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Successful Anesthesia and Hip Surgery in a 107-Year-Old Patient

Authors' Contribution:
Study Design A
Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
Literature Search F
Funds Collection G

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Conflict of interest: None declared

Patient: Female, 107
Final Diagnosis: Hip fracture
Symptoms: —
Medication: —
Clinical Procedure: Hip surgery
Specialty: Orthopedics and Traumatology

Objective: Rare disease

Background: In modern societies, elderly populations have increased over the last four decades and have become the main clients of medical services. A hip fracture is a significant injury for anyone, but for older people it can be catastrophic.

Case Report: A 107-year-old female was admitted with fracture of the right hip. The patient took a single 200 mL carbohydrate drink orally two hours before surgery. Before induction of spinal anesthesia, routine monitoring was started and an intravenous line was placed. Crystalloids and hydroxyethyl starch in 0.9% sodium chloride solution were administered intravenously during the operation. After sedation with i.v. ketamine and midazolam, spinal puncture was performed with the patient in the sitting position and isobaric bupivacaine were administered. The level of sensory block was observed in T12 and motor blockade (grade 3) of the lower limbs. The surgical procedure lasted 60 minutes without hypotension, bradycardia or decreased oxygen saturation. For safety reason, the patient was transferred to the ICU for monitoring; intravenous hydration was withdrawn and released oral feeding six hours after the end of surgery. The patient was sent to his residence on the morning of the second day.

Conclusions: This case showed that with suitable techniques and conduits can perform surgery in a patient with 107 years.

Keywords: Orthopedic Surgery • Spinal Anesthesia • Elderly • Geriatrics

Full-text PDF: http://www.amjcaserep.com/abstract/index/idArt/889961

Background

As life expectancy continues to increase, the number of elderly in-patients needing surgery is rapidly increasing. More and more people are reaching ages of over 100 years. For example, in 2012, in Brazil there were more than 30 000 citizens over the age of 100 years [1]. Brazil has an increasing elderly population and a consequent increase in hip fractures. Despite the good health necessary to achieve old age, the function of various organs will deteriorate, making homeostasis easily compromised, and any situation of stress, such as trauma or surgery, can lead to organ dysfunction or aggravate an already existing dysfunction [2].

Elderly patients (arbitrarily defined as being over 65 years of age) are vulnerable to the adverse effects of anesthesia because of their reduced margin of safety. Morbidity and mortality increase with advancing age. In a 20-year retrospective analysis, of 13 centenarian patients with a hip fracture, mortality at 30 days was 31% and at 1 year it was 56%, which was greater in comparison with their non-injured peers [3].

A hip fracture is a significant injury for anyone, but for older people it can be catastrophic. Many of these patients never recover fully and some die as a consequence of the fracture. We report the case of a 107-year-old patient with a hip fracture operated on after correction of severe anemia and who was discharged home 2 days after surgery as part of Project Acerto.

Case Report

A 107-year-old female (height 1.39 m, weight 39 kg, ASA II, and body mass index of 20.19 kg/m^2) was admitted with a fracture of the right hip and severe anemia (Hm=2 960 000, Hb= 86 g/L e Ht=25.7%). Radiographs showed a fracture at the right proximal femur (AO classification of trochanteric fractures type A3). She had no history of hypertension, hyperlipidemia, diabetes, or cardiac arrhythmia. We obtained informed consent and discussed the anesthetic technique with the patient and family.

Tests revealed all electrolytes were normal. Bilirubin, urea, and creatinine were unchanged. Total protein was 5.9 g/dL. Chest X-ray and ECG results were normal. Heart rate was 73 bpm and blood pressure was 148/64 mmHg.

After correction of anemia with 2 units of packed red blood cells (Hm=4200000, Hb=124g/L and Ht=35.2%), the indicated surgical correction was performed 5 days after admission. As part of Program Acerto, the patient drank a single 200 mL carbohydrate beverage orally (12.5% dextrin maltose) 2 h before surgery.

In the PACU, the patient was placed in dorsal decubitus position for lumbar plexus block. The access to the lumbar plexus was achieved using a stimulator (HNS12 B Braun, Melsungen) connected to a 50-mm (22G × 2") needle (B Braun Melsungen). The needle was advanced and the quadriceps was stimulated with a 0.5 mA current until a response was observed. After negative aspiration of blood, 20 mL of 0.5% bupivacaine and 20 mL of 2% lidocaine plus epinephrine 1:200 000 were injected through the extension connector of the needle.

Before induction of spinal anesthesia, routine monitoring (electrocardiogram, pulse oximetry, and noninvasive blood pressure measurement) was started and an intravenous line was placed. Intraoperatively, 4 mL/kg of crystalloids and 500 mL of 6% hydroxyethyl starch 130/0.4 in 0.9% sodium chloride solution (Voluven®) were administered intravenously.

After sedation with ketamine (5 mg) and midazolam (0.5 mg) intravenously and cleaning the skin with chlorhexidine and removal of excess, spinal puncture was performed with the patient in the sitting position, by the median line in the L_3–L_4 interspaces using a 27 G Whitacre needle. After appearance of cerebrospinal fluid (CSF), 6 mg of 0.5% isobaric bupivacaine were administered at a rate of 1 mL·15 s^{-1}. The patient was immediately placed in the supine position at the beginning of surgery. The level of sensory block was observed in T_{12} and motor blockade (grade 3) of the lower limbs. The surgical procedure lasted 60 min without hypotension, bradycardia, or decreased oxygen saturation. Full recovery from motor blockade of the lower limbs occurred 105 min after injection of local anesthetic. The patient received 200 mL 12.5% dextrin maltose at the end of the spinal blockade (105 min after spinal local injection anesthetic) and before discharge from the PACU. The first analgesic dose was given at the end of surgery in the operating room–tenoxicam (20 mg) and dipyrone (3 g) were administered intravenously.

