Case Report

Successful anesthetic management in a case of Pheochromocytoma

Pramod Bhale[1*], Anshul Udiavar[2], Anushree Choudhari[3]

[1]Professor, Resident, [3]Assistant Professor, Department of Anaesthesia; M.G.M. Medical College Aurangabad, Maharashtra, INDIA.
Email: pramod.bhale@gmail.com

Abstract

Pheochromocytoma is a catecholamine producing tumor that can cause severe hypertension and other systemic disturbances. The perioperative management of pheochromocytoma remains a complicated anaesthesia challenge requiring intensive preoperative preparation and vigilant intraoperative and postoperative care. In this report, we describe a successful management of a case of pheochromocytoma that underwent right adrenalectomy with favorable outcome.
Key Word: anesthetic, Pheochromocytoma.

[*]**Address for Correspondence:**
Dr. Pramod Bhale, Professor, Department of Anaesthesia; M.G.M. Medical College Aurangabad, Maharashtra, INDIA.
Email: pramod.bhale@gmail.com
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INTRODUCTION

Pheochromocytoma is a catecholamine secreting tumor that arises from the chromaffin cells of the sympathetic nervous system in the adrenal medulla and the sympathetic chain.[1] More than 95% of all pheochromocytoma are found in the abdominal cavity and 90 % originate in the adrenal medulla. 10% of these tumors involve both the adrenal glands. Less than 10% of pheochromocytoma are malignant. Pheochromocytoma typically occurs in patients of 30 – 50 years age. Pheochromocytoma can also occur as part of multiple endocrine neoplasia (MEN)[2].Patients present with a variety of symptoms which reflect excessive secretion of catecholamines (nor epinephrine, epinephrine, or dopamine) into the circulation.[3] The released catecholamines cause significant hypertension, often severe and refractory to conventional treatment.[1-4] Early diagnosis and definitive treatment with surgical resection is important because the tumor may be fatal if undiagnosed, especially in patients undergoing surgery for other disorders. The perioperative management of pheochromocytoma remains a highly stressful situation for the anesthesiologists. Appropriate preoperative medical management dramatically decreases morbidity and mortality during the operative management of this tumor. This case report describes the peri-operative anesthetic management in a patient with pheochromocytoma posted for right adrenalectomy.

CASE REPORT

A 35-year-old, 50 kg, female patient was admitted in medical ward for complaints of sudden hypertensive crisis along with vomiting. Blood pressure was 190 / 120 mmHg on admission. There was history of headache, palpitation, pain in abdomen. The history was suggestive of pheochromocytoma for which she underwent investigations. Vanillymandelic acid (VMA) 24-hr urine collection concentration was raised. CT scan report showed a large mixed dense heterogeneous mass at right adrenal region.Echocardiogram showed EF-55% with Grade 1 diastolic dysfunction. Other investigations like creatinine 1.2 mg/dl,hemoglobin 10.2 gm%, differential count 9,800/mm^3, Na^+ 132 meq/L k^+ 4.2 meq/L were within normal limits. The diagnosis of pheochromocytoma was made. Her blood pressure was controlled with oral Prazosin 10 mg once daily and Metoprolol 12.5 mg once daily. Three days after starting the antihypertensive medications, the blood pressure was controlled and the range of readings were in the range of 118/70 to 132/80 mmHg. She was scheduled to undergo

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right open adrenalectomy under general anesthesia, Patient was referred to Anesthesia Department for assessment. On the preoperative visit supine and standing blood pressure were measured which revealed no postural hypotension. Patient was posted for right adrenalectomy when blood pressure was about 140 / 90 mm Hg with no sign of postural hypotension.

