Intrapartum adrenalectomy for pheochromocytoma presenting in pregnancy: A case report

Paul Naseef[1]

[1]Ain Shams University Faculty of Medicine

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Abstract

Pheochromocytoma occurs in 1 in every 50,000 hypertensive pregnant lady. Antenatal diagnosis is critical to reduce maternal and perinatal mortality rates. Here, we describe a patient diagnosed with pheochromocytoma at 35 weeks with an atypical presentation of right flank pain and seizures, her preoperative optimization and intra-partum surgical management.

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Paul Naseef, MD

Obstetrics and Gynecology Department, Ain Shams University, Cairo, Egypt

Correspondence

Paul Naseef, ORCID: 0000-0003-4279-5844

Obstetrics and Gynecology Department, Ain Shams University, Cairo, Egypt

Email: paulabeh@hotmail.com

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ABSTRACT

Pheochromocytoma occurs in 1 in every 50,000 hypertensive pregnant lady. Antenatal diagnosis is critical to reduce maternal and perinatal mortality rates. Here, we describe a patient diagnosed with pheochromocytoma at 35 weeks with an atypical presentation of right flank pain and seizures, her preoperative optimization and intra-partum surgical management.

KEYWORDS

Pheochromocytoma, adrenal mass, hypertension

INTRODUCTION

Pheochromocytoma is a catecholamine-secreting tumour that arises from the medullary portion of the adrenal gland or the sympathetic ganglia's chromaffin cells. It is one of the causes of secondary hypertension that affects 0.2 to 0.4% of people and can cause a severe or fatal hypertensive crisis. During pregnancy, it affects about 1 in 50,000 of women. A timely diagnosis and adequate care of this condition can reduce maternal and fetal mortality and morbidity from over 50% to less than 5% and 15%, respectively [1] .

When significant hypertension arises before 20 weeks of pregnancy and blood pressure (BP) is labile with episodic headaches, palpitations, or sweating, pheochromocytoma should be one of the top differential diagnoses [2] .

However, pheochromocytoma may not show any signs or symptoms during pregnancy, and is far less common than other causes of hypertension in pregnant women. Specific symptoms including paroxysmal sweating, palpitation, and blood pressure crises are also likely to be less prevalent in pregnant women than in non-pregnant women. According to a review of the literature, 90 % of pregnant women experience pheochromocytoma symptoms just before delivery[3] .

The diagnosis is usually established by detecting high levels of catecholamines and their metabolites in plasma and urine. Where the fetus must be protected, ultrasonography and magnetic resonance imaging (MRI) are the most suitable modalities of tumour localization during pregnancy. Pheochromocytoma is treated medically with alpha-adrenergic blockade to regulate hypertension and beta-adrenergic blocker to treat tachycardia and cardiac dysrhythmias. The only way to cure pheochromocytoma is to remove the tumour surgically[4] .

CASE REPORT

At 35 weeks and two days gestation, a 28-year-old previously healthy pregnant lady (gravida 2, para 1) presented to the obstetrical triage of our tertiary care centre with one-week onset of severe hypertension (>160/110 mmHg). She reported having previous episodes of moderately high BP dating back to 25 weeks gestation that required no treatment. She saw her primary care provider, 1 week before, complaining of headache and right flank pain. Her BP was found to be 165/110 mmHg. A series of investigations, including a CBC, electrolytes, BUN, creatinine, liver enzymes and a random urine protein creatinine ratio which all came back within normal range. A presumed diagnosis of pregnancy-induced hypertension was made and she was prescribed Labetalol 200 mg BID. An obstetrical ultrasound and umbilical artery (UA) Doppler were done and showed no signs of fetal growth restriction (FGR). Her follow-up plan was twice daily BP measurement, twice weekly antenatal visits and planned delivery at 38 weeks.

