

ABDOMINAL AORTIC ANEURYSM SURGERY WITH THORACIC EPIDURAL ANESTHESIA

Case Report

TORAKAL EPİDURAL ANESTEZİ İLE ABDOMİNAL AORT ANEVİZMASI CERRAHİSİ

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ABSTRACT

Abdominal aortic aneurysm is a life threatening condition, with a high incidence of rupture. Most patients are elderly with comorbid conditions. They are also at high risk for operative and postoperative mortality and morbidity. Thoracic epidural anesthesia is a technique providing effective postoperative pain control in cardiovascular and thoracic surgery as an adjunct to general anesthesia. Even though general anesthesia is usually preferred in these patients, epidural anesthesia is an alternative technique in selected patients. This study presents our anesthetic approach in a 79 year old patient with chronic obstructive pulmonary disease scheduled for surgery for abdominal aortic aneurysm.

Keywords: Thoracic epidural anesthesia; abdominal aortic aneurysm.

ÖZET

Abdominal aort anevrizması yüksek rüptür insidansı nedeniyle hayatı tehdit eden bir hastalıktır. Olguların çoğu yaşlıdır ve ek hastalıkları vardır. Yüksek operatif ve postoperatif mortalite-morbidite riski taşırlar. Torakal epidural anestezi, kardiyovasküler ve toraks cerrahisinde genel anestezi ile birlikte kullanılan, etkin postoperatif ağrı kontrolü sağlayan bir yöntemdir. Bu hastalarda genel anestezi çoğunlukla tercih edilse de seçilmiş hastalarda epidural anestezi alternatif bir yöntemdir. Yazımızda abdominal aort anevrizması nedeniyle opere edilen 79 yaşında, kronik obstrüktif akciğer hastalığı olan erkek hastaya anestezi yaklaşımımız anlatılmaktadır.

Anahtar Kelimeler: Torakal epidural anestezi; abdominal aort anevrizması.

INTRODUCTION

Abdominal aortic aneurysm (AAA) is dilatation of the aorta to 1.5 times its normal diameter. The prevalence of AAA has been reported to range between 1% and 4% in the community (1). The annual risk of AAA rupture for aneurysms 7 cm or larger in diameter is 33% (2). Thoracic epidural anesthesia is a technique providing effective postoperative pain control, as an adjunct to general anesthesia, in cardiovascular and thoracic surgery. Given the concomitant pathologies in critically ill patients, it is a reliable technique particularly in patients with lung problems (3,4).

The complications encountered during anesthesia may be related to the preoperative condition of the patient, the type of the surgical procedure and the type of anesthetic technique. The anesthetic technique of choice in critically ill patients is of higher importance. A study evaluating 40.822 patients retrospectively reported that 92,2% of the complications were recorded after general anesthesia and 7,8% after central regional blockade (5).

In this case report, we discuss our experience with thoracic epidural anesthesia in a patient scheduled for AAA surgery who was considered to be at high risk for general anesthesia because of concomitant pathologies.

CASE REPORT

A 79 year old male patient (height, 165 cm; weight, 63 kg) scheduled for AAA surgery in the cardiovascular surgical unit was admitted to anesthesia clinic. The patients complaints were pain in the legs and abdomen pain, dyspnea, chest pain, severe coughing, and getting tired quickly had a 50 year history of smoking 1,5 packs of cigarettes per day. The patient had grade III-IV functional capacity. On physical examination, respiratory rate was 30/min with using of accessory respiratory muscles. The anteroposterior diameter of the chest was increased. There were