ANESTHETIC MANAGEMENT

T.Alprazolam 0.5 mg P.O. was given at night before operation. Morning doses of oral antihypertensive was continued. In the operation theatre blood pressure was 160/86 mmHg, heart rate was 76/min,SpO2 was 99% on room air. Intravenous Access was secured with 18 G intravenous cannula. Monitors were attached for continuous monitoring of NIBP, SpO2 and ECG. An epidural catheter was placed at the T12-L1 level for intra operative hemodynamic stability and post operative analgesia. Patient was pre medicated with Inj.Midazolam 2 mg IV,Inj.Fentanyl 100 mcg IV. After pre oxygenation patient was induced with Propofol 1% 100mg and trachea was intubated with 7.0mm I.D. cuffed endotracheal tube after achieving adequate relaxation with Inj. Rocuronium 50 mg. Inj. Lidocaine (without preservative)1.5 mg/kg body weight intravenously was administered1 minute before laryngoscopy to minimize adverse cardiovascular effects of laryngoscopy and intubation. An Central venous access was established through the sub clavian approach for continuous central venous monitoring. An arterial access was established through right Radial artery for invasive blood pressure monitoring. Anaesthesia was maintained with Isoflurane in an Oxygen and Air mixture along with supplemental doses of Inj. Fentanyl and Inj. Vecuronium bromide. During the excision and manipulation of tumor mass there was rapid fluctuation of blood pressure which rose maximum up to 220/160 mm of Hg and was controlled by infusion of Inj. Nitro Glycerin (1 mcg/kg/min) throughout the procedure as per requirement. During removal of tumor there was precipitous fall of blood pressure to 80/50 mm Hg which was restored by rapid infusion of crystalloid (Ringer's lactate 2 L) and colloids (Hydroxyethyl starch 6% 0.5 L). Blood pressure was restored by infusion of Inj. Noradrenaline (0.1 mcg/kg/min). Inj. Hydrocortisone 200mg was administered immediately after removal of tumor mass. Urine output was adequate throughout the procedure (at a rate of 1.5 ml/kg/hr). At the end of surgery incision line was infiltrated with 0.25%bupivacaine (20ml). Residual neuromuscular blockade was reversed with Glycopyrrolate and Neostigmine at the end of surgery and patient was extubated. Patient was shifted to SICU and kept under close supervision for continuous monitoring of NIBP, SpO2. Hydrocortisone 100 mg I.V. 6 hourly was also administered. The ICU stay was uneventful and patient was shifted to the ward on the 2nd post operative day.

DISCUSSION

Pheochromocytoma is a catecholamine secreting tumor which secretes nor epinephrine, usually sustained and often in huge quantities. Sustained severe continuous or paroxysmal hypertension is often the commonest presentation of phaeochromocytoma.(5) Diagnosis is usually confirmed by raised urinary catecholamine and VMA in 24hrs urine. Localization of tumor is accurately done by CT scan, MRI, MIBG scan.[5] Roizen *et al*[6] recommended the following preoperative conditions prior to surgery for pheochromocytoma: (a) blood pressure < 160/90 mmHg for 24 hr before surgery, (b) postural hypotension > 80-45 mmHg, (c) ECG should be free of any ST-T changes for a week and (d) no PVCs more than 1 in five min. Main aim is resolution of symptoms in the pre- operative period so that wide variation in arterial pressure does not take place during operation. This is achieved by anti adrenergic drugs i.e. alpha (α) and beta (β) blockers. The sympathetic blockade is achieved first by an adrenergic blocker followed by a α blocker. Alpha blockade results in vasodilatation and tachycardia which is controlled by beta blockers. A non selective beta blockade is should never be prescribed before an alpha blocker as there may be unopposed alpha stimulation leads to vasoconstriction and hypertensive crisis.[5] In our case we used prazosin, a selective α□-blocker. Prazosin interferes selectively with post synaptic α- adrenergic receptor function. Prazosin is short acting, causes less tachycardia and postural hypotension than other α-adrenoreceptor blockers(5). Here we used metoprolol as □β blocker in small doses.[5] The period of greatest danger occur secondary to hypertension, arrhythmias during anesthetic induction, intubation, surgical incision, abdominal exploration particularly during tumor manipulation and secondary to hypotension following ligation of tumor's venous drainage.[5]The anesthetist should be vigilant during these events. Factors that stimulate catecholamine release like fear, anxiety, pain, shivering, hypoxia should be avoided.[5] There must be judious use of Pre-medication to avoid sympathetic stimulation. Drug causing histamine release should be avoided.[7] In our case we used propofol 1% as induction agent and fentanyl, a potent short acting opioid as analgesic as both of them can modify the haemodynamic effect of laryngoscopy and intubation. Lidocaine (preservative free) 1.5mg/kg i.v. was administered 1 min. before laryngoscopy to attenuate pressure response of laryngoscopy and intubation.[5] Rocuronium was used for intubation instead of suxamethonium because latter

