

Posterior Spinal Anesthesia for Bilateral Calcaneus Fracture in Cardiac Patients: A Case Report

Luiz Eduardo Imbelloni^{1*}, Larisse Gomes Figueiredo², Jorge Augusto C. Santos³ and Alexandre A. Galvao⁴

¹Anesthesiologist at the Mangabeira Hospital Complex, João Pessoa, PB – Brazil

²Anesthesiology resident, Mangabeira Hospital Complex, João Pessoa, PB – Brazil

³Ortopedista do Complexo Hospitalar Mangabeira Gov. Tarcisio Burity, João Pessoa, PB – Brasil

⁴Ortopedista do Complexo Hospitalar Mangabeira Gov. Tarcisio Burity, João Pessoa, PB – Brasil

*Corresponding author

Luiz Eduardo Imbelloni MD, PhD, Rua Marieta S. Silva, 106/1001, Miramar, 58043-320 – João Pessoa, PB-Brasil, E-mail: dr.imbelloni@hotmail.com

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Abstract

Background: The calcaneal is more likely bone to be fractured between the tarsus bone. We report a case of a posterior spinal anesthesia without any degree of motor block, for a bilateral calcaneus fracture in cardiac patients.

Case Report: A 51-year-old male (height 1.70 m, weight 75 kg, ASA II), cigarette smoking, diabetes, hypertension, was admitted for treatment of bilateral fracture of the calcaneus. Chest X-ray were normal. ECG showed left bundle branch block. Heart disease with congestive heart failure NYHA class II treated with captopril 50 mg, amiodarone 200 mg, spino-lactone 25 mg, caverdilol 12.5 mg and furosemide 40 mg. The blood examination revealed: red blood cells (4,290,000/mm³), hemoglobin (15.3 g/dL) and hematocrit (42.8%). Routine monitoring. Spinal puncture was performed with the patient in the prone position, in the L₂-L₃ interspaces using 26 G Quincke. After appearance of cerebrospinal fluid (CSF) 6 mg of 0.15% hypobaric bupivacaine were administered at a speed of 1 mL.15^{s-1}, obtaining sensory level at T₁₀ and no motor block of limbs. The operation lasted 50 minutes and was maintained during surgery motor function of lower limbs, without hypotension, bradycardia or decreased oxygen saturation. Bilateral sciatic nerve block was performed in the popliteal region with neurostimulator and needle A50 and injection of 20 mL of 0.2% levopubivacaine on each nerve for postoperative analgesia.

Conclusions: The main advantage of this method of spinal block for this procedure includes hemodynamic stability, patient satisfaction with the absence of motor block in the lower limbs, fast recovery and no urinary retention. In addition, the patient is already anesthetized in the position in which he will be operated (ventral decubitus).

Keywords: Anesthetics, Hypobaric Bupivacaine, Spinal Anesthesia, Calcaneal, Fracture

Introduction

The calcaneal is the most likely bone to be fractured between the tarsus bone. Historically, the calcaneals fractures were treated in a conventional way, however with technological advances, nowadays the treatments tend to decrease the quantity of surgeries and internal fixation [1]. Lumbosacral nerves may be blocked in three different ways: the first, with patients in the lateral position; the second with patients in the sitting position, and finally the third, with patients in the prone position. A practical definition of spinal hemianesthesia could be the attempt of achieving an asymmetrical distribution of spinal block between the operated and non-operated sides of the

patients: unilateral spinal anesthesia and posterior spinal anesthesia [2]. Posterior radicles form sensory roots and anterior radicles form motor roots.

We report a case of a posterior spinal anesthesia without any degree of motor block, for a bilateral calcaneus fracture in cardiac patients.

Case Report

After written consent for publication and signing the informed consent, a 51-year-old male (height 1.70 m, weight 75 kg, ASA II), cigarette smoking, diabetes, hypertension, was admitted for treatment of bilateral fracture of the calcaneus in prone position. Tests revealed all electrolytes normal. Bilirubin, urea, creatinine unchanged. Chest X-ray was normal. ECG showed left bundle branch block. Heart

disease with congestive heart failure NYHA class II treated with captopril 50 mg, amiodarone 200 mg, spinolactone 25 mg, caverdilol 12.5 mg and furosemide 40 mg. The blood examination revealed: red blood cells (4,290,000/mm³), hemoglobin (15.3 g/dL) and hematocrit (42.8%).

