. Her blood test showed that D-dimer level was 33.25 and cardiac troponin I 1.49. She was clinically diagnosed with pulmonary embolism. **Conclusion:** Pulmonary embolism may be the possible condition for patients who show shortness of breath, lower oxygen saturation, chest pain, etc after Caesarean section. Though computerised tomography pulmonary angiography is the gold standard for diagnosing PE, we highlight the importance of applying transthoracic echocardiography combined with electrocardiograph, blood gas, plasma of D-dimer, cardiac troponin I dynamically to diagnose and treat pulmonary embolism.

Keywords: Pulmonary embolism; Transthoracic echocardiography; Caesarean section

Introduction

Pulmonary embolism (PE) is one of the major life-threatening emergencies that can occur in the peri-parturient period or following caesarean section [1]. Pregnancy and the postpartum period are times of hypercoagulability, increasing the risk of pulmonary embolism [2]. The major risk factors for PE during pregnancy are amniotic fluid embolism, operative vaginal delivery, caesarean section, previous venous thromboembolic events etc. Post-caesarean PE is associated with significant peri-operative morbidity and mortality [3]. The case reported is about a case of a 25-year-old Chinese female patient on her second postoperative day with an acute PE. It highlights the value of transthoracic echocardiography combined electrocardiograph, D-dimer and cTnI in diagnosis.

The Main Body of the Paper

A 25-year-old, 61-kg, and 163-cm Chinese female patient received a caesarean at 38⁺⁶ weeks gestation due to spinal column bend. On her second postoperative day, the patient developed generalized discomfort with shortness of breath with an oxygen saturation of 84% on room air. Electrocardiograph (ECG) examination showed sinus tachycardia and SIQIIIITIII. Arterial blood gas values were PH = 7.41, PaO₂ = 55 mmHg, PaCO₂ = 32 mmHg and SO₂ = 88%. D-dimer level was 33.25 [normal range, 0-0.55]. cTnI 1.49 [normal range, 0-0.01]. Her blood pressure was 100/70mmHg. Transthoracic echocardiography (TTE) examination showed a moderately dilated right atrium (RA) and ventricle (RV) with normal right ventricular function. Moderate tricuspid regurgitation with a

peak velocity of about 4 m/s was recorded. It was estimated that the pressure of pulmonary artery from the tricuspid regurgitation was about 45mmHg. An abdominal ultrasonography examination was performed without evidence of internal bleeding. A lower extremity Doppler ultrasound study was negative for deep venous thrombosis. The patient was diagnosed with PE. She was given oxygen inhalation with mask and treated with low-molecular-weight heparins calcium injection 4100IU (Glaxo Wellcome Production, 0.4ml) 12h Bid subcutaneously injection. Two days later the arterial blood gas measurement was normal. The level of D-dimer and cTnI was 4.5 and 0.52 respectively. She could maintain oxygen saturation of over 95% on room air. A follow-up TTE examination, 1 week later, revealed complete resolution of the pulmonary

hypertension. The RA and RV were regained to normal in size and there was mild tricuspid regurgitation.

Discussion

Amniotic fluid embolism (AFE) and pulmonary embolism (PE) are two of the most common causes of maternal mortality. AFE may arise from simultaneous tears in the fetal membranes and uterine vessels, which permit amniotic fluid to enter the uterine vein and hence the maternal pulmonary arterial circulation [4]. It is characterized by immediate cardiovascular collapse, respiratory distress and disseminated intravascular coagulation [5]. PE is one of the major life-threatening emergencies that can occur before, during, or after the parturition or caesarean section [6].

Symptoms of pulmonary embolism include tachycardia, tachypnea, and shortness of breath, all of which are common complaints in pregnancy. Heightened awareness leads to rapid diagnosis and the institution of therapy. Amniotic fluid embolism is associated with maternal collapse. AFE patients were classified into two types of post-partum hemorrhage and cardiopulmonary collapse based on the initial symptoms. Fifty percent of the patients initially presented with cardiopulmonary arrest or pulmonary arrest as initial symptoms [7]. The rate of PE in pregnancy is increased five times compared to non-pregnant women of the same age [8].

In this case, caesarean section could have contributed to the development of the venous thromboembolic event. Clinically PE is characterised by dyspnoea, tachycardia, sudden chest pain and

shock. Diagnosis of PE is difficult. It is often misdiagnosed, thus leading to higher mortality rate. At present, computerised tomography pulmonary angiography (CTPA) is the gold standard for diagnosing PE [9]. Concerning the effect of radiation dose received and the expensive price of CTPA, other means of diagnosis of PE may be necessary for perinatal women. Real-time three-dimensional transesophageal echocardiography (TEE) was also used to diagnose PE [3]. Evidence has shown that increased plasma levels of cardiac troponin I (cTnI) are sensitive to identify the right cardiac dysfunction and predict clinical severity and prognosis of PE [10]. D-dimer values too have been related to the severity of PE by Aujesky et al. and Ghanima et al [11]. Biomarkers such as troponin I, creatine kinase-MB, d-dimer had positive correlation with the mortality risk of PE [12]. It is important to observe ECG, blood gas, plasma of D-dimer, cTnI dynamically to

diagnose and treat PE. D-dimer measurements are sensitive but nonspecific for PE and therefore may have a high negative predictive value.

TTE is simple and quick to perform bedside. TTE combined with ECG, D-dimer and cTnI dynamically could improve the diagnostic value. The limitation in the study is that CTPA and ventilation-perfusion lung scans were not performed timely. The case is not confirmed pulmonary embolism by CTPA. It can only be said to be highly suspected pulmonary embolism. The present case report demonstrates the feasibility and usefulness of TTE combined with ECG, D-dimer and cTnI for evaluating patients in emergency especially in hospital without CTPA examination. Elevated cTnI and D-dimer should raise the clinician's concern for the possibility of pulmonary vascular obstruction.

For patients with shortness of breath, lower oxygen saturation, chest pain, etc after operation, pulmonary embolism should be taken into consideration. Though computerised tomography pulmonary angiography is the gold standard for diagnosing PE, it is important to apply TTE combined with electrocardiograph, arterial blood gas, plasma of D-dimer, cTnI dynamically to diagnose and treat PE. PE should be concerned if RA and RV are dilated accompanied with the pressure of pulmonary artery over 40mmHg and elevated D-dimer and cTnI.

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