

CASE REPORT

Emergency surgery in a hyperparathyroid patient: is spinal anesthesia safe?

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ABSTRACT

Hyperparathyroidism can have a profound influence on human physiological mechanism and may affect the management of anesthesia. We present a case of successful management of a 65 years old female patient with parathyroid adenoma who underwent emergency intramedullary nailing in right femur for pathological fracture under low dose unilateral spinal anesthesia. An uneventful course of anesthesia in the presented case was related to the thorough systemic evaluation and careful anesthetic strategy.

Key-words: Parathyroid adenoma; Hyperparathyroidism; Hypercalcemia; Spinal anesthesia

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INTRODUCTION

Endocrine tumors may be the primary reason for surgery or they may coexist in patients requiring operations for other reasons. The presence of an endocrine dysfunction may increase the complexity and risk of an anesthetic delivered to these patients. Primary hyperparathyroidism is one of the most common causes of hypercalcemia. Calcium plays a central role in a large number of physiological actions that are essential for life. Of particular relevance to the anesthesiologist are the effects of calcium on the myocardium, vascular smooth muscles and blood coagulation. The endocrine, electrolyte and metabolic disturbances resulting from such disorder can have a profound effect on the normal human physiology.¹ We present a case of successful management of a 65 years old female patient with parathyroid adenoma who underwent emergency intramedullary nailing in right femur for pathological fracture under low dose unilateral spinal anesthesia.

CASE REPORT

A 65 years old female patient with primary hyperparathyroidism presented in the emergency with pathological fracture of right femur. She was recently diagnosed to have a parathyroid adenoma. Along with

pain at the fracture site, she had a history of recurrent episodes of nausea, vomiting and headache. She also complained of weakness and lethargy. In the emergency room, the patient had a BP of 110/70 mmHg, a pulse rate of 124/min and an oxygen saturation of 100% on room air. Her biochemical investigations showed blood calcium levels of 14.4 mg/dl, phosphate 2.5 mg/dl, PTH level 3778 pg/ml. Alkaline phosphatase level was 1273 IU/L. ECG showed sinus tachycardia. There was increased tracer uptake by parathyroid gland in parathyroid scan done one week earlier which confirmed the diagnosis of parathyroid adenoma. Rest of the investigations were within normal range. Emergency intramedullary nailing of the right femur was planned.

After securing a wide bore cannula, intravenous infusion was started. Pamidronate 60 mg and furosemide 40 mg was given keeping close watch on blood pressure and heart rate. Repeat serum calcium level was done before the surgery which was found to be reduced to 12.1 mg/dl.

In the operating room patient was connected with multiparameter monitor and monitored for ECG, NIBP, pulse oxygen saturation and temperature. Under full aseptic precautions patient was given unilateral subarachnoid block in lateral decubitus position with 2.2 ml of 0.5% of hyperbaric bupivacaine along with fentanyl 20 µg in L3-

Emergency surgery in a hyperparathyroid patient

L4 space with 25G Whitacre needle. Adequate sensory block was achieved unilaterally upto T10 level after which surgery was performed in the effected limb. The patient remained hemodynamically stable perioperatively. No blood transfusion was required intraoperatively

DISCUSSION

There are no specific guidelines for the conduct of anesthesia in patients with hyperparathyroidism for emergency surgery. Anesthetic management in such patient may be difficult because of cardiac arrhythmias and arterial hypotension during induction. Calcium, which is essential for a number of physiological processes in life, is usually found in three forms: as non-ionised protein bound (approximately 50%), as calcium-anion complexes (5%) and as ionised divalent cations (approximately 45%). It is the free (ionised extracellular calcium concentration that mediates all the physiological effects. Maintenance of calcium is affected by three main calciotropic hormones: parathyroid hormone, vitamin D and calcitonin.²

Hypotension should be avoided as acidosis increases ionized calcium. Elevated calcium levels can cause cardiac arrhythmias. The response to neuromuscular blocking agents may be altered in patients with pre-existing muscle weakness caused by the effect of calcium at the neuromuscular junction. Primary hyperparathyroidism and the associated hypercalcemia are treated initially by medical means followed by surgical removal of parathyroid gland, which is the only curative treatment.³ Hydration with sodium containing fluids and diuresis with furosemide usually decreases serum calcium to acceptable levels (<14mg/dl). Rarely more aggressive therapy with intravenous biphosphonates like pamidronate or etidronate may be necessary. Plicamycin, glucocorticoids, calcitonin or dialysis may be needed when biphosphonates are not sufficient or are contraindicated.^{4,5}

Preoperative evaluation should include an assessment of volume status to avoid hypotension during induction. These patients may present with dehydration, polyurea, tachycardia and even psychosis. Dehydration results in anorexia and vomiting which in turn worsen dehydration.

Osteoporosis worsened by hyperparathyroidism may predispose patients to vertebral compression during laryngoscopy and bone fracture during transport. Therefore special care should be taken while positioning the patient for surgery.

Our patient had parathyroid adenoma and was advised parathyroidectomy, but refused surgery. Anesthetic management of the patient for emergency surgery with parathyroid adenoma had some challenges. There are some advantages and disadvantages of both regional anesthesia and general anesthesia (GA). Tracheal intubation, extubation and inadequate depth of anesthesia under GA may result in considerable fluctuations in blood pressure. Regional anesthesia on the other hand can lead to hypotension.

Keeping in mind all the risks and benefits we decided for low dose unilateral spinal anesthesia. The cardiovascular stability following this technique is certainly the most important benefits in such type of patients. Hypotension may develop in 30% of patients after spinal anesthesia even with intermediate dose compared to 0-6% with unilateral or selective spinal anesthesia.^{6,7} We used 25G Whitacre needle instead of commonly used Quincke needle because various studies showed that Whitacre needle led to 66% of successful unilateral blocks compared with 16% with Quincke needle.⁸

Hyperbaric local anaesthetics had a more predictable and reliable block with faster recovery as compared to plain solutions. Low dose of lipophilic intrathecal opioids improve the quality of anesthesia and reduce the failure rates of spinal anesthesia. Fentanyl (10-25 µg) or sufentanyl (10 µg) have been used successfully with different local anesthetics. A recent meta analysis showed significantly lower visual analogue scale (VAS) pain scores and a reduced need for postoperative analgesics when surgery was performed under spinal anesthesia compared with GA.⁹ Aggressive intraoperative monitoring in these patients plays a major role. ECG is useful to detect cardiac conduction abnormalities with shortened P-R and Q-T interval, with or without QRS widening of the complex. Old age patients after spinal anesthesia can develop hypothermia intraoperatively hence temperature monitoring is essential.

Understanding the physiological disturbances involved in hyperparathyroid patient is essential for safe anesthetic management during the perioperative period. In this case study the whole course of anesthesia and operation was uneventful due to thorough systemic evaluation and a planned anesthetic management.

We consider, low dose unilateral spinal anesthesia as an alternative to general anesthesia in hyperparathyroidism patients with emergency lower limb surgeries.

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