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Lower Extremity Surgery with the Patient Under Spinal Anesthesia: Cardiac Arrest

Spinal Anesteziyle Alt Ekstremite Cerrahisi Uygulanan Hastada Kardiyak Arrest

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SUMMARY

We present herein the case of an 87-year-old male undergoing surgery for traumatic fracture of the femur in whom severe bradycardia and cardiac arrest developed after spinal anesthesia. Dopamine infusion started after resuscitation was stopped in the 3rd hour. A relationship was seen between this process and intrathecal application and development of bradycardia. However, this relationship represents only one of the cardiac arrest etiologies. With this case study, we aimed to question all possible causes to determine if the development of cardiac arrest following spinal anesthesia was coincidental or a remarkable phenomenon, since the operation performed under general anesthesia 15 days later was uneventful.

Key words: Bradycardia; cardiac arrest; spinal anesthesia.

ÖZET

Spinal anestezi sırasında gelişen kardiyak arrest çok alışılmadık, nadir ve beklenmedik bir durumdur. Bu yazıda, travmatik kırık nedeniyle opere edilecek 87 yaşında bir erkek hastada, spinal anestezi sonrası gelişen ağır bradikardi ve kardiyak arrest olgusu sunuldu. Kardiyopulmoner resüsitasyon sonrası başlayan dopamin infüzyonu 3. saatte sona erdirildi. Hastada bu süreç ve intratekal uygulama ile bradikardi gelişmesi arasında bir ilişki görünmektedir. Fakat bu ilişki kardiyak arrest etyolojilerinden yalnız biri olabilir. Bu olgu aracılığıyla tüm olası nedenlerini, spinal anestezi sonrası kardiyak arrest geliştikten 15 gün sonra genel anesteziyle sorunsuz bir şekilde opere edilmesinin şans mı yoksa dikkat çekici bir fenomen mi olduğunu sorgulamayı amaçladık.

Anahtar sözcükler: *Bradikardi; kardiyak arrest; spinal anestezi.*

INTRODUCTION

Cardiac arrest developed during spinal anesthesia is very rare, unusual and unexpected.[1] However, in daily anesthesia practice in addition with older age and higher ASA classification the more common development of this complication is a problem that needed to be cautious and requires aggressive resusitation.

We present herein the case of an 87-year-old male undergoing surgery for traumatic fracture of the femur in whom severe bradycardia and cardiac arrest developed after spinal anesthesia.

CASE REPORT

Case has been take place in the Ministry of Health, Istanbul Training and Research Hospital's Orthopedic and Traumatology Surgery room at April 2010. An-87-year-old male, 98 kg, 178 cm man was scheduled to undergo operation for intertrochanteric femur fracture developing after falling down. ASA-II patients, the preoperative evaluation of chronic obstructive pulmonary disease (COPD), hypertension, chronic alcohol use, 30 packs/year smoking history, had glaucoma. Physical examination was remarkable features of a lipoma were present in the neck region

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10 cm in diameter. Patient has no history of regular drug use and allergies. After preoperative evaluation by pulmonologist Combivent® (ipratropium/salbutamol), Pulmicort® (budesonid) and intravenous 40 mg methylprednisolone was proposed. Active pulmoner infection was not considered. Preoperative haemogram and biochemistry values were normal. A peroperative electrocardiogram revealed a sinus rythm with a rate of 83 beats min^{-1}.

