



Continuous Spinal Anesthesia for Hip Fracture Surgery in a very Old Patient with Pulmoner Hypertension

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Abstract

Elderly patients have increased risk for perioperative and postoperative mortality and morbidity due to additional comorbidities, such as cardiac diseases. Anesthesia and surgery in patients with pulmonary hypertension (PH) are associated with high perioperative morbidity and mortality, and elective surgeries should generally be avoided for this reason. Anesthesia and surgery are associated with significantly increased morbidity and mortality in patients with PH due mainly to right ventricular failure, arrhythmias, postoperative hypoxemia, and myocardial ischemia. Regional anesthesia techniques are usually preferred in high-risk patients due to some advantages, such as the maintenance of cardiovascular stability and early postoperative mobilisation. This case presents the anaesthetic approach in a 87-year-old male patient with atrial fibrillation, chronic obstructive pulmonary disease and pulmonary hypertension who underwent hip fracture surgery. In the present case, continuous spinal anesthesia with low-dose hyperbaric bupivacaine provided safe and effective anaesthesia during surgery with minimal haemodynamic changes and analgesia during the first 24 hours after surgery.

Keywords: Continuous spinal anesthesia, surgery, hip fracture, elderly

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Introduction

Hip replacement surgery is unfortunately common among elderly patients. These patients have increased risk for perioperative mortality and morbidity due to additional comorbidities, such as cardiac, endocrine, renal, cerebral and respiratory diseases [1]. Spinal anesthesia provides nerve blockade in a large part of the body during surgery with a smaller dose of local anaesthetic and shorter surgery time. However, spinal anesthesia may lead to adverse haemodynamic changes in high-risk patients [2]. Continuous spinal anesthesia (CSA) provides extending blockade during surgery and versatile pain management during the postoperative period via an indwelling catheter, allowing intermittent injection of local anesthetic into the subarachnoid space. Better cardiovascular stability, less local anesthetic requirement, better control of anesthesia level and lower risk of local anesthetic toxicity were reported in the CSA technique compared with a single-dose spinal anesthesia technique [3]. We reported a very old patient with aggressive pulmonary hypertension who underwent successful hip fracture surgery under CSA.

Case Report

A 87-year-old male patient with atrial fibrillation, chronic obstructive pulmonary disease and mild pulmonary hypertension admitted for hip fracture surgery. Preoperative laboratory findings were within normal limits. His blood pressure was 100/70 mm Hg, and heart rate was 90 bpm preoperatively. For the procedure, continuous spinal anaesthesia was planned, and written informed consent was obtained from the patient after informing him and his relatives about the high-risk of anesthetic procedure. In the operating room Ringer's lactate solution was given intravenously at 1-2 mL/kg/hour at first and the patient was monitored with invasive arterial pressure, electrocardiography and pulse oximetry. The patient was placed in the lateral position, and after cleaning and draping, CSA was performed in the L3-L4 interspace. The epidural space was identified with a Crawford needle, and a 22-G (Spinocath®, B. Braun, Melsungen, Germany) catheter with a 27-G Quincke spinal needle was advanced through the epidural space until cerebrospinal fluid was observed in the catheter. Then, the spinal catheter was advanced into the intrathecal space and fixed using sterile tape. After the cerebrospinal fluid was aspirated, 7.5 mg hyperbaric bupivacaine was injected while the patient was in a supine position. The sensory block level was tested using

pinprick tests, and motor block level was evaluated with the Modified Bromage Scale. Nasal oxygen (2 L/minute) was applied during the operation. The patient was haemodynamically stable during surgery, and there was no bradycardia or hypotension requiring inotrope drugs. The operation continued for 100 minutes with any complication, and 5 mg hyperbaric bupivacaine was administered through the spinal catheter close to the end of surgery. During surgery, blood transfusion was not required and the total amount of fluid given was 1000 mL of crystalloids and 500 mL of Ringer's lactate solution. At the end of surgery, the patient's blood pressure was 115/70 mm Hg and pulse was 86 bpm; the patient was conscious without pain. Afterwards, the patient was transferred to the intensive care unit, and 5 mg hyperbaric bupivacaine was administered through the catheter twice within 24 hours postoperatively to provide postoperative analgesia. No anesthetic complications, including postdural puncture headache were observed in the patient during surgery and postoperative period. After 24 hours in the intensive care unit, the patient was clinically stable and was transferred to the orthopaedic ward following the removal of the spinal catheter. He was discharged from hospital 7 days after his operation.

