

Application of Fractional Epidural Anesthesia to a Patient with Eisenmenger's Syndrome: Case Report

Eisenmenger Sendromlu Hastaya Fraksiyone Epidural Anestezi Uygulaması

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ABSTRACT Eisenmenger syndrome is a large defect with reversal progress between systemic and pulmonary systems, developing with any increase in pulmonary arterial pressure and resistance. We aimed to administer fractional epidural anesthesia to the patient with Eisenmenger's syndrome, to whom we planned to perform bilateral ooferectomy. 18G epidural catheter was inserted at L3-L4 level. The patient, developing vagal response during catheter insertion, was turned to the supine position and administered 5 mg of ephedrine. Following a test dose, 75 mg of levobupivacaine and fentanyl 50 µg at doses of 15 mg /per 5 minutes during a period of 25 minutes were administered. No complication was developed during or after surgery. Although general anesthesia is recommended for subjects with Eisenmenger's syndrome, laryngoscopy, positive pressure ventilation, postoperative pain, hypoxia and hypercapnia shunts may be increased during application. Our fractional epidural anesthesia application may be an appropriate anesthesia method for patients with Eisenmenger's syndrome.

Key Words: Anesthesia, epidural; eisenmenger complex

ÖZET Eisenmenger sendromu sistemik ve pulmoner sistemler arasında zıt çalışan geniş bir defekt, pulmoner arter basınç ve rezistansında artışla seyredir. Bilateral ooferektomi planlanan Eisenmenger sendromlu hastaya fraksiyone epidural anestezi uygulamamızı sunmayı amaçladık. Epidural anestezi, L3-4 aralığından yerleştirilen 18G kateter ile sağlandı. Kateter yerleştirilmesi sırasında vagal yanıt gelişen hasta supin pozisyona alınarak 5 mg efedrin (iv) uygulandı. Test dozundan sonra, her 5 dakikada 15 mg'lık dozlar halinde toplam 75 mg levobupivakain ve 50 µg fentanil 25 dakika içerisinde uygulandı. Cerrahi sırasında ve sonrasında komplikasyonla karşılaşmadık. Eisenmenger sendromlu olgularda geleneksel olarak genel anestezi önerilmekteyse de uygulama sırasında laringoskopi, pozitif basınçlı ventilasyon, postoperatif ağrı, hipoksi ve hiperkapni şantı arttırabilmektedir. Fraksiyone epidural anestezi uygulamamız Eisenmenger sendromlu hastalarda uygun anestezi yöntemi olabilir.

Anahtar Kelimeler: Anestezi, epidural; eisenmenger kompleksi

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In 1837 Victor Eisenmenger described a large ventricular septal defect (VSD) and pulmonary hypertension developing in his 32-year-old patient with cyanosis and progressive cardiac failure. Wood described Eisenmenger's syndrome as a large defect with a performance of reverse or bidirectional shunt between systemic and pulmonary systems and an increase in pulmonary arterial pressure and resistance.¹ Eisenmenger's syndrome is a disease with a high rate of perioperative mortality; however,

mortality rate which is 4% in minor surgical interventions rises up to 24% in major surgical interventions.² In this study we aimed to report our fractional epidural anesthesia application to a patient with Eisenmenger's syndrome who was planned to have bilateral ooforectomy.

CASE REPORT

The operation was planned for the 22-year-old female patient who was being followed up in the gynecology clinic due to bilateral ovarian mass when her pain intensity progressively increased and endometriomas 52 x 52 mm and 49 x 50 mm in size were observed in the right and left ovaries respectively. During the examination of the patient in the anesthesia clinic we learned that she was being followed up due to Eisenmenger's syndrome developing as a result of congenital VSD. A systolic heart murmur of 3/6 was auscultated at Erb's point in the patient who had dyspnea and cyanosis. In the patient, undergoing echocardiography (ECHO), the rate of left ventricular ejection fraction and mean pulmonary pressure were measured respectively as 60% and 60 mmHg (pulmonary hypertension). Additionally, an interventricular septal defect 47 mm in size, a right-to-left shunt, interatrial septal aneurysm and 1° tricuspid insufficiency were determined by the ECHO. Also electrocardiographic findings of right ventricular hypertrophy were observed in the patient. We learned that our patient, operated on for brain abscess in our hospital 5 years ago, was followed up in the intensive care unit for a month and started having epileptic attacks 2 years ago. Bioelectrical slowing down in the right frontal region was detected by electroencephalography (EEG). The patient was using sodium valproate, alprazolam, phenytoin, acetylsalicylic acid. The measured hemoglobin and hematocrit values were 16/50. The arterial blood gas revealed pH 7.45, PCO₂ 30 mmHg, PaO₂ 40 mmHg, bicarbonate 22 mmol and base deficit -2.4, SaO₂ 80%. Epidural anesthesia was planned for the patient and administration of acetylsalicylic acid was cancelled a week before surgery. The patient was brought into the operation theatre, then monitored by ECG, SpO₂,

