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Original Research Paper

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ANAESTHETIC CHALLENGES & MANAGEMENT OF A PATIENT FOR PHEOCHROMOCYTOMA EXCISION - CASE REPORT

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ABSTRACT

BACKGROUND: Pheochromocytoma is a rare catecholamine producing tumor of the adrenal gland. The anaesthetic management of the tumor can be challenging because of hemodynamic fluctuations encountered preoperatively, during induction of anaesthesia, manipulation of tumor & after the excision.

OBJECTIVE: To report perioperative anaesthetic management of a 63-year old female with pheochromocytoma for surgical excision, the major challenges were uncontrolled hypertension, diabetes with history of ischaemic heart disease.

METHOD: Combined general and epidural anaesthesia was used in this patient. Preoperatively, the patient presented with high blood pressure which was adequately controlled with alpha and beta blockers. Intra- operatively she developed severe hypertension during manipulation of the tumor which was managed pharmacologically with nitroglycerin, esmolol, magnesium sulphate & epidural anaesthesia while hypotension that developed after the excision of the tumor was managed with intravenous fluid, packed cell volume and noradrenaline. Post operatively she was transferred to intensive care unit for monitoring and pain management and she made an uncomplicated recovery.

CONCLUSION: Pheochromocytoma is a rare tumor with its management being challenging and patient is at significant risk for major adverse cardiac as well as neurological complications. Successful management requires careful preoperative optimization, intra operative planning, post operative close supervision and hemodynamic management with thorough knowledge of the physiology & pharmacology of drugs will lead to good outcome.

KEYWORDS : Pheochromocytoma; Hypertension; Anaesthetic Manaegement.

INTRODUCTION[1]:

Pheochromocytomas are catecholamine-secreting tumors that arise from chromaffin cells of the sympathoadrenal system. Pheochromocytomas account for less than 0.1% of all cases of hypertension in adults. Their detection and management is imperative, because they have potential complications, also they are one of the truly curable forms of hypertension. Uncontrolled catecholamine release can result in malignant hypertension, cerebrovascular accident, and myocardial infarction.

Cause is unknown & usually an isolated finding (90% of cases); 10% are inherited (familial) as an autosomal dominant trait. Familial pheochromocytomas usually occur as bilateral adrenal tumors or extra adrenal tumors that appear in the same anatomic site over successive generations. Both sexes are equally affected, and the peak incidence is in the 3rd-5th decades of life.

Most pheochromocytomas secrete norepinephrine, either alone or, more commonly, in combination with a smaller amount of epinephrine in a ratio of 85:15 and the inverse of the secretion ratio in the normal adrenal gland, Approximately 15% of tumors secrete predominantly epinephrine.

This case report describes the peri-operative anaesthetic challenges & management in a patient with pheochro mocytoma.

CASE REPORT

A 63-year old, 65kg, Indian female patient presented with paroxysmal attacks of hypertension causing palpitation, dizziness, blurring of vision, headache with syncopal attack & orthostatic hypotension since last 6 months. Examination was essentially normal except for high blood pressure 180/110mmHg. A tentative diagnosis of pheochromocytoma was made and she underwent investigations and antihypertensives were started. Clinical suspicion of pheochromocytoma was confirmed by 24 hour metanephrine level in the urine was 1000pg/ml, Ct scan abdomen showed fairly large heterogeneously enhancing capsulated mass lesion of size 10 x 9.0 cm in the region of right adrenal mass not infiltrating to right lobe of liver & right renal parenchyma. Right renal vein and IVC appeared normal in caliber. Other investigations like hemoglobin percentage, differential count, serum electrolyte, blood urea, creatinine, clotting profile were within normal limits. Her blood pressure was controlled with oral prazosin 5mg twice daily and metoprolol 12.5mg two days prior to surgery. Blood sugar was controlled with insulin 8-8-6 unit (soluble human insulin) subcutaneously. The ST changes in ECG earlier had reverted back to normal with no ventricular ectopics noted with 2D echocardiography finding of left ventricular ejection fraction of 60%, concentric left ventricular hypertrophy, mild dilated left atrium and grade 2 diastolic dysfunction. Patient was posted for right adrenalectomy when blood pressure was about 130/80mmHg with no signs of postural hypotension and blood sugar was controlled to 130mg/dl post prandial with hematocrit near normal range. She was assigned ASA IV and high risk informed consent was taken.

