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Case Report

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Acute pulmonary edema developing after cesarean section: a case report

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Abstract

Objective: The aim is to present the case of sudden pulmonary edema developing after cesarean section of a pregnant woman who had undiagnosed valvular heart disease, and to raise awareness about the importance of heart diseases in pregnant women.

Case: A primigravida pregnant woman who was on 33 weeks of gestation admitted to the hospital with the complaints of bleeding and contraction. Intrauterine singleton pregnancy was identified. Tocolysis was initiated and betamethazone was administered. Approximately 48 hours later, the patient was taken to cesarean section with spinal anesthesia upon finding non-reactive and variable decelerations in NST. When monitoring the patient at postoperative service, she was diagnosed with pulmonary edema due to sudden onset of maternal hypotension, tachycardia, dyspnea and tachypnea, and put into intensive care. She was discharged in full recovery one week later following the treatment at intensive care.

Conclusion: Since the changes during pregnancy may sometimes show similarities with the symptoms of some cardiac pathologies, preconceptional cardiac evaluation would be an appropriate step if women planning pregnancy have cardiac risk factors.

Keywords: Cesarean section, pulmonary edema, cardiac disease, mitral valve insufficiency.

Özet: Sezaryen doğum sonrası gelişen akut akciğer ödemi: Olgu sunumu

Amaç: Önceden tanı konulmamış kalp kapak hastalığı olan gebede sezaryen sonrası ani gelişen akciğer ödemi olgusunun sunulması ve kalp hastalıklarının gebe hastalardaki önemi hakkında farkındalık oluşturulması amaçlanmıştır.

Olgu: Gebelik yaşı 33 hafta primigravid gebe hasta, kanama ve kontraksiyon ile hastaneye başvurdu. İntrauterin tekil gebelik tespit edildi. Tokoliz ve betametazon başlandı. Yaklaşık 48 saat sonra NST'de non-reaktif ve variable deselerasyonlar saptanması üzerine spinal anestezi ile sezaryene alındı. Hasta postoperatif serviste takip edilirken iki saat sonra ani başlayan maternal hipotansiyon, taşikardi, dispne, takipne meydana geldi ve akciğer ödemi teşhisi konuldu ve yoğun bakıma alındı. Yoğun bakımda tedavi sonrası 1 hafta sonra şifa ile taburcu edildi.

Sonuç: Gebelikte meydana gelen değişiklikler bazı kardiyak patolojilerin semptomlarıyla benzerlik gösterdiğinden gebelik planlayan kadınlarda kardiyak açıdan risk faktörleri mevcut ise prekonsepsiyonel kardiyak değerlendirme yapılması uygun olacaktır.

Anahtar sözcükler: Sezaryen, akciğer ödemi, kalp hastalığı, mitral kapak yetmezliği.

Introduction

Acute pulmonary edema is an emergency clinical condition with mortality and morbidity risk which is seen in about 0.08% of pregnant women.[1] It has generally 2 reasons: Cardiogenic pulmonary edema is caused by high pulmonary capillary hydrostatic pressure, and non-cardiogenic pulmonary edema is associated with the permeability due to capillary endothelial and alveolar epithelium injury.[2] The major reason in non-cardiogenic pulmonary edema is acute respiratory distress syn-

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drome (ARDS), and high altitude and neurogenic pulmonary edema, high dose opioid use, pulmonary emboly, eclampsia-associated pulmonary edema acute pulmonary damage in transfusion are rarer reasons.[3–5] Cardiogenic and non-cardiogenic pulmonary edemas have a similar radiological appearance. Both clinical conditions cannot be always distinguished clearly, and even both may appear simultaneously. The presence of protein in lung fluid and pulmonary artery wedge pressure (PAWP) can be used in the differential diagnosis. PAWP being ≤18 indicates non-cardiogenic pulmonary edema.

