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Original Research Paper

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A CASE REPORT OF PERIOPERATIVE MANAGEMENT OF A PATIENT WITH PHEOCHROMOCYTOMA.

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ABSTRACT Catecholamine secreting Neuroendocrine Tumors are either associated with adrenal (pheochromocytoma) or nonadrenal (paraganglioma) tissue. To prevent and cure various cardiovascular and systemic complications, surgical removal of these tumors is often indicated. The measurement of catecholamines and their metabolic end products in plasma and urine along with computed tomography, and/or magnetic resonance imaging are required for diagnosis and anatomical delineation of such tumors. The surgical removal of these tumors requires optimization of hemodynamics such as blood pressure and intravascular volume before surgery.

This is a case of Pheochromocytoma for tumor excision. The patient was managed pre-operatively in the Intensive Care Unit with alpha and beta blockers for hemodynamic stabilization. During surgery the patient was put on vasodilators and after tumor resection ionotropic support was given. The patient followed uneventful and speedy course of recovery and was discharged on oral medications.

KEYWORDS : Catecholamines, Neuroendocrine, Pheochromocytoma, Paraganglioma, Blood pressure.

INTRODUCTION

Pheochromocytoma is a rare catecholamine secreting neuroendocrine tumor which is derived from the chromaffin cells of the adrenal medulla in 80-85% cases [1, 2]. The World Health Organization has defined pheochromocytoma as an intra-adrenal paraganglioma arising from catecholamine producing chromaffin cells in the adrenal medulla. Catecholamine producing tumors of the extra adrenal sympathetic origin and catecholamine producing parasympathetic tumors are classified as extra adrenal paragangliomas [3]. The annual incidence of pheochrom ocytoma is around 2 to 8 cases per one million [4]. The clinical features include headache, hypertension, palpitations and sweating [5]. The management of pheochromocytoma surgeries starts preoperatively with patient preparation and optimization of hemodynamics. This pre-operative medical management improves peri-operative outcomes by reducing morbidity and mortality [1, 6]. Preoperative preparation includes the use of alphaadrenergic antagonists, beta-adrenergic antagonists with or without other antihypertensive agents, fluid therapy as well as insulin therapy for hyperglycemia if required [7].

Case Report

A 24 year old female adult who is a known case of Left Suprarenal Mass with a diagnosis of Pheochromocytoma since last 8 months presented with complaints of left sided abdominal pain in the flank region since last one month which is of moderate intensity and not radiating in nature. There is a history of loss of appetite and weight loss (3kgs over one month). There is also history of intermittent sweating, shortness of breath and palpitations. There is no history of nausea or episodes of vomiting in the past. No history of any menstrual irregularity, thinning of scalp hair, postural fall or any cardiovascular accident in the past. The patient was initially put on medical management using a selective alpha receptor antagonist-Prazosin 8mg BD and a cardioselective Beta Blocker-Metoprolol 25mg OD. Due to her present symptoms she was admitted for surgical resection of tumor mass.

On examination all her vitals were found to be normal. On local examination, the abdomen was soft, relaxed, non tender and no guarding or rigidity was present. However, a solid firm mass was palpable in the left lumar region which was not mobile and non tender. Her BMI was 18.4 kg/m^2. His CECT abdomen showed a large well defined heterogenous iso to hypodense lesion with peripheral enhancing solid component, calcification and central non enhancing areas seen in the left suprarenal location with left adrenal gland not separately visualized. It measured 11.0 ×10.0 × 12.4 cm (AP × TR × CC). The mass effect was seen with anterior displacement of pancreas and inferior displacement of the left kidney. Mean attenuation of the lesion in non contrast scan is ~ 25.6 HU, in venous phase is ~ 40.3 HU & in delayed phase is ~ 38 HU. Absolute washout of lesion is ~ 15.6 %, intermediate. The lesion cannot be characterized by washout pattern in view of large central areas of necrosis. Her PET-Scan showed increased tracer uptake in a large heterogeneously enhancing solid cystic tissue mass (~11.8 × 9.1 cm, SUV Max 7.4) in the left suprarenal location which was described as Pheochromocytoma. No abnormal somatostatin receptor expressing lesion elsewhere in the body was seen.

