Case Report

Anaesthetic management for emergency caesarean section in a patient with an untreated recently diagnosed phaeochromocytoma

Address for correspondence:
Mr. Puneet Khanna,
Room No. 38, Hostel
No. 6, All India Institute
of Medical Sciences,
New Delhi - 110 029, India.
E-mail: k.punit@yahoo.com

Access this article online

Website: www.ijaweb.org

DOI: 10.4103/0019-5049.90622

Quick response code

Anil Agarwal, Puneet Khanna, Suryakumar Narayanawamy, Ganga Prasad, Anuradha Borle

Departments of Anaesthesia and Intensive Care, All India Institute of Medical Sciences, New Delhi, India

ABSTRACT

Phaeochromocytoma is a rare cause of hypertension during pregnancy with potentially fatal consequences. If not detected and treated early in pregnancy, it is catastrophic for both the mother and the baby. Management requires close co-ordination between the obstetrician, anaesthesiologist, paediatrician and the endocrinologist. Perioperative management for an emergency caesarean section in a parturient with untreated phaeochromocytoma is an anaesthetic challenge and no standard recommendations have been reported till date. In this case report, we present anaesthetic management in such a case with successful maternal and foetal outcome.

Key words: Emergency caesarean section, magnesium sulphate, phaeochromocytoma

INTRODUCTION

Phaeochromocytoma may mimic the usual symptoms and signs of preeclampsia, either as simple hypertension or as fulminant eclampsia. Early recognition and optimisation is crucial to favourable maternal and foetal outcome. If the diagnosis is confirmed before 24 weeks gestation, medical management is initiated and the tumour should be excised after adequate adrenergic blockade. After the 24th week, the pregnancy is usually allowed to continue until foetal maturity is attained and hypertension controlled with adequate alpha followed by beta blockade. There is little evidence regarding anaesthetic technique for emergency caesarean section in untreated phaeochromocytoma diagnosed just recently.

CASE REPORT

A 20-year-old primigravida at 38 weeks of gestation presented at the emergency department with a hypertensive crisis. An urgent lower segment caesarean section (LSCS) was planned by the obstetrics team and anaesthetic consultation was sought for it. Her antenatal history revealed spontaneous conception with no complications in the first trimester. During her antenatal visit in the 18th week of gestation, hypertension was detected without any other feature of pre-eclampsia. She was advised Methyldopa 500 mg thrice daily and Nifedipine 10 mg twice daily, but she did not take them regularly. She had occasional headache and palpitation, but did not seek any medical advice. In the 37th week, she started having frequent episodes of headache and dizziness. She resumed her anti-hypertensive and was admitted for LSCS at a private hospital where her blood pressure (BP) was found to be 220/130 mm Hg. Her ultrasound abdomen revealed an adrenal mass lesion (5.6 × 3.9 cm cystic lesion) suggestive of a phaeochromocytoma and she was referred to our tertiary care facility. On admission, she had palpitation and headache, her blood pressure was 200/120 mm Hg, heart rate 110/min with no evidence of non-reassuring foetal heart rate pattern. Her investigations done at the previous hospital revealed Hb 10 gm/dl, platelets 3.52 lakhs/mm^3, and normal renal and liver function tests. Electrocardiogram suggested sinus tachycardia and left ventricular

How to cite this article: Agarwal A, Khanna P, Narayanawamy S, Prasad G, Borle A. Anaesthetic management for emergency caesarean section in a patient with an untreated recently diagnosed phaeochromocytoma. Indian J Anaesth 2011;55:614-7.

hypertrophy with no ST-T changes. Urine dipstick examination showed proteinuria (3+) and glycosuria, and fundoscopy suggested grade 4 hypertensive retinopathy with early papilloedema. Subsequent foetal cardiotocograph revealed nonreassuring heart rate pattern. The decision for an emergency LSCS was made by the obstetrician.