causes histamine release and compression of abdominal tumor during fasciculation which may mechanically squeeze the tumor.[9] Vecuronium was used as muscle relaxant for maintenance of anaesthesia due to its cardiovascular stability and inability to release histamine. Sodium Nitroprusside is agent of choice for hypertension.[5] In our case Inj. Nitro Glycerine infusion was used to control rise of blood pressure during handling of tumor due to non availability of Sodium Nitroprusside. But nitroglycerine has its disadvantages as it causes tachycardia and is required in large doses.[5] After removal of tumor blood pressure was maintained with nor adrenaline infusion and crystalloids and colloids. Hydrocortisone replacement was also given. Glucocorticoid and mineralocorticoid cover is mandatory for patients undergoing bilateral adrenalectomy.[10] Various anesthetic techniques have been successfully employed for the resection of pheochromocytoma. Regional anaesthesia has been used alone or in combination with general anaesthesia. The choice of anaesthesia does not influence the outcome of the operation.[8] We used a combination of low thoracic epidural and general anesthesia. A practical rational anaesthesia technique consisting of a mid to low thoracic epidural combined with adequate general anaesthesia and selective adrenergic antagonists to control hemodynamic surges in response to tumor manipulation.[2] Central access is mandatory in a case of pheochromocytoma to continuously monitor the CVP as vasopressors and large volume of fluids are infused peri operatively. The three most important complications in the immediate postoperative period are hypertension, hypotension and hypoglycaemia.[4] Hypotension is the most frequent cause of death. So large volumes of fluids are necessary post operatively.[5] Approximately 50% of patients remain hypertensive for a few days, most likely related to elevated catecholamine levels which may persist for one week after pheochromocytoma resection. Therefore restarting or continuation of antihypertensive medication may be required for a few days. Presence of residual tumor must be considered in cases of persistent hypertension and catecholamine levels should be repeated. Persistent hypotension may be due to residual effects of preoperative adrenergic blockade.[1]

CONCLUSION

The anesthetic management of patients with pheochromocytoma remains a challenge to even the most experienced of anesthesiologist, although the perioperative mortality has reduced remarkably. Surgical resection is the definitive treatment. Patients with pheochromocytoma should ideally be managed by an experienced team of endocrinologist, endocrine surgeon and anesthesiologists. Proper monitoring, adequate fluid replacement and availability of drugs which can rapidly alter blood pressure make the surgical resection of pheochromocytoma as safe as other tumor resection

REFERENCES

1. Hull CJ. Phaeochromocytoma. Diagnosis, preoperative preparation and anaesthetic management. Br JAnaesth 1986; 58: 1453– 58.
2. Thomas JL, Bernardinodino ME. Phaeochromocytoma in multiple endocrine adenomatosis. JAMA 1981; 245: 1467 – 9.
3. Prys-Roberts C. Pheochromocytoma - recent progress in its management. BrJ Anaesth 2000; 85:44-57.
4. Singh G, Kam P. An overview of anaesthetic issues in Pheochromocytoma. Ann Acad Med Singapore 1998; 27:843-8.
5. Arun Paul. Endocrine diseases. In: Roberta L Hines, Katherine Marschall, editor. Stoelting'sAnaesthesia and Co‐existing Disease, 5th ed. South Asian edition, Pa: Saunders Elsevier; 2012. p. 427-432.
6. Roizen MF, Schreider BD, Hassan SZ: Anesthesia for patients with pheochromocytoma. *Anesthesiol Clin North Am*; 1987, 5:269-275.
7. Wallece JM, Gill DP. Prazosin in diagnosis and management of Phaeochromocytoma. JAMA 1978; 240: 2752 – 3.
8. Dugas G, Fuller J, Singh S, Watson J. Pheochromocytoma and pregnancy: a case report and review of anesthetic management. Canadian Journal of Anesthesia 2004; 51:134-8.
9. Stoelting RK, Blood pressure and heart rate changes during short duration laryngoscopy for tracheal intubation: influence of viscous or intravenous lidocaine. Anesth Analg 1978; 57: 197 – 9.
10. Pullertis J, Ein Sigmud, Williamson S. Anaesthesia for Phaeochromocytoma. Can J Anaesth 1988; 35: 526 – 534.

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