However, her BP was still labile on the given dose of Labetalol and her right flank pain persisted, so an abdominal ultrasound was done to rule out renal pathology. Surprisingly, the ultrasound showed a heterogeneous right suprarenal solid mass measuring 6 x 4.5 cm as shown in**figure (1).** The patient was referred by her physician to our hospital. Her BP upon presentation was fluctuating between 200/120 mmHg above and 110/80 mmHg below. CBC, coagulation profile, liver profile, electrolytes, urea, and creatinine were all normal. Urinary proteins were 165 mg/24 hours, all of which made the diagnosis of preeclampsia unlikely. Pheochromocytoma was suspected given the labile nature of the patient's blood pressure (BP) and the suprarenal mass discovered in ultrasound. 24-hour urine collection was sent for metanephrine and vanillylmandelic Acid (VMA) to confirm the diagnosis which came back markedly elevated being 703 µmol/day and 82 µmol/day respectively. This was followed by an abdominal MRI, revealing a 5.5 x 4 cm right adrenal mass, a normal left adrenal gland, and no extra-adrenal tumours were discovered.

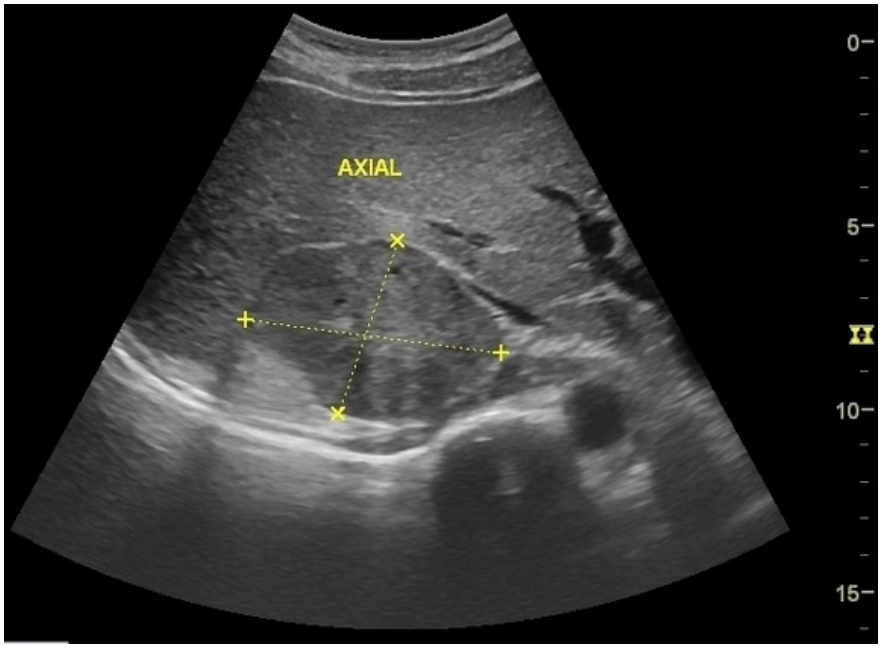

Figure (1): Abdominal ultrasound showing a right suprarenal mass

The patient was admitted to the obstetrical intensive care unit (ICU) for close monitoring of her blood pressure. The decision was to deliver the patient via Caesarean section in the attendance of general surgery team for concurrent adrenalectomy, after optimization of her BP with alpha-adrenergic blockade using Phenoxybenzamine 30 mg TID and subsequent beta-blockade with Metoprolol 50 mg BID for 14 and 10 days respectively. Patient's past medical history and family history were negative for features suggestive of multiple endocrine neoplasia (MEN) syndromes.

On the night of the scheduled surgery, the patient developed a generalized tonic clonic (GTC) seizure that was aborted by 2 mg of Lorazepam. There were no post-ictal neurological lateralizing signs and urgent CT brain was done to rule out intracranial hemorrhage and was negative. MRI stroke protocol was also done and revealed no signs suggestive of ischemic stroke. Possible metabolic causes of seizures were also excluded. Exceptionally, as reported in a few cases in the literature, seizures were found to be a rare presenting symptom of pheochromocytoma. Thus, this episode may have directly been related to the patient's condition.