The primary reason for cardiogenic pulmonary edema is acute decompensated cardiac insufficiency leading to rapid and acute increase in the left ventricular filling pressure and the pressure of left atrium.[2] Except coronary artery and valvular diseases, primary hydration (such as blood transfusion), severe hypertension, renal artery stenosis and renal diseases may also cause pulmonary edema. Pregnancy-induced physiological changes may complicate the diagnosis of cardiac diseases. Changes such as systolic murmurs, effort dyspnea, exhaustion and lower limb edema seen during normal pregnancy may be perceived as cardiac diseases. However, cardiac diseases should be considered in some symptoms such as progressive dyspnea or orthopnea, night cough, hemoptysis, syncope and chest pain, and in some clinical findings such as clubbed fingers, cyanosis, persistent dilatation in neck veins, systolic murmur being 3/6 and above, diastolic murmur, cardiomegaly, and persistent arrhythmia. In most of the pregnant women, the diagnosis of diseases can be established by non-invasive methods such as electrocardiography (ECG), echocardiography (ECO) and chest radiography, but invasive techniques can be used in some cases.

In this study, we aimed to present the case of sudden pulmonary edema developing after cesarean section of a pregnant woman who had undiagnosed valvular heart disease.

Case Report

Twenty-one-year-old primigravida pregnant woman who was on 33 weeks of gestation according to the first trimester ultrasonography examination admitted to our hospital with the complaints of vaginal bleeding and contraction. In the fetal ultrasonographic examination, intrauterine singleton pregnancy with living fetus was identified where placenta with 1670 g of fetal weight was on fundal location, and consistent with 50th percentile. Amniotic fluid was within normal limits and the placenta was on fundal location. According to umbilical artery Doppler blood count, S/D was 4.30, PI was 1.31 and RI was 0.22. According to her medical history, she had no known disease, drug intake, smoking habit or alcohol consumption. Her vital signs in the physical examination were stable; her body temperature was 36.1°C and heart rate was 87 beat/min, arterial blood pressure was 122/76 mmHg, respiratory rate was 12; her laboratory findings showed that Hb value was 9 g/dL, Plt value was 256 K/uL, PT value was 10.1/sec, INR value was 0.93 and aPPT value was 27.7/sec; the protein in her urine was negative. Non-stress test (NST) was reactive. No cervical dilation and bleeding were observed in the pelvic examination. Upon the contractions felt by the patients, betamethazone 3 g 2×2 (with 24 hours of interval) was initiated for the liver development of baby and nifedipine 10 mg capsule 3×1 was initiated for tocolysis. The vital follow-ups of the patient were within normal limits. When the patient could not feel the movements of baby approximately 48 hours later after the hospitalization and NST progress was non-reactive for longer than 90 minutes as wells as the presence of variable decelerations, the patient was taken to the cesarean section with spinal anesthesia without sedation premedication. A live female baby, whose birth weight 1765 g and 1-minute Apgar score was 7, was delivered. The baby was hospitalized at newborn intensive care unit. No complication was observed in the patient during spinal anesthesia. The cesarean section took 30 minutes without any problem, there was about 600 cc bleeding and she was monitored at obstetrics clinic. While the patient's service follow-ups after cesarean section were stable, dyspnea, agitation, deterioration of general condition, clouding of consciousness, hypotension, tachypnea and tachycardia developed suddenly at postoperative second hour. It was calculated that the patient was administered 2000 cc intravenous isotonic solution and the patient urinated 1000 cc. Arterial blood pressure was 70/60 mmHg, heart rate was 130 beat/min, respiratory rate was 33 per minute, arterial blood gas Ph was 7.32, PCO_2 was 31.3 mmHg, PO_2 was 88 mmHg, oxygen saturation was 80%, and Hb was 9.1 g/dL. The patient was provided 3 lt/min 100% oxygen support treatment. Generalized infiltrations were observed in the chest radiography (**Fig. 1**). Common thin rales were identified in both lungs. Heart sounds could not be evaluated properly due to the rales. There was no asymmetric rash, swelling or temperature increase in the legs of the patients. With the pre-diagnosis of pulmonary

