Case Report

Indian Journal of Anesthesia and Analgesia
Volume 8 Number 1 January-February 2021
DOI: http://dx.doi.org/10.21088/ijaa.2349.8471.8121.20

Management of a Patient with Pheochromocytoma Posted for Right Adrenalectomy

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Abstract

Introduction: Patients posted for adrenalectomy with pheochromocytoma pose major challenge to anaesthesiologist as there may be excess catecholamine release during its removal that leads to severe hypertension and arrythmias intra operatively.

Case presentation: Here we discuss anaesthetic management of 27 year old female with right supra renal mass posted for right adrenalectomy. She came with complaints of abdominal pain and weight gain for which hormonal evaluation and CECT abdomen done and was diagnosed with pheochromocytoma of right adrenal gland. As patient was obese and venous accesibility was difficult central venous catheterisation was done prior to surgery. Case was done under combined epidural with general anaesthesia.

Conclusion: In patients with pheochromocytoma posted for adrenalectomy, pre operative hormonal evaluation, intra operative and post operative hemodynamic stability are important. Intra operative and post operative tachycardia, hypertension prevented by smooth induction, minimise the intubation and extubation response and use of other adrenergic blockade drugs during and after surgery. Effective post operative pain management is necessary.

Keywords: Anaesthetic management; Pheochromocytoma.

How to cite this article:

Manjula Devi S, Ahmedi Fathima / Management of a Patient with Pheochromocytoma Posted for Right Adrenalectomy. Indian J Anesth Analg. 2021;8(1):137-139.

Introduction

Adrenal tumors are classified as hormonal secreting and non-hormonal secreting tumors.[1] Hormonal secreting tumors present to the anesthesiologist unique challenges requiring good preoperative evaluation, perioperative hemodynamic control, corrections of all electrolytes and metabolic abnormalities.[2] Pheochromocytoma presents the biggest challenge to the anesthesiologist compared with the other hormonal secreting

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Received on 05.01.21, **Accepted on** 16.02.2021.

adrenal tumors. This disease is characterized by excess of catecholamine secretion inducing a sympathetic storm mostly presented by severe hypertension and arrhythmias.[3] Surgical resection of Pheochromocytoma needs a multidisciplinary team including endocrinologist, radiologist, anesthesiologist, and surgeon.[4]

Case Report

A female patient, aged around 27 years, presented with complaint of vague abdominal pain, nausea, generalised fatigue, weight gain and excessive sweating. Ultrasonography showed a right supra renal mass.

CECT scan of abdomen revealed heterogeneously enhancing lesion measuring 8.2 × 6.7 × 13.1 cm over right supra renal gland. Left supra renal gland and liver are grossly unremarkable. Hormonal study showed 24-Hr urine Vanillymandelic acid (VMA) was raised (15.2mg/24 hrs). Thyroid and prolactin levels were within the limit. A diagnosis of Pheochromocytoma was made and the patient was started on Tab Phenoxybenzamine 10mg BD and Tab. Metoprolol 25mg BD.

During pre anaesthetic examination, patient was conscious and alert. Morbid obesity noted. (body weight 91.3kg, BMI: 36.5)

Vital signs were heart rate of 106 bpm, BP of 150/90 mmhg and respiratory rate of 18/min. Reviewing the preoperative vital sign chart of the patient since admission(1week) confirmed that the patient had no persistent or episodic increase in blood pressure. Airway assessment was done and Mallampati classification was Grade II. Cardiovascular and Respiratory systems were normal and rest of examination were unremarkable. Routine preoperative blood investigations were done and the reports were normal. Serum electrolytes, Thyroid profile and Serum Prolactin were normal. ECG and ECHO were unremarkable. The plan of anaesthesia was General anaesthesia with lumbar Epidural anaesthesia.

