ANESTHETIC MANAGEMENT OF PHEOCHROMOCYTOMA

- A Case Report -

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Introduction

Pheochromocytoma is pharmacologically volatile, potentially lethal catecholamine-containing tumor of chromaffin tissues[1]. The perioperative course and anesthetic management of patients with catecholamine-secreting pheochromoytoma has typically been reported only in small case series because of the infrequent incidence of these tumors[2]. In this report, we describe a successful management of a case of pheochromocytoma that underwent right adrenalectomy with favorable outcome.

Case Report

A 17 yr-old female patient presented to the Emergency Department complaining of night sweating, headache and lethargy. On physical examination, she had low-grade fever blood pressure 178/105 mmHg, raised jugular venous pressure (JVP) and audible systolic murmur over tricuspid area. Investigations revealed normal routine blood work. The patient was admitted to medical ward. The history was suggestive of pheochromocytoma for which she underwent all investigations. Vanillymandelic acid (VMA) 24-hr urine collection concentration was 76 mcmol/day (normal 5-25 mcmol/day). MRI of the abdomen which showed well defined large rounded mass seen in the left suprarenal gland measuring around 6.6 × 7 cm displacing the left kidney downward. The right suprarenal gland and liver are grossly unremarkable. Echocardiogram showed mild globular LV systolic dysfunction. The diagnosis of pheochromocytoma was made.

Patient was started on oral phenoxybenzamine 10 mg twice daily and oral amlodipine 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 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. The plan was to increase the oral dose of phenoxybenzamine gradually till start of full alpha-adrenergic blockade with postural hypotension.

Intravenous fluid hydration regimen was started with 1500 ml/day normal saline 0.9%. Five days later, she was reassessed and no postural hypotension was recorded. The dose of phenoxybenzamine was again increased to 40 mg twice daily with continuation on I.V hydration for another two days. At that time she clearly developed postural hypotension; supine blood; pressure range of 115-127/65-78 mmHg and standing blood pressure range of 84-90/48-60

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mmHg. ECG was done and showed sinus tachycardia with heart rate of 115 beats/min with no evidence of PVCs. The hematocrit dropped from 31 prior to 27 following intravenous hydration therapy. At that time the patient was cleared up for surgery.

Premedication was achieved with oral lorazepam 2 mg night before and 2 hr prior to surgery. Phenoxybezamine was continued as scheduled with no interruption. On the day of surgery in the operation room she was connected to routine non-invasive monitoring: five ECG leads, pulse oximeter and non-invasive blood pressure monitoring. Intravenous and arterial cannulations were performed following i.v. fentanyl 25 mcg under local anesthesia. Right internal jugular venous cannulation was performed after commencement of general anesthesia and after tracheal intubation.

The following drugs were readily available to use in case of emergency, sodium nitroprusside (SNP), phentolamine, noradrenaline and adrenaline infusions. Also level 1 pressure pump was standby in case of rapid volume hydration or blood transfusion required. SNP infusion pump was attached to one of the peripheral i.v. lines ready to be used when needed.

Induction of anesthesia started with i.v. lidocaine 100 mg, phentolamine 2 mg, labetalol 2.5 mg, fentanyl 150 mcg, propofol 120 mg and tracheal intubation was facilitated by i.v. rocuronium 40 mg. At induction of anesthesia the blood pressure was 115/82 mmHg and at tracheal intubation it was 105/70 mmHg. Before skin incision i.v. SNP infusion was started at a rate of 0.5-0.75 μg/kg/min.

During surgery central venous pressure (CVP) increased from 6 to around 12-14 cm H_2O with fluid infusion at a rate of 10-15 ml/kg/hr of colloids and crystalloids. The patient tolerated the whole procedure well, with minimal fluctuation of the blood pressure except at the time of ligation of the last blood supply of the tumor where she developed severe hypotension which was successfully managed with i.v. fluids and i.v. phenylephrine 150 mcg in two doses. After completion of surgery and before tracheal extubation epidural catheter was inserted at level of L1-2 for postoperative analgesia. Reversal was given in form of neostegmine 2.5 mg and atropine 1 mg and trachea was extubaed.

Patient was transferred fully awake to surgical intensive care unit (SICU) with stable vital signs. She made uneventful recovery and two days later she was discharged to regular surgical ward. Histopathology of the right adrenal gland confirmed the diagnosis of pheochromocytoma.

Discussion

Pre-operative assessment of patients with pheochromocytoma is an essential part in management[3,4]. Although alpha – blockade is not universally considered as absolute necessity, other investigators recommended proper alpha1-receptor blockade[5,6,7]. In our case, we have used high dose alpha-adrenergic blockade prior to surgery and our target was the development of postural hypotension in order to ensure full blockade.

Roizen et al 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[7]. In our case we strictly adhered to Roizen's criteria.

Preoperative alpha-adrenergic blockade is usually achieved by using phenoxybenzamine, although newer generation of selective alpha-blocker have been used which carry several advantages compared to phenoxbenzamine: they do not produce reflex tachycardia, have shorter half life, so dosage can be adjusted rapidly, such that preoperative and postoperative hypotension should be less[8]. Prazocin and terazocin may be considered.

Preoperative beta-blockade is usually not necessary unless the patient has an epinephrine secreting tumor. This is because cardiac alpha2-receptors are not antagonized by the usual preoperative alpha-adrenergic blockade.

The etiology of hypotension following tumor resection may be due to inadequate intravascular volume replacement, residual effects of preoperative alpha-receptor blockade or hemorrhage[9]. In the present case severe hypotension occurred at ligation

of the vascular supply of the tumor upon removal of the right adrenal gland. Fluids should be considered as the first line of mangement in these patients because they require large amounts of fluid after tumor resection[8]. Management of hypotension by fluids replacement is believed to be a factor for lowering operative mortality[10]. Vasopressors are ineffective in hypovolemic state[9]. If vasopressors have to be used, norepinephrine and phenylephrine are preferred[11]. We used both fluids and phenylephrine during severe hypotension with immediate favorite response.

In conclusion, we believe that early involvement of anesthetist in the management of pheochromocytoma patient is the cornerstone for better outcome. In this case report we confirmed that adherence to Roizen's criteria can lead to successful perioperative management of such cases.

References

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