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Case Report

Reflections of the Anesthetic Management in a Case of Parathyroid Adenoma: A Case Report

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ABSTRACT

Parathyroid adenomas are usually an incidental finding and present more commonly in women. The parathyroid gland releases parathyroid hormone(PTH), which is essential to maintain calcium homeostasis. Hence, the removal of parathyroid glands will result in hypocalcemia and if not treated could be life threatening. We present the case of a young female patient who presented with vague complaints and was evaluated and diagnosed with primary hyperparathyroidism. She was optimized and taken for surgical removal of parathyroid glands. The anesthetic considerations in the perioperative period and an intraoperative event during positioning are mentioned herewith.

Introduction

Introduction: Parathyroid glands are located in the neck behind the thyroid gland. The function of the parathyroid gland is to release parathyroid hormone(PTH), which helps to maintain calcium homeostasis. Parathyroid adenoma is a noncancerous (benign) tumor of parathyroid glands, which leads to increase in PTH levels, a condition known as primary hyperthyroidism. Increased PTH levels can cause altered calcium balance, which leads to increase in serum calcium levels. We report the case of a young female patient posted for enucleation of parathyroid adenoma under general anesthesia with superficial cervical plexus block.

Case Report

A 28-year-old female patient weighing 35kgs presented to the OPD with generalized weakness and bilateral large joint pain since 1 year. Patient was diagnosed with primary hyperparathyroidism in view of hypercalcaemia with increased PTH levels. No history of dysphagia, dyspnea, hoarseness of voice, pain in abdomen, nausea, vomiting. She however, had a history of recurrent renal calculi.

Except alkaline phosphatase (3950 U/L), PTH (5400 pg/ml) and serum calcium (11.8 mg/dl), all other labs were within normal limits. Electrocardiogram showed sinus tachycardia with normal QTc interval. Computed tomography scan was conclusive of parathyroid adenoma, with radiolucency and expansion over the left sided 5th,8th,10th ribs, bilateral ilium and left ischium bone.

On airway examination mouth opening was adequate with mallampatti grade 2 and no neck swelling. Preoperative optimization was done with tab. calcitrol 0.25mcg and inj. architol (Vit-D3) 6 lac IU IM. Indirect laryngoscopy was also done preoperatively to assess vocal cord movement, rule out pathology as well as for documentation. After extensive preoperative evaluation and optimization, the patient was posted for right parathyroidectomy.

On the day of surgery, apart from routine OT preparation, difficult airway cart, resuscitation equipments, emergency drugs and truview video laryngoscope were also kept ready. Patient was taken inside the OT after confirming fasting status and taking high risk consent. All standard monitors were attached and forced air warming blankets were used to prevent

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hypothermia. Two large bore intravenous cannulae were secured and through one 0.9% NS started. Premedication was given according to institutional protocol. Inj. dexmedetomidine 30mcg IV was also given before induction to inhibit pressor response and it also ensured stable hemodynamics intraoperatively. Train of four monitoring was done by placing the electrodes over the medial aspect of left forearm to assess the left ulnar nerve. Patient was induced with inj. etomidate and inj cisatracurium was used as muscle relaxant of choice. Truview video laryngoscopy was utilized for intubation, facilitating easy intubation with minimal manipulation of neck. Anaesthesia was maintained on O2, N2O and sevoflurane. Thereafter, under all aseptic precautions, ultrasound guided superficial cervical plexus block was given with inj.ropivacaine 0.5% and inj.dexmedetomidine 20mcg as adjuvant.

Intraoperative ECG with QTc interval, EtCO2 and urine output were monitored. Intraoperatively 10ml of 10% calcium gluconate was given in 100cc 0.9%NS over 30mins followed by a repeat dose over next one hour.

A sudden increase in peak inspiratory pressure (PIP) was noted with inadequate tidal volume delivery and it was immediately managed by increasing respiratory rate. After check laryngoscopy, intraoral endotracheal tube kinking was detected (Figure 1) and it was rectified by changing the ETT. After completion of surgery, patient was reversed after confirming TOF 0.9% and extubated.

After excision of the mass (Figure 2), she was shifted to post-anaesthesia recovery room and then to surgical intensive care unit for further care and management. Serum calcium levels were checked regularly and accordingly inj. calcium gluconate 10% was continued. A constant watch for hypocalcemic signs and symptoms along with serum magnesium, potassium, phosphates and parathyroid level estimation was done (Table 1).