emboly and aspiration pneumonia, it was decided to do pulmonary CT scan. The patient was intubated and taken to anesthesia intensive care unit since she could not tolerate supine position after CT scan, her oxygen saturation decreased 60%, she had agitation, her general condition deteriorated. Common interstitial thickenings and ground-glass appearance were observed in both lungs In the CT scan (**Fig. 2**). Secondary tricuspid regurgitation, secondary mitral regurgitation, ejection fraction 55%, 45 mmHg pulmonary artery pressure (PAP), and impaired left ventricular wall motion were observed in the ECO scan performed under suboptimal conditions during intensive care follow-ups. It was considered that the patient had pulmonary edema developed due to valvular heart disease and cardiac failure. There was no reproduction in blood, urine and sputum cultures during intensive care follow-ups. Tuberculosis was ruled out in acid-fast bacilli (ARB) staining. C-reactive protein (CRP) value was 2 mg/dl when she hospitalized at the intensive care unit, and it elevated to 16 mg/dl one day later. Then, upon the recommendation of infectious diseases clinic, 1 g 3×1 meropenem was administered. The patient responded to meropenem treatment and controlled diuresis therapy, and extubated on sixth day. Liver and kidney functions were normal according to laboratory results. The chest radiography scans (**Fig. 3**) after treatment were normal, and the patient was discharged with full recovery after 1-week follow-up in the clinic. The patient underwent ECO again under optimal conditions in the cardiology clinic 10 days later. In the ECO scan, it was seen that the left atrium was dilated, mitral regurgitation grade III–IV, ejection fraction was 48%, and it was decided to perform mitral valve replacement (**Fig. 3**).

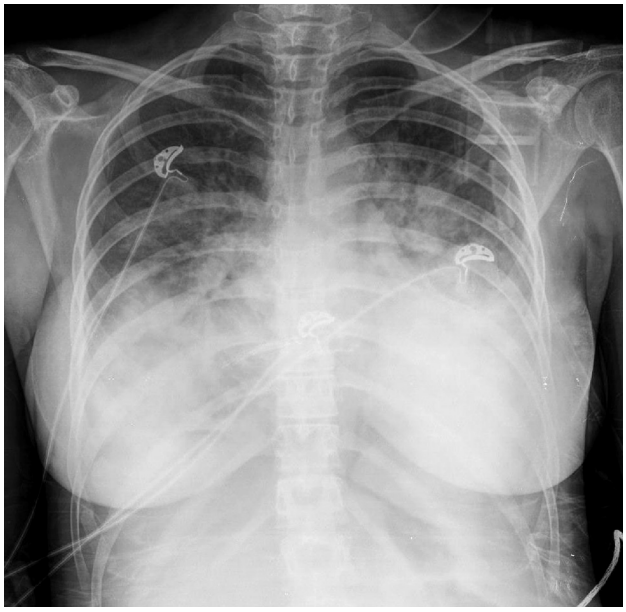

Fig. 1. Chest radiography scan before the treatment.

Discussion

Cardiac diseases are seen in more than 1% of all pregnancies and it is the reason about 20% of maternal deaths; the reasons of more than half of the cardiac diseases during pregnancy are congenital cardiac diseases.[6] Cardiac diseases are still the common reasons of maternal mortality, and mortality rates associated with cardiac diseases increase while maternal mortality rates related with bleeding and hypertension decrease.[7,8] Cardiac diseases are also the frequent reasons of intensive care hospitalization due to obstetric reasons.[8] Cardiovascular

