

Anesthetic management of two geriatric patients with serious aortostenosis and undergoing orthopedic surgery: case report

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Özet

Yüksek kardiyak riskli geriatric hastalarda rejyonel anestezi pulmoner emboli riskinin azalması, etkin postoperatif analjezi sağlanması ve postoperatif akut konfüzyon ve hipoksi insidansının daha düşük gözlenmesi nedeniyle avantajlı bir anestezi yöntemidir. Alt ekstremitte cerrahisinde hemodinamik stabiliteyi korumak için rejyonel anestezi genel anesteziye oranla daha çok tercih edil İleri derece aort darlığı olan geriatric iki hasta femur fraktürü nedeniyle opere edildi. Kombine spinal-epidural ve sürekli spinal anestezi uygulandı ve her iki olguda vital bulgular stabil seyretti. Bu olgu sunumunda geriatric ve ciddi aort darlığı olan alt ekstremitte operasyonu için sürekli spinal veya kombine spinal-epidural anestezi tekniği ile düşük doz spinal anestezi uygulanan iki vaka sunulmuştur.

Anahtar kelimeler: kombine spinal-epidural anestezi, kontinü spinal anestezi, şiddetli aort darlığı, geriatric hasta.

Abstract

Ciddi aort stenozu olan geriatric iki ortopedi hastasına anestezik yaklaşımımız (olgu sunumu)

This case report presents two cases where low-dose spinal anesthesia was used through combined spinal epidural and continuous spinal anesthesia techniques for the lower extremity surgery of elderly patients with severe aortic stenosis. In high-risk cardiac surgery in elderly patients, lower extremity regional anesthesia has been preferred to general anesthesia to maintain hemodynamic stability. Two elderly patients with severe aortic stenosis were operated for hip fracture. Both cases used combined spinal epidural and continuous spinal anesthesia. Vital signs remained stable in both cases.

Key words: Combined spino-epidural anesthesia, Continuous spinal anesthesia, Severe aortic stenosis, Geriatric patients.

Introduction

Geriatric patients are at increased risk of mortality and morbidity from anesthesia. In patients who require lower extremity surgery due to advanced aortic stenosis, continuous spinal anesthesia was reported to be superior to single-dose spinal anesthesia and epidural anesthesia in terms of cardiovascular stability (1). When the aortic valve, which is normally between 2.5 cm² and 3.5 cm² goes below 1cm², serious aortic stenosis occurs (2). In case of serious aortic stenosis, cardiac output is constant and cannot be increased

against surgical stress. Hypovolemia and blood pressure changes associated with fluid loss can not be tolerated. Vasodilation, caused by vasodilator drugs or spinal anesthesia, may lead to cardiovascular collapse. An increase in blood pressure may cause subendocardial ischemia and fibrillation. As a result of ischemic myocardial tissue, an increase in ventricular muscle tissue, fibrosis, and diastolic dysfunction develops. Therefore, in cases with serious aortic stenosis, intravascular volume, sinus rhythm and heart rate should be protected, and invasive monitoring should be performed.