As part of the pre-operative fasting time abbreviation program (ACERTO), two hours and thirty minutes before the surgery patient took 200 mL of supplement (Fresubin Jucy®). Before induction of spinal anesthesia, routine monitoring (electrocardiogram, pulse oximetry, and noninvasive blood pressure measurement) was started and an intra venous line was placed (extracath 20G). Vital signs at arrival in the operating room were: BP 140/100 mmHg, HR 125 bpm and oxygen saturation 95% in room air, and immediately placed nasal catheter 2 L/min.

After sedation with midazolam (1 mg) and fentanyl (75 µg) intravenously and cleaning the skin with alcohol 70% spinal puncture was performed with the patient in the prone position, by the median line in the L2-L3 interspaces using 26 G Quincke needle (B. Braun Melsungen AG). After appearance of cerebrospinal fluid (CSF) 6 mg of 0.15% hypobaric bupivacaine (bupivacaine 0.5%=1,5 mL + distilled water=3.5 mL) were administered at a speed of 1 mL.15^{s-1}, obtaining sensory level at T₁₀ (pinprick test) and no motor block of limbs. The operation lasted 50 minutes and was maintained during surgery motor function of lower limbs, without hypotension, bradycardia or decreased oxygen saturation. After the end of surgery, in the position of ventral decubitus, bilateral sciatic nerve block was performed in the popliteal region with neurostimulator (HNS12) and needle A50 and injection of 20 mL of 0.2% levobupivacaine (Cristália Prod Quim. Farm Ltda) on each nerve for postoperative analgesia. At the blocking, the patient underwent surgical table to the unaided stretcher. It remained in the PACU for 60 minutes until the completion of sensitive blockade, having been to the ward, after received 200 mL of supplement (Fresubin Jucy®).

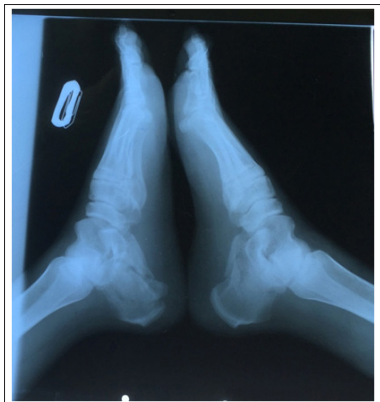


Figure 1: Preoperative Radiography



Figure 2: Patient position for spinal puncture

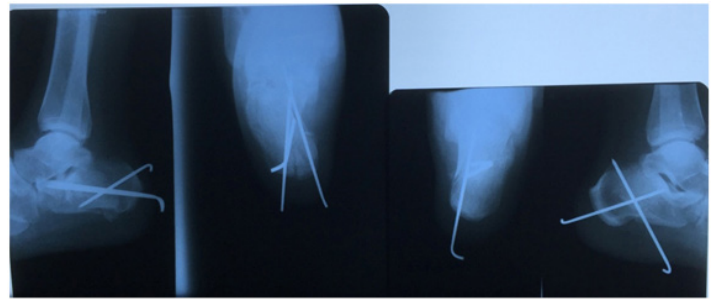


Figure 3: Postoperative Radiography

Discussion

Posterior spinal anesthesia is a promising alternative to traditional, widely used technique of central neuraxial blocks, as it markedly restricts the anesthetized area, thereby, decreasing the risk of adverse events and complication [2]. This case report in a cardiac patient confirms that posterior spinal anesthesia with hypobaric bupivacaine is a safe technique for surgeries performed in the position of ventral decubitus, and the patient no presented lower limbs motor block.