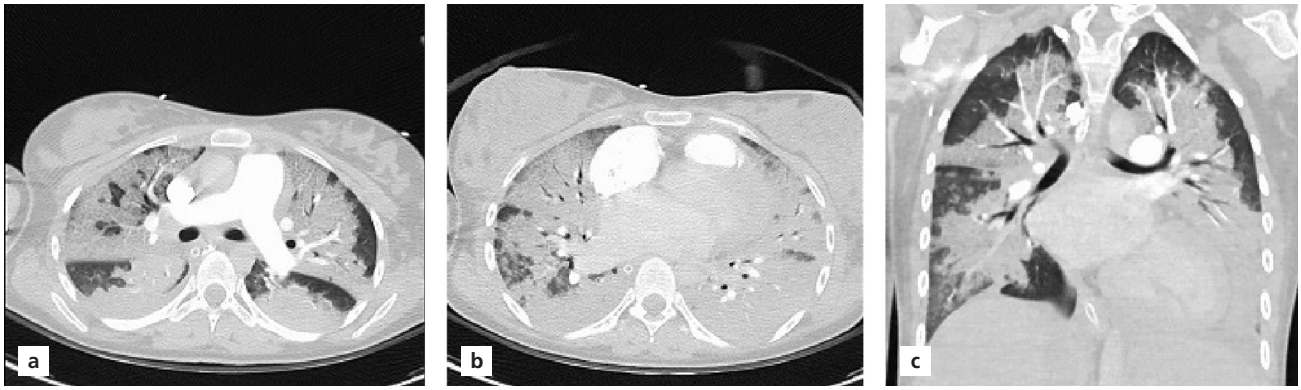

Fig. 2. (**a**–**c**) Pulmonary CT scan before the treatment.

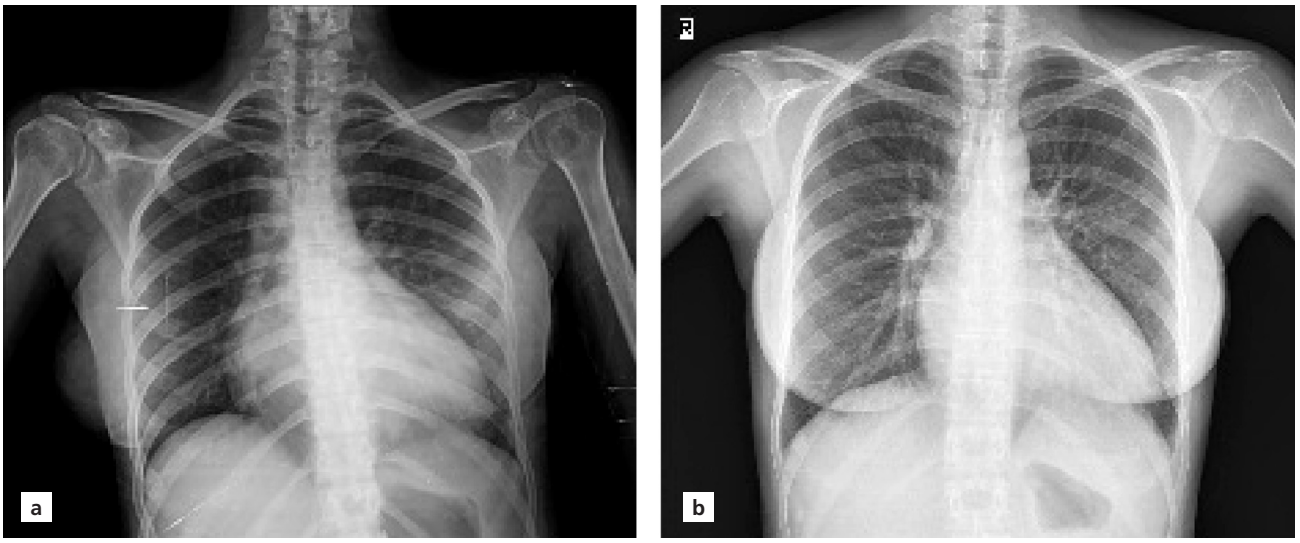

Fig. 3. (**a**, **b**) Chest radiography scan after the treatment.