ANAESTHETIC MANAGEMENT[1,2,6]

Alprazolam 0.25mg per oral was given at night before surgery. Morning dose of oral antihypertensive (Praosin 5mg & Metoprolol 12.5mg) were given, Pre-operative blood sugar was 121mg/dl, blood pressure 130/76mmHg, pulse rate 72/min and Spo2 was 99% on room air. After securing intravenous access with 18G cannula, lactated Ringer's solution was commenced. Non- invasive monitors were attached for monitoring: automated non-invasive blood pressure, pulse oximeter, electrocar diogram and temperature probe. Baseline vital signs were pulse rate 82/min, blood pressure 136/82mmHg and oxygen saturation was 99%.

In the sitting position, epidural needle was inserted at T_{10}/T_{11} under aspetic technique and epidural catheter was inserted

followed by a test dose of 3ml of 1% lidocaine without adrenaline. Epidural analgesia was activated with 10ml of 0.1% ropivacaine. There was no change in patient's vitals.

Patient was pre-oxygenated with 100% oxygen, she was then pre medicated with inj. glycopyrrolate 0.2mg, fentanyl 100ug, lidocaine(preservative free) 97.5mg & midazolam 0.5mg iv. Patient was induced with inj. Propofol 180mg and trachea was intubated with 7.0mm I.D. cuffed oral endotracheal tube after achieving adequate relaxation with inj. vecuronium bromide 6mg. Blood pressure and heart rate after intubation was 126/70mmHg & 86/min. A central venous access was established through internal jugular vein and radial artery was cannulated for invasive blood pressure monitoring. Patient mechanically ventilated with a tidal volume of 7ml/kg at a rate of 14 breath/min with end-tidal co_2 was between 35-40mmHg. Maintenance of anaesthesia with sevoflurane in O_2 + air 50% - 50%, dexmedetomidine(0.2- 0.7mcg/kg/hr titrated accordingly), along with supplemental dose of fentanyl & vecuronium bromide.

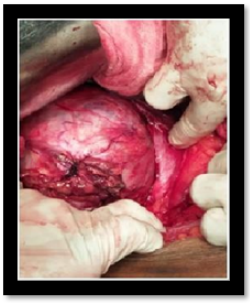


Figure 1: Intra-operative image of tumor

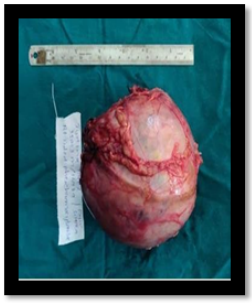
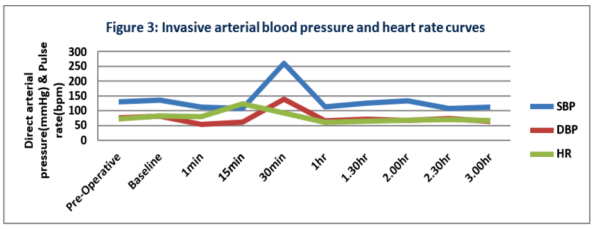


Figure 2: Tumor after excision

During the excision and manipulation of tumor mass there was rapid fluctuation of blood pressure which rose up to 260/140mmHg and was well controlled by nitroglycerin, esmolol, $mgso_4$ & epidural anaesthesia as per requirement. After tumor excision the patient developed hypotension which was corrected with volume replacement (lactated Ringer, normal saline, hydroxyethyl starch) and nor adrenaline infusion. The surgery lasted for 2.30 hours and estimated blood loss was about 900ml which was replaced with 2 unit of fresh whole blood.



Urine output was adequate through out the procedure & blood sugar level was monitored and adjusted with infusion of insulin as per sliding scale throughout the procedure. At the end of surgery for post op analgesia bolus of ropivacaine 0.1% via epidural catheter and inj. paracetamol iv given. Residual neuromuscular blockade was reversed with neostigmine 0.05mg/kg & glycopyrolate 0.01mg/kg and patient was kept intubated and sent to ICU under close supervision for continuous monitoring with ongoing inj. fentanyl + midazolam infusion. To maintain blood pressure noradrenaline infusion was continued in the post operative period. When patient's hemodynamic status became stable, noradrenalin and fentanyl + midazolam infusion was discontinued and patient extubated on 2nd post-op day.

On subsequent post operative day patient's blood pressure and blood glucose level gradually came to near normal. Patient was discharged on 10th post operative day.

DISCUSSION[1-6]

A substantial proportion of pheochromocytoma secretes predominantly norepinephrine, sometime paroxysmal but usually sustained and often in huge quantities. Sustained severe hypertension is often the commonest presentation of pheochromocytoma. There is also vasoconstriction in arteriolar and venous sites due to release of noradrenalin and thereby decreasing the circulating blood volume.

