

Phaeochromocytoma during pregnancy: anaesthetic management for a caesarean section combined with bilateral adrenalectomy

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Introduction

Phaeochromocytoma in pregnancy is associated with high maternal and neonatal mortality rates. Recently, improved management and antenatal diagnosis have reduced the maternal mortality rate below 1% and neonatal mortality rate below 15% respectively [1].

Case report

A 47-year old primigravida presented with headache and widely fluctuating blood pressure. Urinary vanillyl mandelic acid (VMA) was 44 ng/dl (normal range 1-13 ng/dl) and magnetic resonance imaging (MRI) showed 6×5.5×6 cm mass in the left supra renal and 2.8×2×2 cm mass in the right supra renal areas.



Figure 1. MRI showing 2 masses in left and right suprarenal areas.

Oral phenoxybenzamine 10 mg thrice daily was commenced followed by atenolol 50 mg twice daily. Elevated blood glucose was managed with diet control. Other investigations were normal. Elective Caesarean

section plus bilateral adrenalectomy was scheduled at 37 weeks. Preoperatively blood pressure was 140/90 mmHg, ECG showed no ventricular ectopics or ST/T wave changes and she had nasal congestion, thereby meeting Roizen's criteria [2]. Airway assessment showed Mallampati class IV. Physical examination was otherwise unremarkable. Preoperative preparation included six hours fasting, antacid and prokinetic agents. The morning doses of phenoxybenzamine and atenolol were administered.

Intraoperatively, the initial non-invasive blood pressure measurement was 180/100 mmHg. A thoracic epidural catheter was placed. Direct arterial blood pressure, 5 lead ECG and pulse oximetry were monitored. Capillary blood sugar was measured hourly. Preoxygenation followed by modified rapid sequence induction with magnesium sulphate 1.8g (40 mg/kg) i.v was done. Following induction with thiopentone sodium, cricoid pressure was applied, suxamethonium was administered and the trachea intubated. Epidural infusion of 0.1% bupivacaine with 2 mcg/ml fentanyl (4 ml/hour) was commenced. Co-amoxiclavulanic acid 1.2 g and hydrocortisone 100 mg were administered i.v. Lower segment Caesarean section was commenced. A magnesium sulphate infusion (1 g/hour) was started via a central line. Hartmann's solution was infused to maintain a central venous pressure (CVP) of 10-12 mmHg. Vecuronium was the muscle relaxant used. The blood pressure remained stable. A live baby was delivered. Syntocinon 5 units was given as a slow i.v bolus followed by an infusion.

Dissection for left adrenalectomy commenced and the blood pressure reached 180/100 mmHg. Isoflurane concentration, magnesium sulphate and epidural infusions were increased to 3%, 2 g/hour and 8 ml/hour respectively. The left adrenal gland and large tumour were removed. Clamping of the right adrenal vein effected a decrease in blood pressure to 80/40 mmHg. The magnesium sulphate infusion was omitted, epidural infusion reduced (4 ml/hour), 500 ml of tetrastarch was infused to increase the CVP to 10 mmHg and a noradrenaline infusion (0.2 mcg/kg/min) was commenced. The blood pressure increased to 110/70 mmHg.

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Figure 2. Left adrenal gland and mass.



Figure 3. Left adrenal gland and mass after excision.

On completion of the surgery, muscle paralysis was reversed. Once fully awake and breathing, the patient was extubated and transferred to the intensive care unit (ICU) where vital parameters and capillary blood sugar were closely monitored. Noradrenaline was tailed off. Hydrocortisone 50 mg i.v was given six hourly until oral hydrocortisone and fludrocortisone were commenced. The patient remained stable.

Discussion

Phaeochromocytoma in pregnancy is rare [2]. As there is currently no consensus on optimum timing of surgery, the decision should be individualized and made by a multidisciplinary team [3].

After 24 weeks, surgical access is limited by uterine size, unless the fetus is delivered first. Therefore medical management with alpha blockade is commenced followed

by delivery of the fetus once viable, unless maternal or fetal compromise is noted earlier [2]. Combined delivery and tumour resection or delayed tumour resection post-partum following nuclear imaging techniques have both been described [3, 4]. In this case our team decided to perform combined caesarean section and adrenalectomy after two weeks of alpha blockade.

Magnesium sulphate reduces catecholamine release from both the adrenal medulla and peripheral adrenergic nerve terminals [5]. Furthermore it is an alpha adrenergic antagonist in the setting of high dose epinephrine infusions [3]. Its successful use has been described during resection of phaeochromocytoma as well as in phaeochromocytoma crisis [3]. The combination of the extradural and alpha blockade in patients undergoing caesarean section and resection of phaeochromocytoma has been shown to prevent hypertensive responses [6]. Thus we combined alpha blockade, general anaesthesia, epidural block and a magnesium sulphate infusion for our patient. This resulted in stable haemodynamics until tumour handling commenced when the blood pressures began fluctuating. Using higher infusion rates of magnesium sulphate (2 g/hr) along with boluses (2 g) and maintaining a higher CVP may have prevented the hyper and hypotensive responses which occurred in our patient.

The combined use of alpha blockade, epidural analgesia, general anaesthesia and magnesium sulphate infusion was associated with relatively stable haemodynamic parameters and provided a successful outcome for this patient undergoing caesarean section and adrenalectomy.

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