Continuous Spinal Anesthesia with High Dose of Local Anesthetics

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Summary: Imbelloni LE, Gasparini Neto S, Ganem EM – Continuous Spinal Anesthesia with High Dose of Local Anesthetics.

Background and objectives: Better control of the level, intensity, and duration of spinal analgesia represents the greatest advantages of continuous spinal anesthesia. With the advent of intermediate catheters (over-the-needle catheter) and its low incidence of headaches and neurological symptoms, the technique has been gaining credibility. The objective of this paper is to report the possible safety of the new catheter with a large dose of hyperbaric 0.5% bupivacaine with 1.6% glucose associated with hyperbaric 2% lidocaine with 1.6% glucose.

Case Report: Male patient, 78 years old, 85 kg, 168 cm, physical status ASA III, with hypertension, coronary artery disease, and chronic renal failure. The patient was candidate for surgery for huge bilateral inguinal and umbilical hernias, being submitted to preoperative pneumoperitoneum for one week to stretch abdominal cavity. After venoclysis with an 18G catheter, he was monitored with cardioscope, non-invasive blood pressure, and pulse oximetry; he was sedated with 1 mg of midazolam and 100 µg of fentanyl intravenously, and placed in left lateral decubitus. He underwent continuous spinal anesthesia by a median puncture in L_3-L_4 with a set with a 27G cut-bevel needle and 22G catheter. The total dose of anesthetic used was 25 mg of 0.5% bupivacaine (hyperbaric, with 1.6% glucose), 160 mg of 2% lidocaine (hyperbaric, with 1.6% glucose), and morphine (100 µg). The patient was followed-up until the 30th postoperative day without neurological complaints.

Conclusions: Recently, the poor distribution of the local anesthetic through the microcatheter was attributed as the cause of cauda equina syndrome. This case report showed that, with the administration of high doses of hyperbaric anesthetics through the new catheter, poor distribution or risk of cauda equina syndrome were not observed.

Keywords: ANESTHETIC, Local: bupivacaine, lidocaine; ANESTHETIC TECHNIQUE, Regional: continuous spinal anesthesia; SURGERY, Abdominal: herniorrhaphy.

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INTRODUCTION

Continuous spinal anesthesia has some advantages over spinal anesthesia with a single dose, being possible to titrate the level of analgesia and the extent of its duration according to the needs of the surgery or control of postoperative pain. In 1990, a 32G microcatheter was developed which was introduced through a 26G needle [1]. In 1991, it was suspected that the microcatheter could cause cauda equina syndrome after four cases were reported [2], which led the FDA to issue an alert about its use.

In 1999, a new system for continuous spinal anesthesia to be used in anesthesia and control of postoperative pain [4,5] as well as obstetric analgesia [6] was described. It is composed of a 22G and 24G catheter over a 27G and 29G cut-bevel needle (Spinocath™) measuring 72 cm in length. The over-the-needle design eliminates leakage of cerebrospinal fluid (CSF) since the catheter seals immediately the dura-mater orifice. The intermediate-size catheter allows high flow, promoting easy homogenization of the anesthetic solution with the CSF, easy barbotage, and eliminated the potential risk of cauda equina syndrome.

The objective of this case report was to demonstrate the effectivity of continuous spinal anesthesia in a high risk patient undergoing a long duration surgery using high doses of local anesthetics.

CASE REPORT

This is a 78 years old male patient weighing 85 kg, 168 cm, and physical status ASA III. He was scheduled for surgery of bilateral inguinal and umbilical hernias. His medical history included hypertension, coronary artery disease, and chronic renal failure under conservative treatment. He had huge bilateral inguinal and umbilical hernias (Figures 1 and 2). He was being treated with aprozide (150/12.5 mg) for blood pressure control. Renal failure was being treated conservatively. He was hospitalized for one week for preoperative pneumoperitoneum by daily puncture and injection of air to stretch abdominal cavity and accommodate the huge herniated viscera.

After venoclysis with an 18G catheter, monitoring with a cardioscope, non-invasive blood pressure, and pulse oxi-

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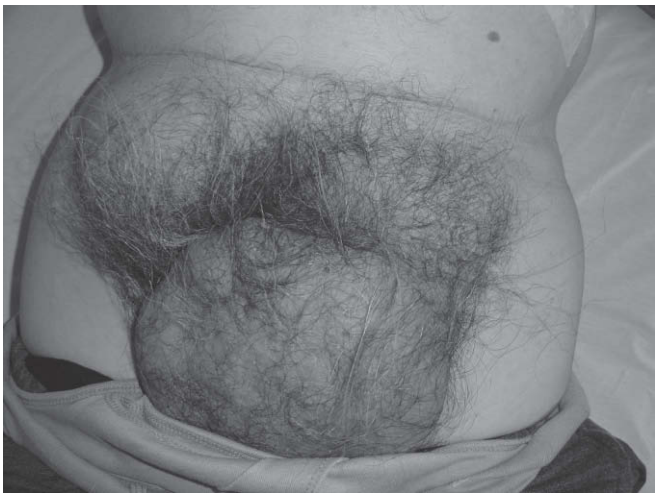

Figure 1. Picture of a Patient with inguinal hernias and umbilical hernia.

