



CASE REPORT

The application of epidural anesthesia in pregnant woman with uncorrected tetralogy of Fallot: a case report

Düzeltilmemiş fallot tetralojili gebede epidural anestezi uygulaması: Bir olgu sunumu

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Summary

Tetralogy of Fallot is the most common cyanotic congenital cardiac disease. The hemodynamic changes which are present immediately after abdominal delivery may be resulted with serious, life-threatening multiorgan complications. Therefore the choice of anesthesia is very difficult. We describe the case of pregnant, 33 weeks gestation, with uncorrected tetralogy of Fallot who underwent caesarian section. The epidural anesthesia was performed uneventfully. After having stabile vital signs and a good general condition patient was followed up at the intensive care unit for 4 days. She was transferred to the obstetric service. We think that application of epidural anaesthesia with fragmented and increasing doses of slow levobupivacain in pregnant women with tetralogy of Fallot is safe. Nonetheless, this data of ours will grow stronger with the increase of the clinical application amount.

Keywords: Caesarean section; tetralogy of Fallot; epidural anaesthesia.

Özet

Fallot tetralojisi en sık görülen siyanotik doğumsal kalp hastalığıdır. Bu hastalarda doğum sonrası meydana gelen ani hemodinamik değişiklikler ciddi, yaşamı tehdit eden multiorgan komplikasyonlarına yol açar. Bu yüzden anestezi seçimi zordur. Otuz üç haftalık düzeltilmemiş Fallot tetralojili gebe sezeryan operasyonuna alındı. Sorunsuz bir şekilde epidural anestezi uygulandı. Hastanın vital bulguları ve genel durumu stabil seyretti ve ameliyat sonrası yoğun bakımda dört gün takipten sonra kadın doğum servisine devredildi. Fallot tetralojili gebe hastada epidural anestezi uygulamasında bölünmüş ve artan dozlarda levobupivacain uygulamasının güvenli olduğu kanısındayız. Bununla birlikte, bizim bu verilerimiz klinik uygulama miktarının artırılması ile daha da güçleneceğini düşünüyoruz.

Anahtar sözcükler: Sezeryan; Fallot tetralojisi; anestezi epidural.

Introduction

Tetralogy of Fallot (TOF) is the most frequent congenital cardiac disease with right to left shunt and is characterized with a ventricular septal defect, an overriding aorta, right ventricular hypertrophy and pulmonary stenosis. In TOF patients who have not undergone any surgery, it has been reported that 11% of the cases have lived up to 20.6% years of age to 30 years and 3% of the patients to 40 years of age. In some cases, pregnancy renders a serious risk for both the mother and the baby; resulting in abortion in 70% of the cases. The adult patients with cyanotic cardiac defect who will

undergo a noncardiac surgery, general anaesthesia creates severe clinical problems. In these patients, pre-existing multiorgan dysfunction due to chronic severe hypoxemia leads to additional problems during both the intraoperative and the postoperative period. The changes in systemic arterial resistance, hypovolemia, and the alterations in blood pressure determines the anaesthesia technique to be used.^[1-3]

In this case report, the succesful application of epidural anaesthesia in a pregnant woman with tetralogy of Fallot has been discussed.

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Submitted: 04.12.2013 Accepted after revision: 01.07.2014

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Case Report

A 24-year-old female patient with 26 weeks of pregnancy has applied to the Obstetrics and Gynecology Department. Her body weight was 52 kg's and she had two previous pregnancies which had ended 24th and 28th weeks, respectively. She had dyspnea and cyanosis when she was thirteen and had a diagnosis of Tetralogia of Fallot. She was initiated medical treatment with Diltizem 30 mg two times a day. Although she was able to last her daily life without any problems, she had dispnea and palpitation from time to time especially during the complaints. Considering her previous abortions, she was hospitalized from 26th weeks to 33th weeks, offer a to close antenatal follow up and a proper caesarean section time was scheduled. As her contractions occurred in regular intervals, she was undergone a caesarean section at 33rd weeks of pregnancy.