Congestive heart failure a common condition with a poor prognosis. Male sex, less education, physical inactivity, cigarette smoking, obesity, diabetes, hypertension, valvular heart disease, and coronary heart disease are all independent risk factors for developing congestive heart failure [3]. This patient presented as risk factors such as cigarette smoking, diabetes, hypertension.

By definition, baricity is the ratio between injected solution density and CSF density. Local anesthetics density may be decreased by water dilution. The solutions used in spinal blocks should be considered hypobaric when their densities are lower than the lower limit of the confidence interval of the density of the human CSF [4]. Low hypobaric bupivacaine doses (6 mg) injected in the rate of 1mL.15s-1 through 27G Quincke needle have induced posterior spinal anesthesia (sensory) in 90% of patients, and only three patients have presented some level of lower limbs motor block [5].

Reducing myocardial function and cardiac output and lead to increased morbidity and mortality [6]. If surgery is necessary, the drugs and techniques chosen to provide anesthesia are selected with the goal of optimizing cardiac output. These were the main reasons to indicate posterior spinal anesthesia, which provide surgical analgesia without motor block.

Hemodynamic variation during anesthesia is mainly related to specific effects of anesthetic agents on the sympathetic nervous system [6]. Those patients with volume depletion and extended sympathetic blockade can have reduced vascular capacitance resulting in decreased venous return, reduced cardiac output and severe arterial hypotension [6].

Hemianesthesia (posterior or unilateral anesthesia) it has many advantages over conventional spinal anaesthesia such as lower incidence of hypotension, faster recovery and increased patient satisfaction [2]. Subarachnoid block is often considered as a safe method of anesthesia because of low decrease in myocardial contractility and modest decrease in cardiac output [6]. Therefore, these situations are very attractive for patients with cardiac diseases and especially known congestive heart failure. The patient presented

with congestive heart failure and therefore the indication of hemianesthesia prioritizing the sensitive part without motor block was sufficient for the patient not to present hemodynamic changes.

To perform the puncture with patients in the prone position and a pad has to be placed under the abdomen to correct lordosis and increase spinal interspace [7]. The spinal block performed with the patient in the jack-knife position provided surgical analgesia with relaxation of the lower members, and lasting long enough in every patient. The site of sensory block spinal anesthesia is generally considered by blockade of the posterior roots (sensory). Most importantly, it allowed the patient to remain in this position, providing for better surgical exposure for bilateral fracture of calcaneus. Another important advantage is the reduction in the incidence of cardiovascular changes, since the attached motor sympathetic ganglion roots. As virtually no motor block, becomes responsible for this low incidence.

Patients orthopedic surgery, anorectal surgery, vascular surgery and plastic surgery, when performed in the prone position may be anesthetized and remain in this position during the surgical procedure [2]. A slight cefalodeclive during puncture allow hypobaric anesthetic block predominantly posterior roots [2]. Thus, the block had been restricted lower roots preventing its dispersion to the higher roots. Limiting the spread of the spinal block offers many clinical advantages [2]. First and foremost, the hemodynamic impact of spinal anesthesia is greatly reduced, as the increased venous capacity in affected side is compensated by a reflex vasoconstriction in the non-blocked areas. In case of successful posterior spinal anesthesia (hemianesthesia) the difference in levels of sympathetic block between the anterior part and the posterior part of the body can be easily detected by measuring a higher temperature in the affected side, caused by a greater vasodilatation due to the sympathetic block.

Minimally invasive techniques are attractive in the management of intraarticular calcaneus fractures. The benefit of such techniques are less soft tissue trauma, and possibly, reduced cost. One advantage of the minimum motor block observed with this technique was the patient's ability to go from the operating table to the stretcher and of early ambulation. This happened with our patient.

Posterior spinal anesthesia is often considered as a safe method of anesthesia because of low decrease in myocardial contractility and modest decrease in cardiac output [5]. Therefore, these situations are very attractive for patients with cardiac diseases and especially known congestive heart failure. The main advantage of this method of spinal block for this procedure includes hemodynamic stability, patient satisfaction with the absence of motor block in the lower limbs, fast recovery and no urinary retention. In addition, the patient is already anesthetized in the position in which he will be operated (ventral decubitus).

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