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Case I

We evaluated a female patient (160cm, 54kg, 100 years old) with orientation-cooperation disorder, who was planned to have emergency operation by the orthopedics department due to right collum femoris fracture during the pre-anesthetic visit. It was determined that she had limited exercise capacity, apical 3/6 systolic murmur and slight crackle in the lung base, based on listening. ECHO result; E.F (Ejection Fraction): 58%, hypokinetic basal inferior left ventricular, limited expansion of degenerative aortic valve, severe aortic stenosis, 1° mitral insufficiency (MI), 1° aortic insufficiency (AI), 1° tricuspid regurgitation (TR), and pulmonary artery pressure was determined to be 42 mmH₂O, aortic valve area of 0.8cm². The patient was assessed to be ASA IV-E and was admitted for operation. The vital values of the monitored patient were as follows: arterial blood pressure 186/110 mmHg; pulse rate 123/min; SpO₂ 94%. Combined spinal-epidural anesthesia was decided for the patient, who was planned to have Thompson partial prosthesis by the orthopedics clinic. Midazolam i.v. 0.5 mg was given intravenously for sedation, and supplemental oxygen 2 L/min was given via face mask to the patient. The patient initially had invasive arterial monitoring and was then laid to her left side, using a combined spinal-epidural set, and the spinal vertebral interspace between L3-L4 was accessed. Intrathecally, 0.5% hyperbaric bupivacaine 3.5mg (0.7 mL) was administered and the epidural catheter was placed. The arterial pressure of the patient, who had an anesthesia level of T10, was 122/60 mmHg, and her pulse rate was 120/min. Before the placement of cement, 10 mg of ephedrine and O₂ at a rate of 6 L/min was administered. After the placement of cement, blood pressure was measured as 109/67 mmHg. The operation was completed in 105 minutes and at 100 minutes postoperatively, the patient started experiencing pain. In order to provide postoperative analgesia, 3 mg of morphine and 50 µg fentanyl in 15 mL 0.9% NaCl, was administered from the epidural catheter as 5 mL fluid. Postoperative nausea-vomiting, headache, constipation, urine retention were not observed in the patient and her vital signs remained stable.

Case II

A female patient (140 cm, 38 kg, 87 years old) with advanced kyphoscoliosis and orientation-cooperation disorder, who was planned to have an operation by

the orthopedics clinic due to right femoral shaft fracture, was evaluated by us during the pre-anesthetic visit. Lung capacity was severely reduced, cardiothoracic ratio had increased, mediastinal widening was present and lung atelectasis was observed at the lung bases. The patient had advanced aortic stenosis E.F.: 60%, 1° MI, 1° AI, aortic valve area of 0.8cm², was assessed to be ASA IV and was admitted for operation. The patient's vital signs were as follows: Blood pressure 158/103 mmHg; pulse rate: 92/min; SPO₂: 86%. Continue spinal anesthesia technique was used. The patient had invasive arterial monitoring, was laid to her left, using a continued spinal set, and the spinal vertebral interspace between L3-L4 was accessed and the catheter was placed. After that, 0.5% levobupivacaine 3 mg (0.6 mL) was administered intrathecally and supplemental O₂ was provided using a 4 L/min mask. The position of the patient was not changed. After 5 minutes, the anesthesia level was brought to T12. An additional 0.5 mg (0.1 mL) of 0.5% levobupivacaine was administered to the patient. The arterial blood pressure and heart rate of the patient remained stable throughout the operation. The operation lasted 125 minutes. In this patient, who was dependent and received overall poor care, the spinal catheter was removed due to the possibility of an infection developing. Approximately 60 minutes after the operation, the patient started experiencing pain. The patient's pain was eliminated with anti-inflammatory analgesic drugs. Postoperative nausea-vomiting, headache, constipation, urine retention were not observed in the patient and her vital signs remained stable.

Discussion

The patients who underwent regional anesthesia showed lower incidence of pulmonary emboli, deep vein thrombosis and respiratory complications compared to those receiving general anesthesia. It was found that spinal or epidural anesthesia reduced bleeding in patients undergoing hip replacement (3,4). In addition, Spinal anesthesia is contraindicated in patients with serious aortic stenosis (5). In these cases, continued spinal anesthesia is recommended because it provides controlled anesthesia levels with low volumes (1). The aim is to provide a continuous spinal anesthesia, which is more controlled and hemodynamically stable, and is applied locally in low dosages. Therefore, this method is commonly applied in elderly patients with femur fracture (3,6). It should not be ignored that quick pre-application

will present a serious problem in elderly patients and patients with limited cardiopulmonary reserves. Continuous spinal anesthesia via low dosage local anesthetic may be advantageous, since hemodynamic variables can more easily be controlled (7,3).