Laboratory results were as Hemoglobin 15.3gr/dl, fasting blood glucose 102mg/dl, serum creatinine 0.6 mg/dl, Na⁺ 139 mEq/L, K⁺ 4.4 mEq/L and the arterial blood gases were as pH 7.47, pO₂ 52.5 mmHg, pCO₂ 29.1 mmHg, HCO₃⁻ 21.8 mmol/L, BE -2 mmol/L, SpO₂ 84.3%. The transthoracic echocardiography was performed on the patient whose ECG showed sinus tachycardia and right ventricle hypertrophy findings and it had revealed a large VSD in the subaortic region (28 mm), an overriding aorta, rudimentary pulmonary valve and pulmonary arteries originating from the aorta. The right ventricle pressure was 100 mmHg. The chest X-ray presented right ventricle dilatation and no significant lung pathology. The 6 minute walk test was also administered to the patient. Before the test her basic values were; heart rate of 112/min, BP 90/60 mmHg and SpO₂ 86% and after the test they changed as 138/min, 100/60 mmHg, and 67%, respectively. At her preoperative examination she had dispne and cyanosis, heart rate 120/min, BP 100/60 mmHg and respiratory frequency was 36 breaths/min and she had a pancystolic murmur and a strong S2 with normal pulmonary auscultation. As her contractions were observes as coming in regular intervals she underwent a caesarean section at 33th weeks of gestation. After she was monitorized for O₂ saturation, ECG, and radial artery canulation were done and prophylactic Gentamicin and Ampisilin were started. The patient had a heart rate of 130/min,

BP of 130 mmHg and a SpO₂ of 83%. The arterial blood gas examination results were PH: 7.49, PO₂: 52 mmHg, pCO₂: 26.1 mmHg, HCO₃⁻: 19.8 mmol/L, BE -3 mmol/L, SpO₂ 85%. The epidural catheter was placed between the L 3-4 space in the sitting position in order not to cause any problems for the patient and the baby. After the catheter was placed, the patient was positioned slightly in the left lateral decubitis position. As a test dose 3 ml (30 mg) prilocain 1% without adrenaline was applied. After the test dose when motor and symphatic blockage weren't seen 5 ml (25 mg) of 5% levobupivacain was applied via the epidural catheter. A total of 20 ml (100 mg) 5% levobupivacain were performed in 30 minutes with increasing doses at 5-minute intervals until sensorial loss reached the T 5-6 level. The anaesthesia level of the patient was determined as the T5-6 level in approximately 30 minutes. No acute change in the patient's hemodynamia had occurred during this time. The arterial blood gas results after the epidural blockade were pH 7.47, pO₂ 52.2 mmHg, pCO₂ 29.1 mmHg, HCO₃⁻ 21.8 mmol/L, BE -2 mmol/L. 2 L/min of O₂ was given during this procedures. Through the procedure there was constant communication with the patient. The patient didn't have any chest pain or dyspnea. The baby weighing 1550 gr had a first minute apgar score of was born 5-6. After the birth 0.4 mg Metergine was slowly administrated intravenously. Metergine had no effect on hemodynamic parameters. During the operation a total amount of 2000 ml crystalloid infusion was given. Mean heart rate was 125.38±4.84 (120-140/min), mean systolic blood pressure was 139.88±9.14 (125-150 mmHg) and sPO2 was % 82.27±1.80 (80-86) during the surgery. The analgesia of the patient was provided with 4 ml levobupivacain and 25 mcg of fentanyl as a single dose by the intensive care unit during the fallow up. And the catheter was withdrawn after 24 hours postoperatively. Postoperative arterial blood gas value were pH 7.48, PO₂ 53.4 mmHg, PCO₂ 28.4 mmHg, HCO₃⁻ 21.5 mmol/L, BE -2.3 mmol/L, SpO₂ 90%. The transthoracic echocardiography performed in the postoperative 1st hour and the right ventricular pressure was 90 mmHg and didn't differ greatly from the preoperative values. She was followed up at the intensive care unit for 4 days, and as soon as she had stable vital signs and a good general condition was transferred to the obstetric ward.

Discussion

In developed countries, the incidence of cardiac diseases in pregnant women changes between 0.2-3%.

