

Spinal Anesthesia for Hip Fracture Surgery in an Elderly Patient with Acute Hypertensive Lung Edema

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Abstract

Background: Nowadays, fracture surgery represents a big part of the orthopedic surgeon workload, and usually has associated major clinical and social cost implications. We report a patient case of hip fracture with acute pulmonary edema treated with inguinal lumbar plexus block for analgesia and spinal anesthesia with low dose of isobaric bupivacaine for surgery.

Case Report: A 85-year-old female was admitted with fracture of the hip. Echocardiography was performed, which found respiratory auscultation with crepitations rules in both lungs, associated with blood pressure of 205x 108 mmHg. Chest radiographs showed a bilateral alveolar infiltrate. After discussion with the surgical team and family members, previous analgesia was proposed for lumbar plexus block via inguinal and spinal anesthesia with low dose of isobaric bupivacaine. The surgery lasted 110 min. In the PACU, the vital signs were blood pressure 140x73 mmHg, heart rate 80 bpm and with 98% oxygen saturation in the nasal catheter, and diuresis of 2,400 mL, as well as cardiac enzymes are normal. Received 200 mL of a drink with high energy and transferred to infirmary. The patient was discharged to her home on the third postoperative day asymptomatic.

Conclusions: The most important fact of this case is that the 85-years old patient with acute lung edema improved considerably after lumbar plexus block and spinal anesthesia with low doses and returned to her home on the third postoperative day.

Keywords: Orthopedic Surgery, Spinal Anesthesia, Peripheral Nerve Block, Elderly, Geriatrics.

Introduction

The proportion of the elderly population is increasing due to the improvement in the quality of life and development of medical science, and the rate of the increase is expected to accelerate [1]. This study reflects that age alone should not be a bar to surgery [1]. A hip fracture is a significant injury for anyone, but for older people it can be catastrophic. Hip fractures are an important cause of morbidity and mortality in elders' patients. Studies have demonstrated the increased risk of mortality after hip fracture especially during the first year, and excess mortality risk may persist for several years after fracture [2,3].

Acute heart failure typically occurs as acute decompensated heart failure. There is usually fluid overload [4]. The more severe presentations of acute heart failure are acute pulmonary edema. The goals of acute pulmonary edema management are symptom relief, reduction of extracellular fluid excess, improved hemodynamic,

improved arterial oxygenation and satisfactory perfusion of the vital organs [4]. The goal of treatment is to remove water from the lung (diuretics) and drogues to lower blood pressure (vasodilators).

Hypotension following spinal anesthesia is mainly occurring due to sympathetic blockade leading to peripheral vasodilatation and venous pooling of blood. As a result, there is decreased venous return and cardiac output leading to hypotension [5]. In 1958 continuous spinal anesthesia has already been used to treat acute pulmonary edema [6]. We report a patient case of hip fracture with acute pulmonary edema treated with inguinal lumbar plexus block for analgesia and spinal anesthesia with low dose of isobaric bupivacaine for surgery.

Case Report

A 85-year-old female (height 1.58 m, weight 66 kg, ASA II, Goldman III), was admitted with a fracture of hip. In the pre-anesthetic evaluation, tachypnea, breathlessness, tiredness, 91% oxygen saturation, even in supplemental oxygen use by reservoir mask. Echocardiography was performed, which found respiratory

auscultation with crepitations rules in both lungs, associated with blood pressure of 205x 108 mmHg. The blood count revealed (Hm=4,333.000/mm³, Hb=12 g/L, Ht=36.8%) leukogram (10,030/mm³) and plaquets (120,000/mm³). The ionogram revealed: sodium=134 mmol/L, potassium=3.6 mmol/L, calcium=9.6 mg/dL, chlorine=90 mEq/L, phosphorus=2.8 Eq/dL and magnesium=1.5 mEq/dL. Bilirubin, urea, creatinine, transaminases, coagulogram and cardiac enzymes were normal.

The electrocardiogram showed left ventricular hypertrophy without hemodynamic repercussion. Doppler ultrasonography of the lower limbs that were within normal limits. Chest radiographs showed a bilateral alveolar infiltrate.

Patient without previous history with this clinical picture, the patient was released for surgery by the cardiologist. At this moment a discussion was held between anesthesiologist, geriatrician, surgeon and the entire patient's family.

Patient referred to the surgical center with bladder catheterization, being injected furosemide 40 mg intravenous. Routine monitoring (electrocardiogram, pulse oximetry and noninvasive pressure measurement), was started and intravenous line (18G extracath) was placed. Intraoperatively, 1 mL/kg of crystalloids and 500 mL of 6% hidroxyethyl starch 130/0.4 in 0.9% sodium chloride solution (Voluven®) were administered intravenously. Signals vital to the OR were blood pressure (190x90 mmHg) and heart rate (100 bpm). She is breathing at a rate of 16 breaths/min with an oxygen saturation of 89% on 3 L nasal cannula. There is decreased range of motion due to pain.