After optimization of the patient's condition, Caesarean section via midline skin incision with intrapartum adrenalectomy was performed under general anesthesia (GA). A #20 gauge radial arterial line, PAC, and 5-lead ECG were used for intra-operative monitoring. Prior to being induced, Remifentanil (0.1 mcg/kg/min) with Nitroprusside (0.5 mcg/kg/min) were commenced for baseline BP control. Intermittent BP fluctuations were also controlled by boluses of Labetalol 10 mg IV (total 40 mg) (systolic BP 175 mmHg lowered to 115 mmHg pre-induction). The patient was wedged in a position where her uterus was displaced to the left. A 5-mg defasciculating dose of Rocuronium was given, and after three minutes of pre-oxygenation, a rapid sequence induction with 100 mg Lidocaine, 280 mg thiopental, and 120 mg succinylcholine was conducted under cricoid pressure.

After delivery of the baby, closure of the uterus and ensuring haemostasis, general surgery team scrubbed in and performed right adrenalectomy via an open transabdominal approach upon which there was a dramatic decline in patient's BP to 95/60 mmHg necessitating the discontinuation of Nitroprusside infusion. The patient was transferred back to the ICU for postoperative care. The excised right adrenal gland was sent for histopathological examination and the results came back consistent with the diagnosis of benign pheochromocytoma. The patient had a smooth postoperative course with normalization of her BP. She was

discharged home 6 days following the surgery.

DISCUSSION

Pheochromocytoma is a rare cause of hypertension during pregnancy occurring only in 1 in 50,000 cases and may be clinically challenging to differentiate from preeclampsia because hypertension and headache occur with both disorders. It is a catecholamine-producing tumor arising from chromaffin cells of medullary region of adrenal gland or sympathetic ganglia. Symptoms specific to pheochromocytoma include paroxysms of generalized sweating, palpitations, tremor, pallor, shortness of breath, generalized weakness, and panic attack-type symptoms. Some women with pheochromocytoma have an elevated blood glucose level (impaired fasting glucose, apparent type 2 diabetes mellitus). Our patient had an atypical presentation which was right flank pain. She also developed seizures which is one of the uncommon presentations of pheochromocytoma. Overall, antenatal diagnosis of the condition is crucial because intrapartum maternal and fetal mortality are high without appropriate treatment[5] .

While the diagnosis of preeclampsia may overlap with pheochromocytoma presenting in pregnancy, the distinguishing feature is that preeclampsia usually develops after 20 weeks gestation and is associated either with proteinuria or evidence of end-organ damage whereas pheochromocytoma may present at any time throughout the entire pregnancy and is rarely associated with proteinuria [6] . In this case, the patient presented late in pregnancy, around 35 weeks gestation, her 24-hour urine collection was negative for proteinuria and her investigations did not show any evidence of end-organ damage.

A review of literature has shown that 10% of pheochromocytomas are bilateral, 10% of them are extra-adrenal in origin and 10% are malignant. They may be part of multiple endocrine neoplasia (MEN type IIa) syndrome and, if it is the case, the patient should be screened for medullary cell carcinoma of the thyroid and parathyroid adenomas by measuring serum calcitonin and parathyroid hormone (PTH) levels respectively [7] . Our patient's tumor was unilateral (right side), adrenal in origin and benign in nature, as per postoperative histopathological examination. MEN syndrome was ruled by taking the patient's past medical and family histories.

The diagnosis of pheochromocytoma is made by the detection of elevated 24-hour urinary levels of catecholamines (norepinephrine, metanephrines and vanillylmandelic acid) and/or raised plasma catecholamines. Non-specific assays may give false-positive results if the patient is on alpha-methyldopa or labetalol and screening should ideally be performed before antihypertensive therapy is started. Once the diagnosis has been confirmed, CT, ultrasound and MRI offer the best methods for localizing the tumor, although the latter two are preferable in pregnancy. However, MIBG (131I-meta-iodobenzylguanidine) scan to localize norepinephrine uptake is contraindicated in pregnancy [8] .