Diagnosis is usually confirmed by raised urinary catecho lamine and VMA in 24hrs urine. Localization of tumor is accurately done by Ct scan, MRI & MIBG scan.

Roizen et al [5]. Proposed a set of criteria to effectively measure the adequacy of preoperative optimization prior to excision of pheochromocytoma. Over the years these criteria have remained consistently reliable & data does exist in the literature reflecting poorer outcomes when patients have not met these criteria prior to tumor resection. This criteria include :-

1. No blood pressure reading >160/90mmHg for 24hrs prior to surgery.
2. No orthostatic hypotension with blood pressure <80/ 45 mmHg.
3. No ST or T wave changes for 1 week prior to surgery.
4. No more than 5 premature ventricular contractions per minute.

Main aim is resolution of symptoms in the pre-operative period so that wide variation in arterial pressure does not take place during surgery. This is achieved by antiadrenergic drugs i.e. alpha and beta blockers. The sympathetic blockade is achieved first by an alpha adrenergic blocker followed by a betablocker. Alpha blockade results in vasodilatation and tachycardia which is controlled by beta blockers. If beta blockade is achieved first then there may be unopposed vasoconstriction in skeletal muscle causing hypertension. In our case we used prazosin, a selective $alpha_1$ blocker. Prazosin interferes selectively with post synaptic alpha adrenergic receptor function. Prazosin causes less tachycardia and postural hypotension than other alpha adrenoreceptor blockers. Metoprolol as beta blocker was added 2 days prior to surgery.

Goal of anaesthetic management is to provide optimal surgical condition and to suppress the responses to endotracheal intubation, surgical stimulation, tumor handling and devascularization. So in our case we preferred general anaesthesia supplemented with epidural anaesthesia.

The patient was premedicated with glycopyrrolate, mida zolam, fentanyl & lidocaine (preservative free). And the drugs like suxamethonium chloride, sodium thiopentone, morphine, atracurium which potentially release histamine were avoided in the patient. Intra-operative hypertensive crisis was pharmacologically managed in this case with nitroglycerin, esmolol, magnesium sulphate & epidural anaesthesia. Magnesium sulphate is a calcium antagonist and also inhibits the release of catecholamine so magnesium sulphate is an attractive option for catecholamine blockade in patient undergoing pheochromoctytoma excision. Epidural anaes thesia has the advantage of intra-operative blood pressure control and post-operative analgesia.

After the removal of the tumor, hypotension which may be refractory to volume replacement may occur due to residual effect of alpha adrenergic blocker or hemorrhage and our patient responded well by infusion of noradrenalin.

Monitoring is an important part of management in the patient, invasive blood pressure monitoring is the gold standard in the pheochromocytoma resection for beat-to-beat blood pressure monitoring allowing for close hemodynamic monitoring in

addition to other non-invasive monitoring that was used in our patient.

CONCLUSION

Pheochromocytoma is a rare tumor with its management being challenging and patient is at significant risk for major adverse cardiac as well as neurological complications. Successful management & uncomplicated recovery requires careful preoperative optimization, intra operative planning, post operative close supervision and the hemodynamic management with thorough knowledge of the physiology & pharmacology of drugs.

REFERENCES

1. Hines L.R, Marschall E.K, Agrawal J, Parmeshwari A, Paul K.A, Wall III T.R. Endocrine disease. Stoelting's anesthesia and co-existing disease, adapted for South Asian curriculum. 3rd edition 2020; 470-473.
2. Adigun TA, Ayandipo OO, Idowu OK. Anaesthetic management of a patient with phaeochromocytoma in a low resource setting: a case report. Trends Anes Surg, 2018; ISSN: 2631-9950.
3. Jiang A, Zhang H, Liu X, Zhao H. Perioperative anesthetic management of a case of rare ectopic pheochromocytoma. World J Oncol 2017;8(6): 191-195.
4. Pratibha D.S, Katti V, Patil B. Anesthetic management of a rare case of extra-adrenal pheochromocytoma. Anesthesia: Essays and Researches 2016; 10(I); Jan-Apr.
5. Ramkrishna H. Pheochromocytoma resection; Current concepts in anesthetic management. Journal of Anaesthesiology Clinical Pharmacology 2015; July-September Vol 31 Issue 3.
6. Basu M, Gupta D.S, Mukhopadhyay S, Saha S. Anaesthetic management of bilateral phaeochromocytoma in a young female patient. Indian Journal of Anaesthesia 2007;51 (3): 237-239.