Informed high risk consent was obtained from the patient in view of recently diagnosed phaeochromocytoma, an unoptimised hypertensive crisis, and need for postoperative stay in the intensive care unit. Anti-aspiration prophylaxis was given with ranitidine 150 mg intravenous (i.v) before shifting to the operation theatre. Emergency arrangements including invasive monitoring and vasodilator infusions were made in the operating room. The paediatrician was informed regarding planned modified rapid sequence induction with fentanyl and possible need for neonatal resuscitation. Oxygen supplementation was continued. Pre-induction, right radial artery and internal jugular vein were cannulated for haemodynamic monitoring after local anaesthetic infiltration and aseptic precautions. Her baseline central venous pressure was16 mm Hg and BP was 186/120 mm Hg, with a heart rate of 108/min. Magnesium sulphate 2 g i.v. was administered. Pre-oxygenation was started. Fentanyl 100 μg was given i.v., followed by two more boluses of 50 μg each at 3-min intervals. Her BP decreased to 160/100 mm Hg. Subsequently, lignocaine 80 mg i.v. was administered. Anaesthesia was induced with thiopentone titrated to loss of eyelash reflex and succinylcholine 100 mg was given to facilitate tracheal intubation. Cricoid pressure was maintained throughout induction till bilateral air entry was confirmed. BP remained 150/92 mm Hg at intubation. Anaesthesia was maintained with O2 and N2O (50% and 50%) with isoflurane, to attain a minimum alveolar concentration (MAC) of 0.7, and atracurium in bolus of 7.5 mg when the patient had respiratory efforts. After the delivery of the baby, isoflurane was decreased and N2O increased to 60%. A 2.25 kg weight baby was delivered after 6 min which cried immediately at birth with an Apgar score of 9. Oxytocin, 10 units, was administered as a slow infusion. Nitroglycerine (NTG) infusion had to be started immediately after delivery at 1 μg/kg/min as the BP increased to 200/126 mm Hg and was titrated to a mean arterial pressure of 95–100 mm Hg approximately. Residual neuromuscular block was reversed with neostigmine and glycopyrrolate. Diltiazem 10 mg was administered before extubation to blunt the response. The patient was awake and comfortable after extubation and NTG infusion continued while the patient was shifted to the intensive care unit (ICU) for postoperative monitoring and haemodynamic management. Urinary catecholamine levels were sent for confirming the diagnosis. She was started on prazosin 2.5 mg thrice daily and NTG infusion stopped. She was shifted to ward and prazosin dose titrated as per the endocrinologist's opinion to 3 mg four times a day and atenolol 50 mg once daily was added after 2 weeks. Meanwhile, the magnetic resonance imaging (MRI) of her abdomen revealed a multiloculated solid cystic lesion (T2 hyperintense) in right adrenal gland and she was referred to the surgical unit for resection of phaeochromocytoma after a week of beta blockade as her blood pressures were optimised by that time.

DISCUSSION

Phaeochromocytoma is an infrequent catecholamine-producing tumour with a reported incidence of less than 0.2 per 10,000 pregnancies.[1] However, unrecognised phaeochromocytoma carry a high risk of mortality for both mother and foetus. It may cause potentially fatal hypertensive crises precipitated by catecholamine surge during vaginal delivery, the mechanical effects of the gravid uterus, uterine contractions and even vigorous foetal movements.[2] Antenatal recognition and subsequent pharmacological or surgical therapy is important for better maternal and foetal outcome. Management requires close co-ordination between the obstetrician, anaesthesiologist, paediatrician and the endocrinologist. If the diagnosis is confirmed before 24 weeks gestation, medical management is initiated and the tumour should be excised after adequate adrenergic blockade (prazosin with or without beta blockers).[2] After the 24th week, the pregnancy is usually allowed to continue until foetal maturity is attained and hypertension controlled with adequate alpha followed by beta blockade. Elective caesarean section followed by removal of the tumour should subsequently be performed in the third trimester.[1] MRI is the ideal localising technique during pregnancy as it does not employ ionising radiation. Meta-iodo benzyl guanidine (MIBG) scintigraphy scanning is preferably avoided except in cases where there is dissociation between the clinical presentation and MRI results.

Phaeochromocytoma may mimic the usual symptoms and signs of preeclampsia, either as simple hypertension or as fulminant eclampsia.[3] Most patients present with paroxysmal or sustained hypertension, palpitations,

severe anxiety, headache, vomiting and vasomotor phenomena. The incidence of visual complaints and convulsions is increased in pregnant patients. Hypertension is seldom accompanied by oedema or proteinuria, while glycosuria is often present. In our patient also, the hypertension was attributed to pre-eclampsia in her earlier antenatal visits, precluding preoperative optimisation with adrenergic blockade, and she was started on methyldopa and nifedipine. Phaeochromocytoma was diagnosed only hours before the caesarean section.

There are a few reports on the management of anaesthesia for caesarean section in patients with antenatally diagnosed phaeochromocytoma after adequate adrenergic blockade or for antihypertensive therapy in phaeochromocytoma diagnosed after delivery.[4,5]

Most of the available literature suggests use of general anaesthesia for resection of phaeochromocytoma subsequent to elective caesarean section in patients receiving anti-hypertensive therapy. There is little evidence regarding anaesthetic technique for emergency caesarean section in untreated phaeochromocytoma diagnosed just recently. Regional anaesthesia (spinal anaesthesia or combined spinal epidural technique) has been used successfully in patients with severe pre-eclampsia, undergoing caesarean section.[6,7] However, there are no reports of the use of neuraxial anaesthetic techniques solely in emergency surgeries (unrelated to excision of tumour) in patients with phaeochromocytoma. The patient in our case report was diagnosed with phaeochromocytoma very recently and the need for an emergency caesarean section ruled out the possible rapid pre-operative preparation with anti-hypertensive drugs. We, therefore, preferred to select general anaesthesia in this patient in order to attain easy titration of haemodynamics intraoperatively.