Table 1- serial lab values

	Preop	postop	Day1	Day2
S. calcium (8.4-10.2mg/dl)	11.8	10.4	8.0	7.6
PTH (15-65pg/ml)	5400		26.60	
Magnesium (1.8-2.4mg/dl)	2.0		1.0	
Phosphate	2.2		2.7	

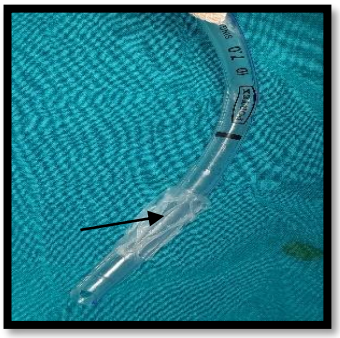

Figure 1- kinked endotracheal tube

Figure 2- Excised parathyroid adenoma

Discussion

Parathyroid adenomas are almost 3 times more common in women and may occur at any age [1]. This is usually an incidental finding, when patients are evaluated for the classical ‘moans, bones and groans’ symptoms, like in this case. Elevated serum calcium levels, on routine lab work done for other reasons is the most common initial sign of hyperparathyroidism.

It has its effects on various systems. Renal manifestations include nephrolithiasis most commonly. In view of impending renal failure and renal tubular acidosis, NSAID’s were avoided both pre and postoperatively [2]. These patients are highly vulnerable to pathological fractures due to prolonged hypercalcemia and so, careful positioning and laryngoscopy is essential to avoid injury to the cervical spine due to lytic lesions and this may result in quadriplegia. Cervical collar or manual in line stabilization (MILS) by an assistant are the commonly reported techniques for cervical stability. However, we preferred to use truview video laryngoscope for intubation since it provides adequate visualization of the vocal cords with minimal manipulation of the cervical spine. Head-up position should be given after intubation to allow for gravitational drainage of venous blood and hence, decreased vascularity of the gland resulting in surgical field clarity.

Dexmedetomidine, an alpha 2 agonist, has multiple advantages. It was used as an adjuvant for superficial cervical plexus block. When given intravenous, it attenuates pressor response during intubation, maintains intraoperative hemodynamics, decreases the dose of anesthetic agents, allows smooth extubation, provides post-operative analgesia and also reduces the incidence of shivering [3]. This is commonly used in our set-up in a dose of 1µg/kg/hr.

Intraoperatively, 10ml of 10% calcium gluconate supplementation was given slowly to prevent sudden untoward effects of hypocalcemia after the removal of parathyroid gland. Hypocalcemia also results in QTc prolongation due to exaggeration of the plateau phase in

the cardiac action potential and this results in cardiac arrhythmias, particularly ventricular tachyarrhythmia [4]. Therefore, drugs that result in QTc prolongation like thiopentone, volatile agents, ondansetron and antifungals should be used with caution or avoided where possible [5-6]. Our patient was on antifungal treatment and this was omitted during the perioperative period.

Head extension and manipulation by the surgeon that is required for this surgery, was the probable cause for intraoral tube kinking in our case. The timely identification of this reason, that caused an increase in the peak airway pressure and decreased delivery of tidal volume with immediate intervention to change the tube intraoperatively played a pivotal role in preventing further catastrophic adverse events. Hence, we advise using a flexometallic endotracheal tube with vigilant monitoring intraoperatively.

Train of four monitoring was essential to assess the degree of neuromuscular blockade and hence recovery from anesthesia. Extubation was considered when the patient was fully awake with a regular breathing pattern and good muscle strength with a TOF ratio of >0.9. Vocal cord position and movement was confirmed prior to extubation.

Postoperatively, various complications should be anticipated. These include bleeding, hypocalcemia, hypomagnesemia, recurrent laryngeal nerve trauma, glottic edema, hypocalcaemic tetany and local haematoma. Hypocalcemia peaks at 24-72 hours postoperatively [7]. Hence, monitoring of serum calcium levels at 6hrs and 24hrs thereafter was done for upto 3days. Hypocalcemia manifests as perioral paresthesia initially and then progresses to show positive Trousseau's and Chovstek's sign. Unilateral recurrent laryngeal nerve injury results in voice hoarseness and bilateral nerve injury causes stridor. The position and movement of vocal cords are usually confirmed prior to extubation. Hematoma requires immediate attention and evacuation; else it may result in respiratory distress.

Hungry bone syndrome is an often neglected manifestation that is seen post operatively after parathyroidectomy or thyroidectomy [8-10]. It is persistent hypocalcemia for more than four days postoperatively and it presents with hypomagnesemia, hypophosphatemia and normal parathyroid hormone level. According to resources, it is defined as profound hypocalcemia of less than 8.4 mg/dL that persists for more than four days post- operatively [8-10].

Reduction of PTH levels by more than 50% of the preoperative levels, is suggestive optimal parathyroid removal [11]. In our case, PTH showed a significant decrease from its preoperative levels.

She was shifted to the surgical ICU for post-operative care, monitoring of symptoms and further management. After serial monitoring of laboratory investigations and corrections, patient was shifted to the ward on post-operative day 3. She was discharged a week later.

Conclusion

An interprofessional collaboration consisting of an endocrinologist, surgeon, otorhinologist, anesthesiologist and intensivist is highly recommended to provide a streamlined approach for the perioperative management and optimal outcome of a patient with parathyroid adeoma. Compliance with calcium is of utmost importance to prevent bone wasting.

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