For safety reason, the patient was transferred to the ICU for monitoring; intravenous hydration was withdrawn and oral feeding was resumed 6 h after the end of surgery. The patient was discharged from the ICU on the following morning, and on the morning of the second day was sent home.

Discussion

We searched the literature and were unable to find any study in which hip surgery was performed for a patient over the age of 104 years. Therefore, we analyzed the present case with studies on octogenarians, nonagenarians, and centenarians. Our case shows that the centenarians tolerated anesthesia and surgery quite well, which has already been observed by others [3,4]. Perhaps the most important fact of this case is

that the 107-year-old patient returned home to her activities on the second postoperative day.

A discussion about anesthetic techniques and risks can reduce patient anxiety and also provides the opportunity to refute preconceived negative beliefs about the safety of anesthetic techniques such as spinal and regional anesthesia. The pre-anesthetic evaluation and explanation of the entire procedure and projected rate of postoperative recovery allowed successful surgical treatment. Advances and improvement in medical science have increased life expectancy and perioperative surgery and anesthesia in elderly patients has become an extremely important issue.

Hypovolemia may easily result from trauma due to blood loss and in hip fractures can exceed 1 liter [5]. This fact was confirmed by severe anemia in the examination on arrival at hospital. Replacement with 2 units of packed red blood cells increased the patient's condition to the point where she could be included in Project Acerto (Hb >100 g/L) and could undergo surgery 3 days later [6]. A large retrospective study showed no increase in mortality, even in elderly individuals, provided that hemoglobin concentration was kept above 80 g/L [7]. For hip fracture patients with trigger Hb of less than 100 g/L, transfusion has been shown to reduce hospital readmission rates, but not to affect mortality or post-operative mobility scores [8]. As the patient had hemoglobin levels greater than 100 g/L and surgery was scheduled for mini-incision, blood replacement during surgery and postoperatively was not required.

Perioperative hypotension is expected in elderly patients with limited function of compensatory mechanisms for effects of anesthetics such as decreased systemic vascular resistance, arterial pressure, central venous pressure, and cardiac output [9,10]. Many of these effects are due to blockade of sympathetic activity, which generally is raised even at rest in elderly individuals [11]. The lumbar plexus block via inguinal approach before surgery allowed low-dose isobaric bupivacaine (6 mg) to be used, reflecting no change in blood pressure during the perioperative period. The patient underwent a surgical fixation of the fractured hip under spinal anesthesia and sedation. The procedure was normal and she did not experience hypotension intraoperatively or in the PACU.

On the other hand, a study in elderly patients with hip fracture has shown that using very small doses of local anesthetic in SSA together with an intrathecal opioid results in less hypotension compared to conventional SSA doses, and in most elderly patients it provides a sufficient block [12]. We prefer to use low doses associated with lumbar plexus block, to prevent the urinary retention so common with opioids.

Aging is associated with several physiologic changes that affect functional reserves, resulting in diminished ability to respond appropriately to stress. Our 107-year-old patient showed no clinical problems, with normal activities and laboratory tests within normal limits. Surgery in centenarians is not without risk; however, several studies have shown that it can be relatively safe [4].

Prehospital nutritional status may play a large role in the outcome of surgical centenarians [13], which is why we administered dextrin maltose before and after surgery and reintroduced oral feeding 6 h after discharge from the PACU.

It is better to treat acute postoperative pain in elderly patients with titration of a single analgesic or combined analgesia such as nerve block for the periphery with intravenous patient-controlled analgesia. The patient was scheduled to receive analgesia through the lumbar plexus block before surgery at a dose sufficient to provide analgesia for 23 h [14].

Results of the study with nonagenarians and centenarians support the hypothesis that when undergoing cardiac surgical procedures represent a higher-risk group of patients, independent of age [15]. But this study also demonstrates that a majority of these nonagenarians and centenarians can be preoperatively identified to have a relatively low risk of mortality [15]. Our 107-year-old patient endured the surgical anesthetic and was discharged home without complications.

Anesthesiologists and geriatricians share the role of managing medical illness among elderly surgical patients. During the immediate perioperative period, anesthesiologists provide most care and generally function in an acute illness model of practice. Problems that arise, such as hypertension, hypoxemia, or hyperglycemia, are judged correctable and an appropriate intervention is initiated to correct them. In contrast, geriatricians, as primary care physicians for older persons during the last years of their lives, more often operate in a chronic disease model. The joint assessment involving the geriatrician, surgeon, anesthetist, and physiotherapist allowed the patient to be operated on and to be discharged as early as possible.

Advanced age traditionally has been considered a risk factor for surgery. Early in the last century, persons older than 50 years were excluded from many procedures considered minor today [16]. Living to 100 years is no longer a rarity. More than 30 000 centenarians live in Brazil. Surgery should not be denied on the basis of age alone. Medical evaluation should focus on identification of risk factors, optimizing status, predicting complications, and providing appropriate information to the surgeon, anesthesiologist, and geriatrician.

Conclusions

Ideally, a treatment plan should be based on careful assessment of the patient's and family's wishes, the relative medical risks and benefits, and the economic costs of the alternatives. This case showed that with suitable techniques surgery can be performed in a 107-year-old patient.

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