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Peripheral Nerve Blocks for Anesthetic Management of a 108-year-old Weak Patient with Hip Fracture: A Report of Case and Review of the Literature

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Abstract **Case Report**

Very elderly patients undergoing urgent hip fracture surgery are generally at high anaesthetic risk and represent a real challenge for anaesthetists in view of the major intraoperative risk. We report the case of a 108-year-old patient who underwent successful surgery with a combined lumbar and sciatic plexus block. Through This case we highlight the interest of this practice as an alternative anaesthetic technique in such situations.

Keywords: Hip fracture, Elderly patients, Anaesthesia, Combined lumbar and sciatic block, Perioperative risk.

INTRODUCTION

Hip fractures (HF) in the elderly are one of the major health problems worldwide, with high morbidity and mortality rate [1]. In order to improve prognosis associated with these injuries, it is essential to fix the fracture without delay, so that patient can be lifted early and reintegrated into society. All studies agree on a delay of <24-72 hours between the trauma and surgery [2]. Very elderly patients represent a real anaesthetic challenge in view of the major perioperative risk. Studies agree on the advantages of perimedullary anaesthesia (PMA), in particular spinal anaesthesia (SA), over general anaesthesia (GA) for HF surgery in terms of a significant reduction in morbidity and mortality [3]. Nevertheless, in this type of very weak population, PMA may not be appropriate due to associated risks of intraoperative hypotension, nausea-vomiting, urinary retention, peripidural haematoma. Recently, peripheral nerve blocks (PNB) specially combined lumbar and sciatic block (CLSB) has been introduced as an effective anaesthetic technique in HF surgery with efficiency comparable to SA [4]. We report a case of 108-year-old patient with a pertrochanteric fracture (PTF) who was successfully operated on using CLSB (*Lumbar plexus block: LPB + Sciatic plexus block: SPB)*, and highlight the interest of this practice as an alternative anaesthetic technique in such situation.

CASE REPORT

A 108-year-old man (160 cm, 45 kg, BMI: 17.58) admitted to the emergency department with left PTF following a fall from his height requiring surgery. Laboratory examinations revealed mild anemia with hemoglobin level of 11.2 g/dl. There were no abnormalities in the electrocardiogram, chest X-Ray or transthoracic echocardiography. The patient was admitted to operating room after 14h of trauma. Blood pressure, 140/80 mmHg; heart rate, 92 bpm; and oxygen saturation on room air, 92%. CLSB was selected as anesthetic technique. The patient was carefully positioned in a lateral decubitus position (fractured side up), with head flexed, lumbar lordosis reduced, and the limb to be operated on slightly flexed hip and knee. After disinfection of the puncture site and local anaesthesia, nerve location was performed using the conventional neurostimulation technique with a 100 mm, 22-gauge short-bevel needle (BBraun, Melsungen, Germany), connected to a neurostimulator with stimulation intensity, frequency and duration set at respectively 2 mA, 1 Hz and 0.1 ms. Once desired motor response had been obtained, the position of needle was optimised so as to maintain a motor response for a minimum stimulation intensity of 0.5 mA, and after an aspiration test, a fractionated injection of the local anesthetics (LA) was performed with a mixture of 2% lidocaine and 0.5%

bupivacaine (with a volume ratio of 1:1). The volumes injected were 12 ml in each block.