Discussion

This case report demonstrates that CSA with low doses of hyperbaric bupivacaine may be safe and effective for hip surgery in a very old patient with pulmonary hypertension. Patients undergoing hip replacement surgery are usually elderly. These patients have increased morbidity and mortality for orthopaedic surgery due to co-morbidities, such as cerebral, cardiac, renal and respiratory diseases [1,4]. Successful management of the perioperative patient with PH is complex and requires a understanding of the pathophysiology of PH and, including recognition of the disorder, especially in patients at-risk for developing pulmonary arterial hypertension. Regional anaesthesia techniques are usually preferred in high-risk patients due to the advantages like the maintenance of cardiovascular stability and early postoperative mobilisation [4]. Neuraxial anesthesia has been used safely in patients with PH and may have advantages in some populations. For all PH patients, intravenous lines and syringes must be de-aired. The hypertensive pulmonary circulation is sensitive to even small amounts of air that would generally be tolerated in a normal patient [5]. Invasive arterial pressure monitoring is indicated for almost all procedures to allow for rapid hemodynamic control and blood sampling for gas analysis. Pulmonary artery catheters are not generally

indicated for low-risk procedures as the risks probably outweigh the benefits. In contrast, hip surgery especially for fracture history is an urgent procedure with few acceptable alternatives. Although pre-operative discussion prior to these procedures is often focused upon the type of anesthesia (regional versus general anesthesia), there is a greater risk related to surgical technique too. In addition to common risks such as bleeding, hip or knee replacement surgery carry the added potential for pulmonary emboli due to preparation of the femoral canal for prosthesis insertion. CSA was preferred in this present case with pulmonary hypertension. CSA allows the administration of local anaesthetics in smaller doses titrated to the patient's requirements, has minimal cardiovascular and respiratory side effects and provides postoperative analgesia, allowing the application of intrathecal local anaesthetics postoperatively [6]. Kiliç et al. [7] compared the haemodynamic consequences and the effectiveness of CSA with unilateral spinal anaesthesia in elderly patients undergoing hip surgeries. They reported similar sensory and motor blocks, haemodynamic changes and ephedrine requirements in two techniques. Conversely, Michaloudis et al. [8] investigated the efficacy and safety of CSA for elderly or high-risk surgical patients undergoing major prolonged surgical procedures. It was concluded that CSA provides safe intraoperative anaesthesia and effective postoperative analgesia with minimal side effects in elderly or high-risk surgical patients. During surgery and the procedure of CSA, hypotension and bradycardia may be observed due to a reduction in systemic vascular resistance and central venous pressure caused by sympathetic blockade [2]. In this present case, we did not observe hypotension or bradycardia during the anaesthesia and surgery procedure. Because, hyperbaric bupivacaine was used in a lower amount and normovolemia was maintained and CSA was applied in the lateral decubitus position in this present case. Hypotension was reported as more common during spinal anesthesia in a supine position compared to the lateral decubitus position in elderly patients with low ejection fraction [9]. Moreover, Lux et al. [6] analysed 1212 cases that underwent surgery of the lower extremities with continuous spinal anaesthesia using a 28-gauge microcatheter. No major complications were reported in any of these patients, and it was concluded that CSA using a 28-gauge microcatheter appears to be a safe and appropriate anaesthetic technique in lower leg surgery for aged patients. In this presented high-risk patient, CSA was applied using a 22-gauge microcatheter, and no major complications or puncture headaches were observed.

Conclusion

We reported the successful anaesthetic management of a patient with pulmonary hypertension undergoing hip fracture surgery. CSA with low dose hyperbaric bupivacaine provided safe and effective anaesthesia with minimal haemodynamic changes for hip fracture surgery in this present case. In the future, studies of elderly patients with PH undergoing anesthesia and surgery should provide greater understanding of the risk factors and optimal perioperative management of these high risk patients.

Conflict of Interest

No conflict of interest was declared by the authors.

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