Maintaining stable haemodynamics during induction and abolition of adrenergic response to intubation were our primary goals in this case. In phaeochromocytoma, prolonged exposure to high circulating norepinephrine concentrations results in a marked decrease in circulating blood volume and induction of anaesthesia may cause precipitous hypotension. Catecholamine-induced cardiomyopathy is frequently associated with the tumour and may also be responsible for hypotension at induction along with haemodynamic instability leading to heart failure. Pulmonary oedema and acute heart failure secondary to undiagnosed phaeochromocytoma has been reported in pregnant patients.[8,9] Hence, we instituted pre-induction invasive monitoring, a modified rapid sequence induction technique using gradual increments of fentanyl (total 4 μg/kg), thus necessitating a lesser dose of thiopentone (150 mg). We could avoid any precipitous drop in blood pressure at induction. Intravenous fluid administration was titrated according to the central venous pressure.

Rapid preoperative preparation with magnesium sulphate and labetalol is reported in non-pregnant patients with phaeochromocytoma.[10] It is preferred based on the ability to inhibit the release of catecholamines from the adrenal medulla, to reduce the sensitivity of the alpha adrenergic receptors to catecholamines, powerful anti-arrhythmic effects and a direct vasodilator effect. Magnesium acts as a calcium antagonist. Calcium plays a fundamental role in stimulus–response coupling of catecholamine release from the adrenal medulla and adrenergic nerve terminals. Hence, we chose to use magnesium sulphate pre-induction in this patient with hypertensive crisis due to untreated phaeochromocytoma.

Magnesium sulphate (2 g), lignocaine (80 mg) and fentanyl (200 μg) in combination successfully blunted the intubation response in this case. Alfentanil, magnesium, a combination of both and lidocaine have all been used to reduce the adrenergic response to intubation in parturients with gestational hypertension.[11,12] Alfentanil has been shown to cause the least change in heart rate, while magnesium and alfentanil in combination produced better control of arterial pressure and heart rate than magnesium alone. Alfentanil was not available at our operation theatre. The possibility of foetal depression with increased dose of fentanyl required to blunt the intubation response was kept in mind and communicated to the neonatologist before the start of the surgery.

Oxytocin bolus may cause hypotension and tachycardia, so we administered it as a slow infusion. Fundal pressure was avoided during the delivery of the baby intraoperatively as it might lead to a catecholamine surge due to mechanical effects. Calcium channel blockers have been used in perioperative management of phaeochromocytoma as they block norepinephrine mediated calcium influx into vascular smooth muscle, thereby controlling hypertension and tachyarrhythmias. Hence, we used

diltiazem to minimise the haemodynamic response during extubation.

CONCLUSION

Phaeochromocytoma is a rare, potentially life-threatening cause of hypertension during pregnancy. The diagnosis should be kept in mind in parturients with paroxysmal hypertension or suspected pre-eclampsia not responding to the usual anti-hypertensive regimen so as to facilitate early recognition and optimisation and to avoid a hypertensive crisis necessitating an emergency caesarean section. In such cases with untreated phaeochromocytoma, vigilant invasive monitoring and use of magnesium sulphate, opioids and calcium channel blockers seem to be crucial for the successful outcome.

REFERENCES

1. Oliva R, Angelos P, Kaplan E, Bakris G. Pheochromocytoma in pregnancy: A case series and review. Hypertension 2010;55:600-6.
2. Bullough A, Karadia S, Watters M. Phaeochromocytoma: An unusual cause of hypertension in pregnancy. Anaesthesia 2001;56:43-6.
3. Hudsmith JG, Thomas CE, Browne DA. Undiagnosed phaeochromocytoma mimicking severe preeclampsia in a pregnant woman at term. Int J Obstet Anesth 2006;15:240-5.
4. Hamilton A, Sirrs S, Schmidt N, Onrot J. Anaesthesia for phaeochromocytoma in pregnancy. Can J Anaesth 1997;44:654-7.
5. Strachan AN, Claydon P, Caunt JA. Phaeochromocytoma diagnosed during labour. Br J Anaesth 2000;85:635-7.
6. Teoh WH, Sia AT. Ultra-low dose combined spinal-epidural anaesthesia for caesarean section in severe pre-eclampsia. Anaesthesia 2006;61:511-2.
7. Chaudhary S, Salhotra R. Subarachnoid block for caesarean section in severe preeclampsia. J Anaesth Clin Pharmacol 2011;27:169-73.
8. Gill PS. Acute heart failure in the parturient - do not forget phaeochromocytoma. Anaesth Intensive Care 2000;28:322-4.
9. Golshevsky JR, Karel K, Teale G. Phaeochromocytoma causing acute pulmonary oedema during emergency caesarean section. Anaesth Intensive Care 2007;35:423-7.
10. Poopalalingam R, Chin EY. Rapid preparation of a patient with pheochromocytoma with labetolol and magnesium sulfate. Can J Anaesth 2001;48:876-80.
11. Allen RW, James MF, Uys PC. Attenuation of the pressor response to tracheal intubation in hypertensive proteinuric pregnant patients by lignocaine, alfentanil and magnesium sulphate. Br J Anaesth 1991;66:216-23.
12. Ashton WB, James MF, Janicki P, Uys PC. Attenuation of the pressor response to tracheal intubation by magnesium sulphate with and without alfentanil in hypertensive proteinuric patients undergoing caesarean section. Br J Anaesth 1991;67:741-7.

Source of Support: Nil, **Conflict of Interest:** None declared