In a study of single-dose spinal anesthesia and continued spinal anesthesia in geriatric patients, Favarel Garrigues et al. determined continued spinal anesthesia to be safer compared with single-dose spinal anesthesia in terms of hemodynamics-cardiovascular stability (8). Similarly, Denny et al. examined patients in a high-risk group and reported that continued spinal anesthesia was more stable than single-dose anesthesia in terms of cardiovascular and respiratory stability (1). Fuzier et al. administered continued spinal anesthesia to two patients with serious aortic stenosis who were to be operated due to femur fracture. They reported that titrated, 0.25% isobaric bupivacaine administered at low doses did not disturb the hemodynamics and no complication was observed (9). Elzinga et al. applied low-dose, low-volume, hypobaric unilateral spinal anesthesia to an 89-year-old patient with atrial fibrillation and serious aortic stenosis in lateral decubitus position and reported that they did not encounter any hemodynamic problems (10). The use of low-dose anesthetic is known to reduce side-effects associated with sympathetic blockage. With age, vessels around the subarachnoid space take on an atherosclerotic structure, decreasing blood flow, which increases spinal anesthesia duration in elderly patients. In both our cases, we achieved anesthesia by applying low-dose and low-volume spinal anesthesia, without changing position, where the broken part facing up. Thus, we aimed to prevent pain and discomfort that may have occurred due to the patient's change of position. In cases with serious aortic stenosis, although epidural anesthesia is not recommended, combined spinoepidural anesthesia is recommended where controlled anesthesia levels are achieved through low volumes. Boso reported that combined spino-epidural anesthesia assisted by invasive monitoring, used during a cesarean operation with aortic stenosis and twin pregnancy, was safe and effective (11). When continuous spinal anesthesia is compared with single-dose spinal anesthesia, the ability to control anesthesia duration and level, is a more advantageous technique, in terms of achieving analgesia hemodynamically and after the operation (1). Provided that a low-dose anesthetic is used, we believe that the application of spinal anesthesia with combined spinal-epidural

catheter and establishing postoperative analgesia through epidural catheter is a safe method. Intrathecal infection risk should be taken into consideration, especially in elderly patients who are dependent on care provided by other individuals. In both patients, we applied low dose and low volume, assisted by invasive monitoring. In second case, we applied continued spinal catheter; due to the patient's advanced age, dependency and tendency towards infections, we removed the catheter at the end of the operation.

The literature includes many cases in which sciatic block and psoas compartment block were successfully applied in knee surgery and hip operations, where central blocks were contraindicated. However, there are limited studies about peripheral neural blocks in elderly patients. A study of upper extremity procedures found a positive correlation between age and block effect period (12). This difference is thought to result from degeneration in the neural system resulting from the decrease in signal speed with aging, which is clear in peripheral neurons and especially in motoric neurons. One-third of myelin was reported to be lost in peripheral neurons older than ninety years (13). Total local anesthesia dosage should be carefully adjusted in old patients given multiple block. Ho et al. successfully applied combined right-sided paravertebral lumbar plexus and parasacral sciatic nerve block in an 87-year-old patient with serious aortic stenosis and right trochanteric femur fracture for operative reduction of the fracture. It was concluded that combined paravertebral lumbar plexus and parasacral sciatic nerve block can be an alternative to general anesthesia and epidural or spinal block applications for hip operations in patients with serious aortic stenosis (14).

In our first patient, with the condition of low-dose anesthetic use, we applied spinal anesthesia with combined spino-epidural catheter. If we had not achieved an adequate anesthesia level, we had planned to increase the level by the application of opioid or local anesthetic through the epidural catheter; however, an additional dose was not necessary during the operation, hemodynamics was not disturbed, the operation was completed and postoperative analgesia was achieved through the epidural catheter. We believe that combined spino-epidural anesthesia can also be used in these cases.

Conclusion

Especially in elderly patients who have aortic stenosis,

we are of the opinion that invasive monitoring-assisted low dose spinal anesthesia, administered using continued or combined spino-epidural technique, is an appropriate anesthesia option for lower extremity operations.

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