and non-invasive blood pressure and oxygenated via a face mask. Left radial invasive artery cannulation was performed and central venous catheter was placed via the right subclavian vein. Cardiorespiratory parameters were recorded as: blood pressure (BP) 96/65 mmHg, heart rate (HR) 88/min, central venous pressure (CVP) 5 mm Hg and SpO₂ 85%. The patient was positioned into sitting posture; the lumbar area was cleaned with an antiseptic solution and draped with a sterile covering. First intra-subcutaneous injection of 2 ml lidocaine was administered via the L3-4 interspace then 18G epidural catheter was inserted. When vagal response developed during catheter insertion, the following parameters were recorded as HR 60/min, BP 60/40 mmHg, SpO₂ 60%. The patient was turned to the supine position and pre-catheterization values were reached after the administration of 5 mg of ephedrine and improvement of oxygenation. The patient was placed in the lateral position and the catheter was fixed and a test dose of 40 mg lidocaine was administered. The total dose was administered in a manner causing no effects on the hemodynamic parameters at doses of 15 mg/per 5 minutes until reaching a sensory level to pinprick testing of T6. A total of 75 mg of levobupivacaine and fentanyl 50 µg were administered to the patient during a period of 25 minutes. Surgery commenced when the level of sensory anesthesia T6 reached. Midazolam 1 mg was administered for sedation. Bilateral ooforectomy was completed within 25 minutes without any problems. The amount of bleeding during the operation was 250 ml and no blood transfusions were required. 1800 ml perioperative infusion of crystalloids was administered by monitoring the CVP. The patient, who received follow up care in the postoperative recovery room, was taken to her room in the clinic when the sensory block level decreased. She was discharged from the hospital one week after the operation.

DISCUSSION

Traditionally general anesthesia has been recommended for patients of Eisenmenger's syndrome undergoing noncardiac surgery. Thus,

excessive sympathetic block and uncontrolled reduction in systemic vascular resistance (SVR) caused by regional anesthesia and as a result increase in right-to-left shunt was avoided.^{3,4}

But, release of catecholamine caused by laryngoscopy, anesthesia and post operative pain during general anesthesia increase pulmonary vascular resistance (PVR). At the same time intermittent positive pressure ventilation increases intrathoracic pressure, decreases venous return and can increase shunt by elevating pulmonary artery pressure.⁵ Prolongation in the uptake of inhalation anesthetics may cause vigilance and insufficiency in control of anesthetic depth. Intravenous anesthetics directly reach the systemic circulation by shunting without out mixing in the pulmonary circulation, especially when propofol is used, significant decreases in SVR and systolic BP are observed.³ Hypoxia, hypercapnia and acidosis may increase shunt by decreasing SVR and increasing PVR. Hypoxia, hypercapnia which may occur during waking up anesthesia may worsen the situation.

In a study examining anesthesia techniques applied to patients with Eisenmenger's syndrome,

mortality rate of 14% was reported. In the same study it was stated that here was no significant difference between general and regional anesthesia in terms of mortality; however, when major surgical interventions are examined, mortality rate was reported to be more feasible in the application of general anesthesia.⁴

When epidural anesthesia compared spinal anesthesia, the incidence of hypotension and total ephedrine dose decreased in epidural anesthesia compared to spinal anesthesia.⁵ Uncontrolled decrease in the SVR and increase of shunt may occur with spinal anesthesia, since sympathetic block is more significant than epidural anesthesia. Yet, nonproblematic low-dose continuous spinal anesthesia applications with a catheter were reported in the literature.^{6,7}

We did not have a serious hemodynamic problem in the slow and low-dose administration of epidural anesthesia to our patient. We believe that controlled regional anesthesia can be an alternative to general anesthesia in patients with Eisenmenger's syndrome.

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