In the operation room, the patient was placed in dorsal decubitus position for lumbar inguinal plexus block. The access to the lumbar plexus was achieved using a neurostimulator (HNS 12 B. Braun Melsungen) connected to a 50-mm (22Gx2") needle (B. Braun, Melsungen), and 20 mL of 0.5% levobupivacaine (Cristália Produtos Químicos Farmacêuticos Ltda) plus 20 mL of lidocaine 2% with epinephrine 1:200,000 (Cristália Produtos Químicos Farmacêuticos Ltda) were injected. It was waited 20 minutes until the lumbar plexus block was installed. Vital signs after 20 minutes of lumbar plexus blockade were blood pressure (150x80 mmHg), heart rate (80 bpm) and pulse oximetry (95%).

After sedation with midazolam (0.5 mg) and levoketamine (0.5 mg) (Cristália Produtos Químicos Farmacêuticos Ltda) intravenously and cleaning the skin with chlorhexidine and removal of excess, spinal anesthesia was performed, between L3-L4, sitting position, median, with 25G Quincke needle. After appearance of cerebrospinal fluid, 7.5 mg of 0.5% isobaric bupivacaine (Cristália Produtos Químicos Farmacêuticos Ltda) were administered at a rate of 1 mL/15s. After 5 minutes, the patient presented improvement of respiratory and hypertensive conditions. Vital signs at this time were blood pressure (140x78 mmHg), heart rate (78 bpm) and pulse oximetry (96%). The level of sensory block was observed in T10 and motor blockade (grade

3) of the lower limbs. The anesthetic-surgical procedure lasted 110 minutes without hypotension, bradycardia, or decreased oxygen saturation. The first analgesic dose was given at the end of surgery in the OR dipyrone (3 g) were administered intravenously.

In the PACU, the vital signs were blood pressure 140x73 mmHg, heart rate 80 bpm and with 98% oxygen saturation in the nasal catheter, and diuresis of 2,400 mL, as well as cardiac enzymes are normal. She was remaining in PACU for 120 minutes. After 2 hours, she was stable, with complete improvement of respiratory pattern, lungs cleaned to pulmonary auscultation. At this moment the patient received 200 mL of a drink with high energy (Fresubin Jucy®), when she was transferred to the ward. Intravenously hydration was withdrawn and oral feeding was resumed 6 h after the end of surgery. Her hematocrit remains adequate without transfusion. The duration of analgesia provided by inguinal lumbar plexus block was 20 h. She is transported from the recovery room back to her ward room. The patient was discharged to her home on the third postoperative day asymptomatic.

Discussion

Neuraxial anesthesia and peripheral block plexus is often used for surgical treatment of hip fractures in elderly patients [1,7]. Perhaps the most important fact of this case is that the 85-years old patient with acute lung edema improved considerably after lumbar plexus block and spinal anesthesia with low doses and returned to her home on the third postoperative day.

Pulmonary edema is an abnormal accumulation of fluid in the interstitial or alveolar spaces of the lung. Its etiology can be explained on the basis of the disturbance in the normal Starling equation. In 1956, in pathology, physiology and clinical management of acute pulmonary edema, the spinal anesthesia was indicated in cases of cerebrovascular accidents or hypertensive heart disease, which is refractory to treatment [8]. Two years after, continuous spinal anesthesia was successfully indicated for the treatment of acute pulmonary edema [6]. In the present case, the anterior lumbar plexus block was performed in the operating room, resulting in improvement of all cardiopulmonary parameters. Twenty minutes later was performed spinal anesthesia with low dose of 0.5% isobaric bupivacaine, which provides satisfactory anesthesia without hypotension. In a recent study, elderly patients experienced lesser hypotension with low dose than a full dose or continuous spinal anesthesia [9,10]. Hypotension during spinal anesthesia occurs due to decrease in venous return, vasodilatation and decreased cardiac output.

An excess of fluid intake has been reported as one of the predisposing factors to develop perioperative acute lung injury [11]. After the improvement of acute pulmonary edema with analgesia provided by lumbar plexus block and low-dose spinal anesthesia, 100 mL of Lactated Ringer's and 400 mL of hidroxyethyl starch was given during the procedure. In the PACU, the patient received a drink with high energy, the venous hydration was withdrawn and the oral feedback was restarted 6 hours after the end of the surgery, as part

of the project to accelerate the total postoperative recovery [1,7].