Urine analysis of the patient was done [Table 1].

Table 1: Urine Analysis

Test	Result
Urine Metanephrine	2944.96 mcg/24hr
Urine Normetanephrine	>10000.00 mcg/24hr
Vanillylmandelic acid (VMA) in Urine	50 (normal <13.5)
Total Volume	2700ml

Blood reports show showed anemia, evelated serum cortisol levels (27.50mcg/dl), decreased Dehydroepiandosterone Sulphate (DHEA-S) levels (45.50mcg/dl) and serum testosterone levels of 8.5ng/dl. She had a normal thyroid profile. Her ECG showed sinus tachycardia with Left Ventricular Hypertrophy. The ECHO findings showed an ejection fraction of 30-35%, Mild concentric LVH, Dialated Cardiomyopathy, Moderate Left Ventricular Systolic Dysfunction and Mild Mitral Regurgitation. Expert opinions were taken from cardiologists and endocrinologists and the patient was put on Tablet Prazosin 5mg BD.

The patient was hemodynamically stabilized prior to surgery in the Anesthesia ICU and planned for surgery after optimal stabilization. In the ICU she was put on non invasive hemodynamic monitoring. She had persistent sinus tachycardia with orthostatic hypotension. For optimization she received medical management in the form of Tablet Amlodipine 5mg OD, Tablet Metoprolol 125mg (morning) and 100mg (night) dose which was increased to 150mg BD for rate control over the period of time. Infusion Dexmedetomidine

was also used for rate control and sedation in a dose of 0.2-0.7mcg/kg/hr not more than 24hrs. Tablet Prazosin 5mg BD was administered to the patient and her glycemic control was maintained using Injection Regular Insulin 6 units subcutaneous three times daily. She also received two blood transfusions for preoperative optimization of anemia.

After managing in the ICU, she was planned for routine surgical resection of the tumor via Laprotomy and Retroperitoneal Tumor Excision. She was kept fasting the night before surgery and premedication was given in the form Tablet Alrazolam 0.25mg, Infusion Dexmedetomidine and Tablet Metoprolol 125mg the night before surgery. She also received Injection Glargine 10 units the night before surgery. On the day of the surgery Tablet Prazosin was omitted and patient was taken inside the operating room with two wide bore i.v. cannula (16G &18G) in each hand and a running infusion of 0.9% Normal Saline at a maintainence dose. While inside the operating room all standard monitoring was attached and an arterial line was taken in the left radial artery and all baseline parameters were recorded. Her vitals showed rise in the Blood Pressure (224/112 mmHg) and tachycardia (HR- 104 beats/ min). A central i.v. line was also secured under aseptic conditions in the left Internal Jugular Vein and Central Venous Pressure was recorded (17.4 cmH2O). Epidural infusion (Ropivacaine 0.25% + Fentanyl) was started after placement of the epidural catheter in the T10-11 intervertebal space, fixed at 10cms. This was administered perioperatively at an infusion dose of 8-12 ml/hr. She was started on Dexmedetomidine infusion (0.5mcg/kg/hr) and Nitro-Glycerine (NTG) Infusion (0.25-0.5mcg/kg/minute) to provide sedation, control heart rate, decrease blood pressure and also reduce anesthetic requirement. An additional Sodium-Nitropruside (SNP) infusion diluted in Dextrose 5% in water (D5W) was used intermittently for not more than 10 min at a rate of 0.5-4mcg/kg/min to control hypertension. When the tumor was excised [Figure 1], the patient developed severe hypotension (IBP 78/44mmH), so infusion NTG was stopped and the patient was put on ionotropic support using infusion Nor-Adrenaline (0.05-0.3mcg/kg/min), Dopamine (5-8 mcg/kg/min) and Dobutamine (5mcg/kg/min). The surgery lasted for 5 hours during which she received two Packed Red Blood Cells (PRBC) blood transfusions. Her total blood loss was ~780ml and her urine output was ~ 360ml while maintaining a CVP of 11.8-17.4 cmH2O intra-operatively.