The patient had fasted preoperatively for six hours. On arrival operating room his blood pressure was 151/87 mmHg, heart rate 80 beats min^{-1}, SpO_2 %92. His consciousness was open, cooperative and minimal agitate. Patient was informed about spinal anaesthesia during preoperative visit, 18-gauge canule was placed and 1000 ml isolyte infusion started for hydration. On sitting position after sterilization of the skin local anesthesia was performed from L2-3 intervertebral space with 3ml %1 lidocain. With 25 gauge spinal needle firstly median approach tried but it was unsuccesfull after that with paramedian approach 15 mg levobupivacaine (Chirocaine®) + 10 μg of fentanyl was injected in 5 seconds after a free flow of cerebrospinal fluid confirmed. No adverse reaction was observed during subarachnoid injection. The patient immediately placed in the supine horizantal position. No hemodynamic instability was experienced. At the level of thoracic segment -T3 spinal anesthesia (sensorial block level) patient taken to the traction table for surgery and both legs were extended. In the meantime, his blood pressure and heart rate were 60/30 mmHg and 50 beats min^{-1}. At the same time the patient's consciousness was closed and asystole determined. Cardiac massage was started, the patient who were intubated orotracheal total of 3 mg adrenaline and 3 mg of atropine was administered intravenously, 500 cc colloid and 1000 cc isotonic infusion was performed. After about 15 min the patient's circulation returned with sinus rythm. Blood pressure 70/30 mmHg and heart rate were 90/min. After the apperance of spontan respiration 2 mg midazolam injected and patient transferred to intensive care unit. In ICU mechanic ventilation was started Synchronized Intermittent Mandatory Ventilation mode with %60 FiO_2. 7 μg/kg/min dopamine infusion and fluid treatment was started to the patient because of hypotension and central venous pressure catheter was inserted and invasive arterial monitorization was performed. Central venous pressure was 20 mmHg. On chest X-ray mediasten was wide and basal opacities have seen. After 3 hours dopamin infusion was stopped. ECG revealed a V4-6 T(-) and ECO showed global hypokinesia of the left ventricular wall motions. EF measured %45. The review by the cardiology clinic acute myocardial infarction was not considered. There was no significant pathology on cranial CT except cortical and cerebellar atrophy. Neck CT was taken for lipoma on the neck to see the relation with vascular structures around the neck or any compressions but no relation was found. Bilateral basal lung atelectasis was seen in the patient was extubated after 24 hours of mechanical ventilation support. Intermitantly oronasal CPAP mask was applied. 4th day patient was transferred to the orthopedic service.

DISCUSSION

Cardiac arrest, spinal anesthesia is a rare but feared complication. Based on two large retrospective studies developed cardiac arrest during spinal anesthesia, were found to be seven cases to 10,000 cases (0.07%).[2,3] Caplan et al.'s [4] publication of 14 patients who developed cardiac arrest during spinal anesthesia, patients are cases of minor surgery. Six of these patients do not respond resuscitation. According to the Carpenter and all. "maximum (peak) and the traditional block-level factors correlated poorly with the severity of bradycardia.[5]

Preganglionic sympathetic nerve blockade are developed with local anesthetic drugs. Because of α-and β-adrenergic blockade the heart rate and arterial blood pressure is expected to desrease in neuraxial block. Severe bradycardia is often occur after spinal anesthesia growing up T4 level. Cases may present with 1 degree AV block, 2 degree AV block and patient sinus syndrome. Risk factors for moderate bradycardia in the spinal anesthesia by Pollard was as follows: 1) <60 bpm baseline heart rate, 2) ASA physical status I, 3) beta-blocker use, 4), sensory block is above T6, 5) <50 years, 6) prolonged PR interval. Of these risk factors, the more risk detection of ASA I patients than in ASA III or IV patients, must

be considered as a point. Carpenter and colleagues[5] have been identified that in ASA I and young patients vagal tone is more severe. According to Pollard the presence of two or more of these risk factors will bring patient to the class of high-risk patients for bradycardia and asystole. In our case, patient did not have these risk factors. However, it is known that the observed bradycardia during spinal anesthesia, regardless of the severity, constitutes a warning for cardiac arrest.

Many studies in the literature showed that the volume load before the spinal anesthesia and quickly began to replace fluid losses, makes it easy to control the results of unwanted effects of expecting decrease on preload.[6] Mackey et al. bradycardia and cardiac arrest were mentioned among the causes of autonomic dysfunction. Elderly, diabetics, AIDS patients have been given as examples of this pathogenesis to the development.[7] In our case, our patient was 87 years old and because of chronic alcohol use and the risk for autonomic dysfunction, which may have contributed to the development of cardiac arrest.

