

ANAESTHETIC MANAGEMENT OF PHAEOCHROMOCYTOMA OF LESSER SAC IN A PATIENT WITH RHEUMATIC HEART DISEASE USING COMBINED GENERAL AND EPIDURAL ANAESTHESIA.

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Phaeochromocytoma is a rare catecholamine-secreting neuroendocrine tumour, accounting for less than 0.1% of hypertensive population with a high cardiovascular morbidity and mortality if left untreated. Extra-adrenal phaeochromocytomas of lesser sac are still rarer. Due to its rarity, anaesthetic experience is also limited. Surgical resection is the only curative therapy. During surgery there is a high risk of massive release of catecholamines, which can result in potentially fatal hypertensive crisis and cardiac arrhythmias. The perioperative management of phaeochromocytoma remains a challenge for the anaesthesiologist, despite the advent of new drugs and techniques, requiring intensive preoperative preparation and vigilant intraoperative and postoperative care. This case report describes the perioperative anaesthetic management in a 38year old female patient with phaeochromocytoma of lesser sac with Rheumatic heart disease. We used combined general and epidural anaesthesia for tumour removal surgery, resulting in the use of fewer drugs and a smoother perioperative anaesthetic course and post-operative analgesia was provided with morphine supplemented through the epidural catheter. This case report highlights the importance of epidural blockade for excision of phaeochromocytoma, especially in a developing country, where the latest techniques and advanced monitoring facilities are unavailable and affordability is a major issue.

Phaeochromocytoma was first described at autopsy by Fränkel in 1886¹. The word “Phaeochromocytoma” was coined by Pick² in 1912, meaning “Dusky coloured tumor”. Phaeochromocytomas and paragangliomas are chromaffin tumors that arise from neural crest cells. The term phaeochromocytoma refers to chromaffin tumors within the adrenal medulla and extra-adrenal phaeochromocytomas (paragangliomas) are chromaffin tumors found along the paravertebral sympathetic chain extending from the base of the skull, through the neck, thorax, abdomen and pelvis. Its prevalence is around 0.1% to 0.6% in patients with hypertensive symptoms. Surgical resection is the only curative therapy. The first successful operation was performed by Roux³ in 1926. Initially, surgical resection of phaeochromocytoma had a high perioperative mortality rate of 20 to 45% which dropped to 0 to 2.9% in the last 50years⁴ due to development

of better imaging techniques for accurate localisation of tumor, better preoperative medical management, and improvements in surgical and anaesthetic techniques.

Several anaesthetic techniques and agents have been used for anaesthetizing phaeochromocytoma patients. Most of the techniques describe combination of different drugs through induction, maintenance, termination and postoperative period to minimize blood pressure fluctuations and to prevent dysrhythmias intraoperatively⁵. The combination of General anaesthesia (GA) and Epidural anaesthesia (EA) may abate the hypertensive and dysrhythmic attacks during surgery resulting in a steady haemodynamic state.

Case Report:

A 38 -year-old, 45kg, female patient was admitted with sudden hypertensive crisis along

with headache, vomiting, epigastric pain and generalized weakness. Her blood pressure was 180/106 mmHg. She was known to have subclinical hypothyroidism for the past 6 months and was on oral thyroxine 50µg once daily. She had a history of menorrhagia and rheumatic heart disease with mitral regurgitation for the past 4 years and bilateral cataract and pulmonary tuberculosis 13 years back for which she took anti-tuberculosis treatment for 10 months. Her investigations included haematological, biochemical evaluations, coagulation profile, thyroid function test, liver and kidney function tests, ultrasonography (USG), CT scan, upper gastro intestinal endoscopy, renal doppler study, 24 hours urinary catecholamines and Vanillyl mandelic acid levels. Ultrasound of abdomen reported an enlarged (4.8cm×5cm), necrotic para-aortic lymph node with mesenteric lymphadenopathy, splenomegaly and left ovarian cyst. Contrast Enhanced Computed Tomography (CECT) abdomen revealed a heterogeneously enhancing mass lesion in lesser sac and retropancreatic area measuring 5cm×5.1cm×5.4cm likely to be a Leiomyosarcoma or Gastro-intestinal stromal tumor. Electrocardiogram showed left ventricular hypertrophy. 2D ECHO showed an ejection fraction of 62%, moderate mitral regurgitation, tricuspid regurgitation pulmonary regurgitation and mild concentric left ventricular hypertrophy. Diagnosis of pheochromocytoma was established by the raised levels of catecholamines and vanillyl mandelic acid (VMA -38.36mg/gm creatinine) in 24-h urinary collection. All other investigations were normal. The patient was prepared for 4 weeks with α and β blockers (phenoxybenzamine 10 mg and atenolol 25 mg, twice daily) prior to surgery.

