

Peripheral Venous Air Embolism in a Pregnancy (Case Report)



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Abstract

Air embolism can occur in many medical surgical situations. Venous air embolism is often lethal when it enters to the venous circulation rapidly. Massive air embolism is usually diagnosed clinically with sudden hemodynamic deterioration. In this case report, the importance of ETCO₂ monitoring in the treatment of pregnant patients with peripheral venous embolism (PVE) has been discussed.

Keywords: Venous air embolism; Pregnant; ETCO₂; Hemodynamic Deterioration; Significant Morbidity; Venous Circulation; Pulmoner Venous Embolism; Sefazolin; Antibiotic Treatment; Dizziness; Dyspnea; Electrocardiography; Sinus Bradycardia; Blurred Vision; Swelling; Nasal capnography; Tachypnea Perfusator Systems; Serum sets; Computerized Tomography; Echocardiography; respiratory distress

Abbreviations: PVE: Pulmoner Venous Embolism; CT: Computerized Tomography; TOE: Transesophageal Echocardiography; VAE: Venous Air Embolisation

Introduction

Air embolism can occur in many medical surgical situations. Venous air embolism is often lethal when it enters to the venous circulation rapidly. It can cause significant morbidity when it is passed to systemic arterial circulation. Massive air embolism is usually diagnosed clinically with sudden hemodynamic deterioration [1]. In this case report, the importance of ETCO₂ monitoring in the treatment of pregnant patients with pulmoner venous embolism (PVE) has been discussed.

Case Report

The patient was a 30-years-old, 17 week first pregnancy woman with no known additional disease and no active problems in follow-up. While the patient was using *sefazolin* (İespor®) 500 mg due to infectious influenza, she applied to another emergency service on the 4th day of treatment. A venous vascular access was opened to receive antibiotic treatment in 100cc 0.9% NaCl. Approximately 1 minute after the solution begins to be given to the patient; dizziness, dyspnea and loss of consciousness presented in the patient. On the controls, it was noticed that there was air in the settee. Promptly, the patient was given a supine position and the patient's blood pressure was 70/30mmHg with spontaneous breathing, which was a positive light reflex. Electrocardiography detected sinus bradycardia. A

new venous vascular access was opened to the patient for fluid replacement and 100% O₂ therapy was given. Approximately 5 minutes later, she regained consciousness and the patient's blood pressure was measured 90/50mmHg. The patient described blurred vision and dyspnea. The systolic function of the patient was normal, valve movements were natural, and EF is 60% on ECHO. Fetal heart rate was positive under USG control and no additional distress was observed. In case of consultation with cardiovascular surgeon, he was not considered a massive embolism since no heat change, swelling, diameter difference was detected in both legs. Since the patient was pregnant, no radiation-containing examinations were performed. Eco was normal but clinic was significant.

At the end of the third day, the patient was admitted to our polyclinic with ongoing dyspnea and tachypnea. The patient underwent end-tidal CO₂ measurement with an nasal capnography device and found to be 26mm/Hg; SPO₂, measured at 96mm/Hg. After three days of follow-up, 100% O₂ therapy and fluid replacement were performed at regular intervals. At the end of the third day ET-CO₂ was measured 32mm/Hg, SPO₂ was measured at 98mm/Hg. Dyspnea decreased significantly at the end of 3 days. Blurred vision was completely improved.

Discussion

Peripheral venous air embolism is rare but can result in serious complications. Possible sources for air embolism are perfusator systems, serum sets, air in the injector which is not evacuated during intravenous drug injection. It is reported that the caesarean case which depends on in anesthesia, the usage of closed loop/circuit/cycle within in a short period high-power air interference is resulted death [2]. In computerized tomography (CT), a case was reported in which carelessly antecubital injection of 150 ml air was performed during contrast medium injection [1]. Generally, in the venous system a small amount of air can be absorbed spontaneously, but when a large amount of air crosses over the systemic circulation rapidly, this can cause significant morbidity and mortality. Fatal air volume is defined as 200-300mL or 3-5mL/kg for adults in case reports, while air collection rate is also important [3,4]. In this case, in the case of pulmonary venous air embolism which may be encountered during routine peripheral venous interventions, the symptoms and end-tidal CO₂ pressure were guided by the fact that patient was a pregnant.

Clinical indicators are late findings of pulmoner venous air embolism and these are not specific. Monitors are more sensitive but can give false positives. End-tidal capnography and precordial doppler are the most sensitive combination. But none of these are specific to Venous air embolisation (VAE). Transesophageal echocardiography (TOE), is the most sensitive and specific monitor [5]. Nasal ETCO₂ level was considered in the diagnosis and treatment of our patient. On the 3rd day of 100% oxygen treatment, it was determined that O₂ treatment was sufficient when ETCO₂ level was reached normal limit. ETCO₂ is a useful tool for detecting VAE because of its widespread use in the operating room. A change in ETCO₂ is considered significant and can be determined if it reduces 0.2% of baseline (53) or 2mm/Hg (57) [6]. Critical care doctors need to be aware of the symptoms of air embolism and be ready to implement possible therapeutic

maneuvers [1]. Peripheral air embolism should be treated with 100% O₂, fluid infusion and vasopressor should be given to correct hypotension. Durant's maneuver (Left-lateral decubitus, up-down positioning) can also be applied [1]. Although VAE is uncommon complication, it is potentially life-threatening and requires prevention and early detection. It should be keep in mind that medical personnel should be trained better, especially to improve the training of injector technicians is crucial because of to prevent this preventable complication.

Conclusion

Air embolism is a rare complication. It is potentially life-threatening and should be prevented and detected early. Patients should be suspected if they have a sudden onset of respiratory distress and / or are experiencing a neurological event in a known risk factor setting. We believe that ETCO₂ measurement is a simple and effective method in the diagnosis and treatment of pregnant patients. We recommend that 100% O₂ treatment should be continued until ETCO₂ normalizes.

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