Levobupivacaine is bupivacain's S (-) enantiomer, and known as cardiac safety aspects. However, cases in the literature is still associated with cardiovascular collapse.[8] In the present case, we were unable to measure serum levels of drugs. Dopamine infusion started after resusitation was ended in 3. hour. This time period is might have a relationship between effectiveness of the levobupivacain. 15 mg intrathecal application of levobupicain provides sensory block 6.5 hours. Effect starts at 15th minute. In our patient this time and time to development of bradycardia with intrathecal application seems as approximately appropriate. But in the etiology of cardiac arrest is only one place that may be why.

Charuluxannan et al. reported that the occurence of cardiac arrest during spinal anesthesia in Thiland was uncomman with incidence of 2.73 per 10.000 anesthetics and high mortality fort he arrest of 90.9%. Two major groups of patients having cardiac arrest during spinal anesthesia were patients undergoing cesarean delivery and surgery to the lower extremity. [9] Such a large bone fractures in case of relatively emergency traumatology of patients of ASA classification status be left partially in the background is the long-term quality of life ahead. Neuraxial block in our case was chosen because of advanced age, obesity and overall physical condition was to be fond of. Were operated under general anesthesia and recovery from anesthesia was concerned about the process of elongation. According to this forecast, the chosen selection of anesthesia result of unintended and severe complications occurred. During this process, operation couldn't done, after transferred to the service from intensive care unite two weeks later patient was enrolled to the operation plan. This time, the patients who underwent general anesthesia and postoperative intensive care were included in the overall follow-up after 24 hours was removed to the orthopedic service. In the literature, bradycardia and cardiac arrest under spinal anesthesia in patients even without hypoxia as discussed many physiological and pathological factors can be considered within.

CONCLUSION

We aim to question the reasons for all these case, a cardiac arrest patients after spinal anesthesia after 15 days to be operated under general anesthesia and the patient experienced no complications made the question that whether the patient or our chance and a remarkable phenomenon, and have led us to offer.

REFERENCES

1. Pollard JB. Common mechanisms and strategies for prevention and treatment of cardiac arrest during epidural anesthesia. J Clin Anesth 2002;14:52-6.
2. Auroy Y, Narchi P, Messiah A, et al. Serious complications related to regional anesthesia: results of a prospective survey in France. Anesthesiology 1997;87:479-86.
3. Tarkkila PJ, Kaukinen S. Complications during spinal anesthesia: a prospective study. Reg Anesth 1991;16:101-6.
4. Caplan RA, Ward RJ, Posner K, et al. Unexpected cardiac arrest during spinal anesthesia: a closed claims analysis of predisposing factors. Anesthesiology 1988;68:5-11.
5. Carpenter RL, Caplan RA, Brown DL, et al. Incidence and risk factors for side effects of spinal anesthesia. Anesthesiology 1992;76:906-16.
6. Kopp SL, Horlocker TT, Warner ME, et al. Cardiac arrest during neuraxial anesthesia: frequency and predisposing factors associated with survival. Anesth

Analg 2005;100:855-65.
7. Mackey DC, Carpenter RL, Thompson GE, et al. Bradycardia and asystole during spinal anesthesia: a report of three cases without morbidity. Anesthesiology 1989;70:866-8.
8. Foxall G, McCahon R, Lamb J, et al. Levobupivacaine-induced seizures and cardiovascular collapse treated with Intralipid. Anaesthesia 2007;62:516-8.
9. Charuluxananan S, Thienthong S, Rungreungvanich M, et al. Cardiac arrest after spinal anesthesia in Thailand: a prospective multicenter registry of 40,271 anesthetics. Anesth Analg 2008;107:1735-41.