^[4] Practice of outpatient anaesthesia is more rare in pregnant women with cardiac disease.^[5]

During the pregnancy the cardiovascular changes and the hemodynamic effects of the sympathetic blockage with the birth generates the basic point of view for the risks and benefits of the neuroaxial block. To minimize the risk and increase the benefits, the patients must be carefully examined and monitorized.^[5]

Pregnant women with uncorrected tetralogy of Fallot carry maternal major risk factors such as heart failure, arrhythmias and endocarditis; these risks create fetal problems like abortus and preterm labor. These risks increase much more when the average SpO₂ gets below 85%.^[3] In this case, the patient's preoperative cardiac condition was monitorized very carefully due to the previous abortions; before anesthesia the patients' ventricle functions and intracardiac pressure levels were determined with the aid of ECO cardiograms. The walk test was applied in order to determine the effort capacity, and terminated at the 6 th minute as the heart rate changed from 112/min to 138/min, BP from 90/60 to 100/60 mmHg and the initial SpO₂ level from 86% to 67%. Hemodynamic follow up was done more frequently because effort capacity was very low after walk test and then medical treatment was reorganized. The patient's hemodynamic data were monitored strictly and the preoperative medical treatment was increased to 30 mg of diltiazem three times a day. The patient was monitorized carefully and was carefully prepared in the operating room conditions. After neuroaxial blockage due to sympathetic system block with the decrease in preload dramatic cardiovascular changes are observed and secondary to the decrease in cardiac output. Arteriolar vasodilatation decreases the systemic vascular resistance (SVR) and causes reflex tachycardia. Decrease at SVR increases R-L shunt and may aggravate hypoxia. Additionally, CO decrease due to preload drop contributes to this problem. Low SVR may cause a dangerous decrease in the pulmonary blood flow by reversing the left to right intracardiac shunt passage. These hemodynamic changes are more severe with single dose spinal anaesthesia compared to epidural blockade.

General anesthesia is the preferred technique for that kind of patient. But general condition of the patient can be further deteriorated after intubation difficulty, aspiration, fast induction, hypertensive response due to laryngoscopy and intubation.

Even though there are many suggestions, there is no standard technique for the anesthesia of pregnant women with cardiac disease. For a safe neuroaxial block one must avoid standard techniques and the block must be adapted in order to be suitable for hemodynamia. According to the collected data, in pregnant women with tetralogy of Fallot, single dose spinal anesthesia is not recommended and it is stated that epidural anesthesia or combined spinoepidural anesthesia is more beneficial even in pregnant women with the most severe cardiac diseases.^[1,5,6] As this patient will not be in a stable hemodynamia, we preferred epidural anaesthesia instead of a single dose spinal anaesthesia. For pregnant women with cardiac diseases selection of safe agents and doses are also important other than the selection of a safe neuroaxial block. A fast setting sympathetic block aggravates the hemodynamic disorders. Therefore use of a slow acting local anesthetic in a slowly increasing doses while controlling the hemodynamic parameters helps the anesthesia settle more gradually and so provides better maintenance of cardiovascular stability.^[7] In our patient levobupivacain is applied within 5 minute intervals. On the other hand, since the local anesthetic's clearance is low in many cardiac diseases, additional doses must be decreased. For pain management of labor and caesarean section, adding an opioid to the local anesthetic decreases the total local anesthetic requirement.^[5,8]

Levobupivacain is similar to bupivacain in the settling, quality and duration of the epidural block^[9] but has less cardiac and central nerve system toxicity.^[10] It is reported that in a patient who was accidentally given levobupivacain instead of antibiotic no cardiac arrest had been developed but only a deep hypotension occurred and the patient was successfully treated.^[11] Because of this property, usage of levobupivacain is increasing in high risk patients, in birth analgesia and in children.^[12,13] We have also chosen levobupivacain because of it's protective property for the cardiovascular stability and observed that there was no hemodynamic disorder even the sensory block reached T 5-6 high levels.

In conclusion we think that application of epidural anesthesia with fragmented and increasing doses of slow levobupivacain in pregnant women with tetralogy of Fallot is safe. Nonetheless, we believe that our data should be supported by the reports of more new studies.

Conflict-of-interest issues regarding the authorship or article: None declared.

Peer-review: Externally peer-reviewed.

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