changes during pregnancy start at 5–8 weeks of gestation, continue up to the end of second trimester, and have a stable progress from last trimester up to the end of pregnancy.[9,10] Relapse of cardiac functions after delivery may be delayed up to postpartum 24th week .[11] Valvular heart diseases are the congenital or acquired damage of cardiac valves. The most common reason of acquired valvular heart diseases is the rheumatic valvular disease. While rheumatic valvular diseases are seen less in developed countries due to the scarcity of crowded living conditions and widespread use of penicillin, they are still common in developing countries.[12] The most common rheumatic valvular diseases are mitral stenosis, mitral insufficiency, aortic stenosis and aortic insufficiency, respectively.[13] Hemodynamic changes during pregnancy in women with valvular heart diseases (VHD) may result in cardiac decompensation. Stenotic valvular lesions are tolerated less during pregnancy compared to regurgitant lesions. The complication risk varies according to the type and severity of underlying VHD. According to the recommendations of American Heart Association / American College of Cardiology (AHA/ACC) published in 2014 and of European Society of Cardiology (ESC) published in 2011/2012, it is difficult to tolerate pregnancy by patients with severe aortic stenosis (aortic valve area ≤1.0 cm^2) or severe mitral stenosis (aortic valve area ≤1.5 cm^2).[14–16] In valvular lesions diagnosed by insufficiency, the risk depends on the severity of insufficiency, symptoms and ventricular functions.

In our case, we observed advanced mitral insufficiency diagnosed with pulmonary edema after cesarean section in a patients who had no history of any cardiac complaint. Mitral insufficiency is a condition which is the most common in pregnant women and mostly concurrent with mitral stenosis.[17] The severity of mitral insufficiency decreases due to the reduced vascular resistance in pregnant women. While patients with mild and moderate mitral insufficiency usually have a comfortable pregnancy, mitral valve surgery, and preferably mitral valve repair, is recommended before pregnancy for women with severe mitral insufficiency. However, if patient develops left ventricular dysfunction induced by mitral insufficiency, the toleration will be difficult during and after pregnancy.[18] Our case had advanced mitral insufficiency and left ventricular dysfunction not accompanied with mitral stenosis. It is likely that the hydration which will not cause any hemodynamic problem in a normal patient caused pulmonary edema in this patient.

Tricuspid regurgitation usually develops due to rheumatic valvular disease and it is frequently concomitant with other valvular diseases. Present complaints of patients depend on the decrease of cardiac output, and the treatment approach in such patients is similar to those of mitral stenosis. Tricuspid regurgitation usually develops secondary to the pulmonary hypertension. Isolated tricuspid regurgitation does not lead to a serious problem during pregnancy.[18]

Physiological changes induced by normal pregnancy may complicate the diagnosis of cardiac diseases. Changes such as systolic murmurs, effort dyspnea, exhaustion and lower limb edema seen during normal pregnancy may be perceived as cardiac diseases. However, cardiac diseases should be considered in some symptoms such as progressive dyspnea or orthopnea, night cough, hemoptysis, syncope and chest pain, and in some clinical findings such as clubbed fingers, cyanosis, persistent dilatation in neck veins, systolic murmur being 3/6 and above, diastolic murmur, cardiomegaly, and persistent arrhythmia. In pregnant women, the diagnosis of diseases can be established by non-invasive methods such as ECG, ECO and chest radiography, but invasive techniques can be used in some cases; however, ECO is a diagnostic tool that can be used at first if cardiac disease is suspected. In our case, ECO was sufficient to establish the diagnosis of valvular insufficiency.

Conclusion

Valvular heart diseases are still the reasons of serious maternal morbidity and mortality in developing countries. Hemodynamic changes induced by pregnancy may reveal advanced asymptomatic cardiac diseases. As the changes during pregnancy may sometimes show similarities with the symptoms of some cardiac pathologies, preconceptional cardiac evaluation would be an appropriate step if women planning pregnancy have cardiac risk factors and especially in the presence of suspicious clinical findings.

Conflicts of Interest: No conflicts declared.

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