diffuse wheezing on auscultation and crepitations in the lower and middle zones. The heart rate (HR) was 90/min, arterial blood pressure (ABP) was 120/83 mmHg. Echocardiography revealed ischemic findings in leads DII, V1, V2, V3, V5. A pulsatile abdominal mass was palpated. Laboratory findings were: Hb, 8.8 mg/dl; Htc, 29,3%; WBC, 198.000 mm³; PT, 13 seconds; aPTT, 25 seconds. Arterial Blood Gas investigation showed a pH of 7.514, PO₂ of 44.9 mmHg, PCO₂ of 58 mmHg, HCO₃ of 31,6 mmol/L, BE of 8.6 mmol/L, and O₂ sat of 83% (2lt/min O₂ with nasal cannula). Other laboratory parameters were within the normal range. Posteroanterior chest radiograph showed mediastinal enlargement, increased bilateral bronchovascular markings, an increase in cardiothoracic index in favor of the heart, and bilateral fluid in the sinuses. Pulmonary function test revealed FEV₁ of 31%, FVC of 59%, and FEV₁/FVC of 38%. Coronary angiography revealed 50% stenosis in the left main coronary artery, plaque in the left anterior descending and the circumflex coronary arteries 30-50% stenosis in the right coronary artery. An aneurysm 8 cm in size was detected in the abdominal aorta. Transthoracic Echocardiography (ECHO) was performed but could not be evaluated optimally because of COPD. The patient was considered at high risk for anesthesia by the cardiology and respiratory diseases departments. Preoperative medications were 2000cc/day of balanced electrolyte solution, furosemid 20 mg tb 2x1, ramipril 2.5 mg tb 1x1, ranitidine 50 mg tb 3x1 and salbutamol 100 mcg inh 4x2. The patient was considered to be ASA IV. An epidural anesthesia was considered because of concomitant pathologies. Considering the surgical incision site, the administration of thoracic epidural anesthesia was decided on.

The patient was taken to the operating room with blood pressure of 128/85 (MAP) mmHg, heart rate of 100 beats/min and SpO₂ of 89%. After standard

monitorization, sedation was performed using midazolam 2 mg IV. The sedation was supplemented using midazolam 1 mg and fentanyl 50 mcg on the second hour of surgery. Catheterization of the right internal jugular vein and left radial artery was performed under local anesthesia. Before the insertion of the epidural catheter, 500 ml of balanced electrolyte solution was administered. After fluid replacement, the CVP was +5 mmHg. With the patient in the sitting position, the epidural catheter was inserted via a 18 gauge Tuohy needle in the 6-7 thoracic intervertebral space using loss of resistance technique. 12 cc of 0,5% bupivacaine was administered after the administration of 2% lidocaine as a test dose. Within 20 minutes, sensory block and Bromage Grade 2 motor block at the T-4 level was achieved. After the block, the patient had a PHR of 58 beats/min, and ABP of 89/55 (MAP: 66) mmHg and received 10 mg ephedrine intravenously. Aortobifemoral by-pass was performed in the patient anesthetized in this manner. Then, 100 units/ kg of intravenous heparin was administered 130 minutes after the insertion of the epidural catheter. After six hours of surgery, ABP was 89/55 - 130/85 mmHg, HR was 58-100 beats/min, SpO₂ was 89-95% and CVP was 5-9 mmHg. Two hours after the administration of the first dose, 5 cc of 0,5% bupivacaine was administered as the supplementary dose via the epidural catheter. The total amount of bleeding during the surgery was 3 liters, and the patient was given 5000 cc of crystalloid, 1000 cc of colloid, 5 units of erythrocyte suspension, and 2 units of fresh frozen plasma. Urinary output was 120 mL/hour. Peroperatively, the patient was given 6 lt/min of O₂ via face mask with no need for inotropes or vasodilators and arterial blood gas values were within the normal range. No complications were recorded peroperatively and the patient was transferred to the intensive care unit postoperatively. Postoperative epidural analgesia was achieved with 5 mL of 0.125% bupivacaine injected every 6 hours, the first dose was given 6 hours

after the last drug administration. The patient had normal PT, aPTT values and platelet count 6 hours after the last heparin administration and the epidural catheter was removed 68 hours. The patient was mobilized at postoperative 8. hour. The patient was followed up for 3 days in the intensive care unit, with normal levels of CK, CK-MB, troponin I, BUN, and creatinine. The patient was transferred to the cardiovascular surgery department in a hemodynamically stable condition.