Nowadays, hip fracture surgery represents a large quota of the orthopedic surgeon activity, and normally has associated major clinical and social cost implications [12]. Even with optimal care, elderly trauma patients suffer a higher morbidity and mortality rate when compared with the general population, and often demand for expensive hospital aftercare. Because of that, surgical treatment of hip fracture in these patients has exceptional clinical challenges, and needs strategies to optimize patient care.

Early surgical fixation, the role of antithromboembolic and anti-infective prophylaxis, good pain control at the perioperative, avoidance of malnutrition, and promotion of early mobilization to improve functional recovery and falls prevention are basic recommendations for an optimal care of hip fractured patients. Regional anesthesia significantly reduces as well these complications, probably in relation with its capability to generate peripheral vasodilatation and to maintaining venous blood flow in the lower extremities, as well as to promote a local inhibition of platelet aggregation and stabilization of endothelial cells.

It would seem to be generally accepted, nonetheless, that hip fracture surgery should be performed within 48 h of the patient's admission to hospital, and that the patient should be provided with an appropriate analgesic, bearing in mind that in most cases the best analgesic is surgical treatment [13].

It is important to have a discussion that involves the geriatrician, anesthetist and surgeon about the pros and cons of care. Just as important is there to be a discussion with family members about the benefits of immediate surgery in a hip fracture patient. This was done at the preanesthetic visit. She receives anterior lumbar plexus block on the right side and spinal anesthesia. The patient tolerates both the procedure and the anesthesia well. Not every anesthesiologist would place the femoral nerve block. A regional anesthetic will provide adequate analgesia with less opioid, which may be beneficial in an elderly patient with impaired pulmonary function. The benefits of potent analgesia obtained with lumbar plexus block and the hemodynamic effects of low-dose spinal anesthesia of isobaric bupivacaine have been demonstrated to all involved. As demonstrated nearly 60 years ago the benefits of spinal anesthesia for patients.

References

1. Imbelloni LE, Lacerda S, Barbosa R, Gouveia MA, Morais Filho GB (2017) Outcome after anesthesia and surgery for fractured of the hip in patients aged over 100 years. The "Oldest Old" of the new millennium. *World J Pharm Pharmac Sciences* 6: 1642-1652.
2. Schroder HM, Erlandsen M (1993) Age and sex as determinants of mortality after hip fracture: 3,895 patients followed for 2.5-18.5 years. *J Orthop Trauma* 7: 525-531.
3. Vestergaard P, Rejnmark L, Mosekilde L (2007) Has mortality after a hip fracture increased? *J Am Geriatrics Soc* 55: 1720-

1726.

4. Krum H, Abraham W (2009) Heart failure. *Lancet* 373: 941-955.
5. Imbelloni LE (2013) *Spinal anesthesia*, Rio de Janeiro, Elsevier, 2013. Chapter 6: Cardiovascular changes of spinal anesthesia 71-82.
6. Ebner H (1958) Continuous spinal anesthesia in treatment acute pulmonary edema. *Anesthesiology* 19: 561.
7. Imbelloni LE, de Moraes Filho GB, da Silva A (2014) Outcome after anesthesia and orthopedic surgery in patients nonagenarians and centenarians. *J Anesth Clin Res* 5: 411.
8. Luisada AA, Cardi L (1956) Acute pulmonary edema. Pathology, physiology and clinical management. *Circulation* 13: 113-135.
9. Imbelloni LE, Braga RL, Filho GBD, da Silva A (2014) Low dose of isobaric bupivacaine provides lower incidence of spinal hypotension for hip surgery in elderly patients. *Anaesth Pain & Intensive Care* 18: 17-20.
10. Imbelloni LE, Beato L (2002) Comparison between spinal, combined spinal-epidural and continuous spinal anesthesia for hip surgeries in elderly patients. A retrospective study. *Rev Bras Anesthesiol* 52: 316-325.
11. Licker M, de Perrot M, Spiliopoulos A, Robert J, Diaper J, et al. (2003) Risk factors for acute lung injury after thoracic surgery for lung cancer. *Anesth Analg* 97: 1558-1565.
12. Bergström U, Jonsson H, Gustafson Y, Pettersson U, Stenlund H, et al. (2009) the hip fracture incidence curve is shifting to the right. *Acta Orthop* 80: 520-524.
13. Griffiths R, Alper J, Beckingsale A, Goldhill D, Heyburn G, et al. (2011) Management of proximal femoral fractures 2011: Association of Anaesthetists of Great Britain and Ireland. *Anaesthesia* 67: 85-98.

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