Anaesthetic Management:

Alprazolam 0.5 mg was administered orally at night before surgery. Morning doses of oral antihypertensives were given 2 hours preoperatively with a sip of water. Preoperative blood pressure was 140/70 mmHg; heart rate was 77/min; SpO₂ was 100% in room air. After securing intravenous access with 18G intravenous cannula, ringer lactate infusion was started. Monitors were attached for continuous monitoring of NIBP, SpO₂ and ECG. Radial artery cannulation was done under local anaesthesia for continuous blood pressure monitoring. Then using 18G Tuohy' needle epidural catheter was inserted in T10-11

interspace and a single bolus dose of 15 ml of 0.25% bupivacaine was administered after a test dose of plain lignocaine. Glycopyrrolate 0.2mg, midazolam 1 mg and fentanyl 100 µg were administered intravenously as premedication. After preoxygenation for 3minutes, patient was induced with propofol 1% 100mg and intubation with 7.0 mm I.D. cuffed endotracheal tube was uneventfully facilitated with vecuronium bromide 6mg. Lidocaine 1.5 mg/kg body weight intravenously was administered 1 minute before laryngoscopy to minimize adverse cardiovascular effects of laryngoscopy and intubation. Maintenance of anaesthesia was done by positive pressure ventilation with O₂ and N₂O and isoflurane, along with supplemental dose of vecuronium bromide on demand. A central venous access was established through right subclavian approach after induction for continuous central venous pressure monitoring. During the excision and manipulation of tumour mass there was fluctuation of blood pressure, the maximum was 167/90 mm of Hg and returned to normal without further treatment (see Figure1). Neither acute hypertensive attack nor dysrhythmia was seen intraoperatively and therefore antihypertensive agent was not administered. Urine output was adequate throughout the procedure (1.2 - 1.5 ml/kg/hr). Residual neuromuscular blockade was completely reversed with neostigmine 0.05mg/kg and glycopyrrolate 0.01 mg/kg and the patient was extubated. Patient was kept in ICU under close supervision for the next 48 hours for continuous haemodynamic monitoring. Post operative pain relief was facilitated in the ICU via epidural Patient Controlled Analgesia pump and a mixture of 0.0625% bupivacaine and 0.05mg/ml of morphine was administered at 2ml/hr. Patient on demand dose was 4ml and the lock up interval was 30 minutes. Ondansetron 4mg intravenously was administered 12 hourly. There were no adverse effects like respiratory depression, pruritus, nausea and vomiting. The patient developed hypertension, for which a nitroglycerine infusion was started and titrated according to the blood pressure. On subsequent post operative days, patient's blood pressure gradually came to near normal, Nitroglycerine infusion was discontinued and patient was shifted to the ward after removal of epidural catheter on the second day and for further analgesia tramadol 100 mg was administered intravenously. The patient was discharged home on the 9th postoperative day with oral atenolol

25 mg and hydrocortisone tablet 10 mg in the morning and 5mg in the night. Histological report confirmed the tumour as phaeochromocytoma.