The LPB was performed using the approach described by Capdevila X *et al*., 2002 [5], at the puncture point the needle was advanced perpendicular to the skin until it made contact with the transverse process of L4, then withdrawn 0.2 cm and advanced 1 to 2 cm below the transverse process until contractions of quadriceps muscle were obtained (ascension of the patella). The SPB was performed using the para-sacral approach according to Mansour technique [6], keeping the patient in the same position, at the puncture point the needle was inserted perpendicularly in all planes until plantar flexion or dorsiflexion of the foot was obtained. The anesthetic procedure was performed without incident over a period of 13 minutes. Sensory block was assessed by pinprick test, and motor block by bromage score. Nerve blocks were assessed at 5-minutes intervals from the end of the last injection. Once patient was pain-free, he was placed in the supine position and closed reduction of the fracture was performed. Surgical incision was authorised when sensory and motor blocks were complete. Haemodynamic (HR, mean arterial pressure, heart rate, ST segment), respiratory (respiratory rate, SpO2) and neurological (continuous verbal contact) parameters were monitored regularly (every 3 minutes) until incision, and then every 5 minutes until the end of surgery. Patient experienced mild arterial hypotension during surgery, which was corrected with 3 mg of ephedrine. No intraoperative analgesic supplementation was required. The operation lasted 42 minutes (*closed* procedure of a Gamma nail). Surgical bleeding was estimated at 150 ml. The surgeon's satisfaction with the degree of immobilisation and muscle relaxation during the operation was 10/10. Post-operatively, patient was admitted to the recovery room, where pain was assessed at 0/10 using the visual analogue scale (VAS), and then transferred to traumatology department for further management. Regular visits and assessment of VAS were made by nursing assistant. The first need for analgesics was expressed after 14 hours. Neurological status of the operated limb was regularly assessed by surgeon during post-operative visits (complete sensory-motor recovery). After early ambulation (24 hours), the patient was *discharged from hospital* after a total stay of 72 hours.

DISCUSSION

SA has long been preferred by most operators as the anaesthetic technique of choice for HF surgery. However, CLSB has been introduced as an anaesthetic alternative for HF particularly for patients at high anaesthetic risk [7-9]. CLSB provides complete unilateral anaesthesia of hip because the sensory and motor innervation of this region comes from nerve branches of lumbar and sciatic plexuses [4, 10]. This observation confirms the interest of CLSB as an effective anaesthetic technique for PTF procedures, as no intraoperative analgesic supplementation or GA conversion were required.

The patient was operated on within 14 hours of trauma, a very optimal time compared with that recommended in literature (24-72 hours) [2]. Early fixation of PTF is one of the main factors involved significant reduction of morbidity and mortality associated with HF [2].

The objective of choosing CLSB in our patient was preserving consciousness state with haemodynamic and respiratory stability. The slight hypotension observed after BLCS is very probably explained by sedation of pain obtained after installation of nerve blocks. No respiratory or neurological complications were recorded. Peripheral nerves blocks (PNB) have very little effect on haemodynamic state; sympathetic block is generally inferior to that observed after SA due to its unilateral nature, and consequently offers better haemodynamic stability [10]. Publications in literature agrees on major benefit of CLSB in severe patients who are very sensitive to perioperative haemodynamic variations [4, 9].

Intraoperative muscle relaxation, particularly in areas of high muscle density such as the hip, is of major importance in reducing HF and facilitating surgical manipulation. In our patient, this was judged to be optimal by surgeon. In previous studies, the muscle relaxation obtained with CLSB was considered comparable to that obtained with SA [4, 11].

The first need for postoperative analgesics was expressed after 14 hours. PNB has demonstrated its superiority to other anaesthetic techniques in terms of postoperative analgesia. Effective intraoperative pain control is of essential importance in very old and weak patients. This significantly reduces the need for postoperative analgesics, in particular morphine and anti-inflammatory drugs, thereby avoiding their side-effects, which can be harmful in this population (respiratory depression, mental confusion, gastrointestinal bleeding, renal failure, etc.). In addition, this sufficient analgesia obtained during the operation and postoperatively for several hours would have helped to reduce the onset of cognitive disorders, which are very common in the elderly postoperatively.

Post-operative ambulation was very early in our patient, to the great satisfaction of both the family and the surgical team. This can be explained by: unilateral nature of CLSB which preserves the autonomy of the healthy limb, the high-quality analgesia obtained over several hours postoperatively and the absence of some adverse effects (nausea-vomiting, urine retention, headaches, etc.). Early ambulation helps to improve postoperative rehabilitation, prevent onset of decubitus complications and shorten the hospital stay.

CONCLUSION

This clinical case illustrates the major interest of CLSB as an anaesthetic alternative for urgent PTF surgerys in very old and fragile patients: reduced operating deadlines, optimal anesthetic effectiveness, haemodynamic and respiratory perioperative stability, adequate muscle relaxation, absence of GA and PMA complications (nausea-vomiting, urinary retention, hypotension, headaches, etc.), quick passage to recovery *room*, highly effective postoperative analgesia with considerable morphine saving, early ambulation and finally high patient and surgical team satisfaction.

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