DISCUSSION

The patients scheduled for elective AAA repair usually have history of hypertension (55%), coronary artery disease (73,5%), pulmonary artery disease (21%), stroke and transient ischemic attack (22%), diabetes mellitus (7%), renal insufficiency (10%) and smoking (80%) (6). The anesthetic technique of choice is determined according to underlying disease of the patient and the surgical intervention. There are no definite guidelines or options in this issue (3). Epstein et al (7) developed a cardiopulmonary risk index by combining the Goldman Risk and obesity, cigarette smoking, coughing, wheezing, obstruction and hypercarbia, which are known to increase postoperative complications. According to this index, one point is assigned to each risk factor and the incidence of postoperative cardiopulmonary complications was defined to be 73,4% in patients with a score higher than 4 and to be 11% in those with a score lower than 4. The patient presented in this study had a score of 5, resulting in a move away from general anesthesia. Because of the fact that the injection site is one of the most important factors influencing the level of epidural anesthesia (8), we planned to insert the epidural catheter at the thoracic region, taking into consideration the surgical incision.

TEA is used successfully as an adjunct to general anesthesia in heart, lung and major abdominal surgeries. The concern

of increased risk of epidural hematoma due to anticoagulation in cardiac surgery is perhaps the greatest limiting factor for this technique. However, in recent years, it has been suggested that it is sufficient to follow the guidelines for insertion and removal of the catheter to reduce the risk of hematoma (9). Additionally, there are studies reporting that heparin administration after catheter insertion should be performed one hour later at the earliest (10). In order to prevent heparin-induced hemorrhage, the first dose of heparin was administered 130 minutes after the insertion of the epidural catheter. Local anesthetics administered epidurally lead to a reduction in heart rate, mean artery pressure, mean pulmonary artery pressure, pulmonary capillary wedge pressure, perfusion and plasma catecholamine levels. Decrease in blood pressure is more severe in hypovolemic patients (11). Despite prehydration, mean arterial pressure (MAP) decreased by 44% and HR by 42% after the administration of local anesthetics via the thoracic epidural catheter in our patient. However, there are studies reporting that thoracic epidural anesthesia is hemodynamically more stable than general anesthesia (12). It was demonstrated that TEA favorably altered both normal and ischemic myocardial oxygen supply to demand ratio in determining myocardial function and reduced myocardial oxygen consumption (13,14). The decreased preload in patients with moderate angina leads to improvement of left ventricular function. A metaanalysis demonstrated that thoracic epidural analgesics reduced postoperative MI risk even though a higher proportion of patients had angina, previous myocardial infarction (MI) and COPD (15). Another meta-analysis reported a reduction in supraventricular arrhythmias and respiratory complications but no change in myocardial infarction, stroke and mortality in patients receiving thoracic epidural anesthesia (16). The patient presented in this study had normal levels of postoperative cardiac enzyme, with no further complications.

Postoperative pulmonary dysfunction results from surgery and anesthesia-related physiologic changes and remains a major cause of postoperative morbidity (17). Groeben et al reported that TEA could be used safely in patients with severe COPD (18). It has been advocated that TEA improved postoperative diaphragmatic function (19). In addition, the motion of the diaphragm toward the head and decreased thoracic blood volume lead to increased functional residual capacity and moderately reduced total pulmonary capacity, vital capacity and forced expiratory volume in one second (20-21). This change in expiratory function can be easily tolerated by healthy individuals whereas it leads to poor cough effort in individuals with obstructive lung disease. Despite the studies reporting that TEA leads to severe bronchospasm in patients with bronchial hyperactivity, it has been demonstrated that bronchospasm is associated with reasons other than pulmonary sympathetic denervation (22).

In conclusion; we consider that TEA alone can be safe alternative to general anesthesia in patients at high risk for general anesthesia scheduled for AAA surgery.

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