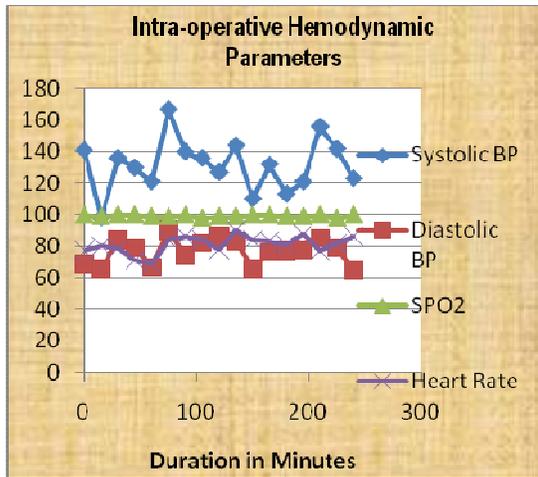


Figure - 1

Discussion:

Phaeochromocytomas account for 90% of chromaffin tumors and about 10% originate from extra-adrenal chromaffin tissue⁶. Symptoms and signs of a phaeochromocytoma result from an uncontrolled release of catecholamines (norepinephrine, epinephrine, and dopamine). Once there is a suspicion, localization of tumour is usually done by CT scan, MRI or MIBG scan and the best confirmatory biochemical test is to measure 24 hours urinary VMA^{4,7}. Surgical resection of the tumour is the only curative procedure.

Prior to surgery, it is necessary to adequately control arterial pressure, heart rate, arrhythmias and restore the blood volume to normal. Haemodynamic swings may occur at induction of anaesthesia, intubation, and during tumour handling⁴. Preoperative preparation is conventionally done with alpha blockers followed by beta blockers, as alpha blockade results in vasodilatation and tachycardia which is controlled by beta blockers⁴. Alpha blockade is commonly achieved with oral phenoxybenzamine which also permits spontaneous volume expansion but this occurs gradually and may take two to three weeks. Beta blockade should be started once alpha adrenergic blockade is fully achieved as unopposed alpha stimulation may lead to severe hypertension⁹. Patients usually develop hypertensive swings during surgical

manipulation of the tumour despite complete pharmacological blockade. Therefore alpha and beta blockers should be continued until the day of the surgery except phenoxybenzamine which is stopped a day before surgery as it has a long half life and may cause postoperative hypotension. We preferred isoflurane as inhalational agent as it does not sensitize the myocardium to catecholamines¹⁰. Vecuronium, rocuronium and cisatracurium cause the least histamine release and have shown cardiovascular stability, so we have used vecuronium as muscle relaxant. Besides α and β blockade pre-operatively, increasing anaesthetic depth plays an important role in the prevention of hypertensive crises¹⁰. Therefore, the use of suitable anaesthetic technique to prevent hypertensive attacks is mandatory. Combination of epidural analgesia with general analgesia is not very commonly practiced for phaeochromocytoma surgery. The technique we reported in this case has the advantage over usual methods of blood pressure control in that high and extensive sympathetic blockade with epidural anaesthesia (EA) may enhance the efficacy of both, α blockers and β blockers, and it might inhibit the release of catecholamines from the phaeochromocytoma and also cause vasodilatation. As in this case, the extended epidural sympathetic blockade facilitated the effectiveness of general anaesthesia and also prevented the adverse cardiovascular responses to surgical stimuli and tumor manipulations (see Figure 1).The combined technique seemed to have modified the anaesthetic course considerably, resulting in the use of fewer drugs and a steady haemodynamic state.

The three most important complications in the immediate postoperative period are hypertension, hypotension and hypoglycaemia. Nearly half of the patients remain hypertensive for a few days, probably due to elevated catecholamine levels which may persist for one week post operatively¹⁰. Hence, institution of antihypertensive therapy may be required for a few days, as in our case the patient was hypertensive post operatively for which nitroglycerine infusion was started in the ICU and finally switched over to oral β -blockers.

Conclusion:

The anaesthetic management of patients with phaeochromocytoma still remains a challenge as the pathophysiology of the disease is complex

and a team approach of an experienced endocrinologist, endocrine surgeon and anaesthesiologist is necessary for its successful outcome. In our experience we found combined general and epidural anaesthesia to be a unique and safe technique for excision of phaeochromocytoma which could also be extrapolated for laparoscopic surgical approaches.

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