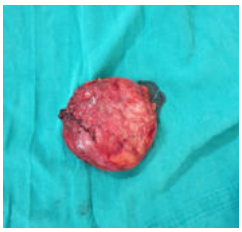

Figure 1: Tumor mass- Pheochromocytoma

Post operatively the patient was shifted to the Post Anesthesia Care unit (PACU) and was given continuous Ionotropic support, Epidural Infusion for analgesia and i.v. sedation (Inj. Dexmedetomidine). After monitoring in PACU she was shifted to the anesthesia ICU for post operative monitoring. She had transient paresis and numbness of the right lower limb in the immediate post-operative period, probably due to epidural infusion which subsided over the next few hours. While monitoring of vitals was carried out in the ICU she was weaned off from ionotropic support overnight and was further managed with IV fluids, antibiotics and Proton Pump Inhibitors (Inj. Pantoprazole 40mg BD). Post Operative analgesia was given using Epidural infusion for the next 24 hours. Deep Vein Thrombosis prophylaxis was started 6 hours after removing the epidural catheter using Inj. Enoxaparin 0.6ml subcutaneously. Hourly blood sugar monitoring was carried out for the first 12 hours (90-120mg/dl). Expert opinion was taken from Endocrinology and cardiology post operatively and the patient made an uneventful recovery. After 24 hours, the patient was eating and drinking normally, mobilizing well, wound was clean and vitals were within normal limits. She remained in the ICU for 72 hours. On discharge, the patient was voided well, advised to follow a proper diabetic diet, informed to contact hospital if any signs of sweating, palpitation and vomiting were observed. She was discharged with T. Prazosin 2 mg TDS, T. Glimepride 1mg in the morning and Tablet Metformin Sustained release 500 mg HS.

DISCUSSION

In this case we have clearly discussed the necessity of effective preoperative adrenoceptor blockade and other preventive procedures in pheochromocytoma tumor resection surgery patient. Our patient was experiencing intermittent sweating and palpitation suggestive of catecholamines excess, together with difficulty to treat hypertension should arouse immediate doubt of pheochromocytoma [3]. The biochemical confirmation of the presence of pheochromocytoma should be based on measurements of metanephrines in plasma or urine. Investigations of our patient showed an increase in metanephrines, which is precise as it is based on the constant adrenal activity of COM-T. The COMT converts catechola mines to metanephrines which occurs through both the COMT and the MAO pathways[4]. The elevated symptoms of Pheochromocytoma were managed using Non-Selective Alpha blocker and a Beta Blocker. These medications negate the effects of the excess hormones secreted by the pheochromocytoma, reducing the frequency and severity of dangerous blood pressure fluctuations perioperatively [8]. Prazosin was preferred over Phenoxy benzamine in this case since they have conservation of alpha-2 effect and lower incidence of post-operative hypertension [5]. Added therapy with beta blockers was used to counteract the tachycardia induced by nonselective alpha-blockade and also due to vasodilatation induced increase in heart rate [6]. As suggested by evidences, patient had normalized and expanded intravascular volume by infusing normal saline prior to surgical procedure so as to reduce post-operative hypotension [5]. Reducing anxiety prior to induction is essential to prevent trepidation from causing catecholamine surges. For this Tablet Alprazolam and Infusion Dexmedetomidine were used as pre-operatively prior to induction to reduce the hypertensive crisis [5].

CONCLUSION

The management of patients with pheochromocytoma begins from ample preoperative preparation, intraoperative monitoring and watchful follow-up during the postoperative period. Prognosisappears to be allied to tumor size, extent of uncontrolled HTN, and the existence of metastatic disease; it is good if the tumor is detected early to evade major complications linked to catecholamine excess.

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