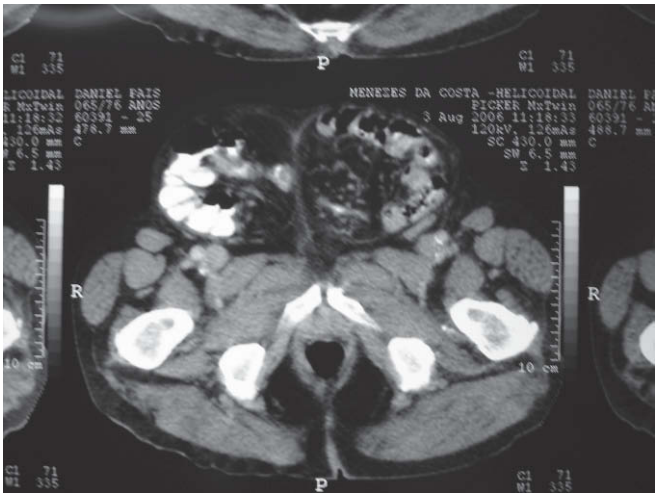

Figure 2. Magnetic Resonance Image of Hernias.

metry was instituted. The patient was sedated with 1 mg of midazolam and 100 µg of fentanyl, intravenously. With the patient on left lateral decubitus, after antisepsis with 70% alcohol and placement of a fenestrated field, the point demarcated as the L_3-L_4 space was infiltrated with 5 mL of 1% lidocaine. An 18G Crawford needle using the loss of resistance technique was used in the approach of the epidural space. A 22G catheter over a 27G needle (Spinocath™, B. Braun – Melsungen) was introduced in the dura mater through the Crawford needle, perforating it after the introduction of only 20 mm. Paresthesia was not observed and the reflow of CSF could be identified. The needle of the catheter was removed suing the retractor in the proximal tip of the system. Afterwards, the Crawford needle was removed. The luer connector was installed.

The catheter was fixed to the back of the patient. Four milliliters of isobaric 0.5% bupivacaine were mixed with 1 mL of hyperbaric 0.5% bupivacaine with 8% glucose, diluting the glucose to 1.6% and the same concentration of bupivacaine (Table I). The total volume of the solution was maintained in a 5 mL syringe. Fifteen milligrams (3 mL) of this solution were injected through the catheter. The remaining was used for further administration. After 10 minutes, the sensorial blockade reached the level of the T_{11} dermatome and the motor blockade did not reach 3 in the modified Bromage scale. Upon incision for correction of the umbilical hernia, the patient complained of pain. Another 2 mL (10 mg) of the same solution were injected and the patient was placed on a head-down position of 30°, and we waited 10 minutes before restarting the surgery. The level of the blockade was still unsatisfactory. A new solution was prepared with 2% lidocaine with 1.6% glucose by adding 1 mL of the solution of hyperbaric lidocaine with 8% glucose to 4 mL of the isobaric 2% lidocaine solution. One milliliter (20 mg) of this solution was then injected every 5 minutes, until the third dose, with the patient on a 30° head-down position. After the third dose, the sensorial blockade reached enough level for surgery, which was restarted by repairing the umbilical hernia.

After correction of the umbilical hernia, the repair of the left inguinal hernia was initiated without complaints. After two hours and thirty minutes, the patient complained of pain and another 2 mL of the solution of lidocaine with 1.6% glucose were injected. A total of 25 mg of 0.5% bupivacaine (hyperbaric, with 1.6% glucose) and 160 mg of 2% lidocaine (hyperbaric, with 1.6% glucose) were used in the procedure, and the surgery lasted seven hours. Bradycardia and hypotension were not observed during the procedure.

At the end of the surgery, 100 µg of morphine were injected through the catheter for control of postoperative pain. The catheter was removed at the end of the surgery and the patient was transferred to the Intensive Care Unit (ICU). Eight hours after placing the catheter, the patient complained of pain and was able to move the lower limbs. The patient was discharged from the ICU to the regular floor on the second postoperative day (PO), being discharged from the hospital on the 4th PO day. Phone follow-up on the 10th, 20th, and 30th days did not reveal any neurological complaints.

Table I – Evaluation of the Density of the Mixtures

Mixture	LA%	Density 20° C	Density 37° C	Glucose
1 mL hyperbaric 0.5% bupivacaine + 4 mL of isobaric 0.5% bupivacaine	0.5	1.0067 g.mL	1.0108 g.mL	1.6%
1 mL hyperbaric 2% lidocaine + 4 mL isobaric 2% lidocaine	2	1.0210 g.mL	1.0160 g.mL	1.6%