Patient's consent was obtained. The pre operative advice was NPO as per guidelines. Tab. Alprazolam 0.5mg HS. Tab. Ranitidine 150mg HS. Continue Tab.Phenoxybenzamine and Tab.Metoprolol till the day of surgery. A triple lumen central line was placed in left subclavian vein under ultrasound guidance, the previous day of surgery. On shifting to OT non invasive monitors like ECG, NIBP, pulseoximeter, capnograph were connected to the patient. As we were anticipating difficult airway, the difficult airway cart was kept ready. Loaded syringe pumps – NTG and Vasopressin were kept ready. Under aseptic precautions, 20G epidural catheter was placed at L1-2 for intra operative and post operative analgesia. Premedication with 100mcg of IV Fentanyl. Preoxygenation with 100% O2 for three minutes. Induction was done with 180 mg of IV Propofol. Injection Succinyl choline 125mg IV was given to facilitate Endotracheal intubation after confirmation of adequate bag and mask ventilation. Injection lignocaine (2% preservative free) 60mg was given before intubation. After confirming correct placement of ETT, Arterial line was established in Left radial artery. The patient was positioned in the left lateral position and care was taken to pad all pressure points. Invasive monitoring of blood pressure and CVP was started. The patient was catheterised and hourly urinary output was monitored. Anaesthesia was maintained with oxygen, nitrous oxide and isoflurane. Dexmedetomidine infusion was started for maintenance of anaesthesia and to achieve hemodynamic stability. Epidural Top ups of 5ml 0.25% bupivacaine were given every hour during the intraoperative period after the epidural test dose. Patient was transferred fully awake to intensive care unit with stable vital signs. The patient did not have any episodes of hypotension in post operative period. Epidural top ups were continued for two days for post operative pain relief. Patient was shifted to the ward on 3rd post operative day and discharged on 15th day after an uneventful postoperative period. Histopathology of the right adrenal gland confirmed the diagnosis of pheochromocytoma.

Discussion

Pheochromocytoma are tumours of chromaffin tissues which synthesize catecholamines. Pheochromocytoma can be adrenal or extrarenal (paraganglia), and can excessively secrete epinephrine, nor epinephrine, and rarely dopamine.

Pre-operative goals include

- Control of arterial pressure
- Reversal of chronic circulating volume depletion
- Control of heart rate and arrhythmias
- Assessing and optimizing myocardial function
- Managing electrolyte and glucose imbalance.[5]

This tumor can also be associated with multiple endocrine neoplasia. 10% of pheochromocytomas

may be malignant and 10% may be bilateral. Pre-operative assessment of patients with pheochromocytoma is an essential part in management. Treatment with adrenergic blocking agents plays an important role in the operative management of patients with pheochromocytoma.[1] Alpha adrenergic block reduces hypertension preoperatively and modifies responses to high levels of circulating catecholamines. It also expands the intravascular volume in those patients in whom this has been decreased due to intense peripheral vasoconstriction. Beta adrenergic block if used alone in patients with pheochromocytoma, there may be a marked rise in the total peripheral resistance due to vasoconstriction secondary to unopposed alpha adrenergic activity.[4] Our patient was started on Tab Metoprolol (beta blocker) and Tab Phenoxybenzamine (alpha blocker). The efficacy of adequate preoperative alpha blockade were assessed by the Roizen Criteria. The Roizen criteria includes

- Blood pressure not more than 160/90 mmHg for 24hours prior to surgery
- No orthostatic blood pressure
- No ST or T wave changes for 1 week prior to surgery
- No more than 5 premature ventricular contractions per minute.[6]

Our patient had BP of 150/90mmhg, no ECG changes and no orthostatic hypotension which fulfilled all the criteria and the patient was taken up for surgery. Even when patients with pheochromocytoma have been prepared preoperatively with adrenergic blocking agents, episodes of severe hypertension and/or cardiac arrhythmias may occur during excision of the tumor. This is explained by the fact that preoperative adrenergic block is only partial and does not reduce the response to high levels of circulating catecholamines which occur during removal of these tumors. Our patient did not have any episodes of hypertension in the initial period. BP was well controlled with Dexmedetomidine infusion and epidural top ups.[5] Following the removal of pheochromocytoma, the consequent fall in the levels of circulating catecholamines may result in hypotension. In our case, the hypotension was managed with crystalloids, blood products and vasopressin infusion with careful monitoring of central venous pressure and urinary output.[6]

Conclusion

The following points should be considered during the anaesthetic management of a patient with pheochromocytoma.

- Preoperative preparation with adrenergic blocking agents. The adequacy of the block using Roizen criteria.
- Use of an anaesthetic agent which is not associated with release of endogenous catecholamines and does not sensitize the myocardium to high levels of circulating catecholamines.
- Adequate fluid and blood administration, including preoperative transfusion if necessary.[2]

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