When pheochromocytoma presents in pregnancy, there is a greatly increased maternal and fetal mortality rate, especially if, as in up to 50% of cases, the diagnosis is not made antenatally, as potentially fatal hypertensive crises may be precipitated by labor, vaginal or abdominal delivery, general anesthesia or opiates. Hypertensive episodes may occur in pregnancy even when patient is in supine position owing to the pressure caused by the gravid uterus on the tumor. The main causes of maternal mortality are arrhythmias, cerebrovascular accidents or pulmonary edema. Its rate may reach up to 17% in undiagnosed cases while it is only about 4% in diagnosed cases. On the other hand, the perinatal mortality rate is about 26% in undiagnosed cases and 11% in diagnosed cases [9] .

The only curative option for pheochromocytoma is surgical removal of the tumor, either open or laparoscopic. The optimal timing for that depends on the gestational age at which the diagnosis is made. There is an increasing vogue to delay tumour resection until the puerperium. If pharmacological blockade, ideally with α-blockade with phenoxybenzamine, prazosin or doxazosin to control hypertension followed by β-blockade, if required, to control tachycardia, has been achieved prior to 23 weeks' gestation, then resection may be performed in pregnancy especially if the tumor is small. If the pregnancy is more than 24 weeks' gestation, then surgery becomes more hazardous and should be delayed until fetal maturity, when caesarean section with concurrent or delayed tumour removal is undertaken [10] .

Expert anaesthetic care is necessary in dealing with these cases and both perinatal and maternal mortality rates have improved significantly since the advent of α-blockade, which should be given for at least 3 days prior to the surgery. IV Phenoxybenzamine must be available for caesarean section. In an emergency if IV α-blockade is not available, then IV labetalol is the appropriate alternative[11] .

CONCLUSION

Despite the fact that pheochromocytoma is uncommon cause of hypertension, particularly in pregnancy, our case emphasized the importance of early diagnosis and prompt medical optimization of this condition prior to surgery. Satisfactory maternal and fetal outcomes can be achieved with the help of expert anesthesia and pediatric teams. Our case also showed that pheochromocytoma can present atypically with flank pain and seizures.

AUTHOR CONTRIBUTION

The author was involved in data collection, interpretation, drafting the article, revision of the manuscript, and the final approval of the version to be published.

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None.

CONFLICT OF INTEREST

The author declares no conflict of interest.

ETHICAL APPROVAL

This case report was approved by the Research Ethics Committee (REC) of Faculty of Medicine, Ain Shams University.

CONSENT

Written informed consent was obtained from the patient to publish this report in accordance with the journal's patient consent policy.

REFERENCES

1. Biggar, M.A. and Lennard, T.W. (2013) Systematic review of phaeochromocytoma in pregnancy. *Br J Surg* , 100, 182–190.
2. Kamoun, M., Mnif, M.F., Charfi, et al. (2014) Adrenal diseases during pregnancy: Pathophysiology, diagnosis and management strategies.*Am J Med Sci,* 347(1), 64–73.
3. Van der Weerd, K., Van Noord, C., Loeve, M., et al. (2017) Endocrinology in pregnancy: Pheochromocytoma in pregnancy: Case series and review of literature. *Eur J Endocrinol,* 177(2), R49–R58.
4. Freier DT, Thompson NW. Pheochromocytoma and pregnancy: the epitome of high risk. Surgery 1993; 114: 1148–52.
5. Tranquilli AL, Dekker G, Magee L, et al. (2014). The classification, diagnosis and management of the hypertensive disorders of pregnancy: A revised statement from the ISSHP. *Pregnancy Hypertens;* 4:97.
6. Harrington JL, Farley DR, van Heerden JA, Ramin KD. (1999) Adrenal tumors and pregnancy. *World J Surg;* 23: 182–6.
7. Lefebvre, M., & Foulkes, W. D. (2014). Pheochromocytoma and paraganglioma syndromes: genetics and management update. *Current Oncology,* 21(1), e8.
8. Widimský Jr, J. (2006). Recent advances in the diagnosis and treatment of pheochromocytoma. *Kidney and Blood Pressure Research,* 29(5), 321-326.
9. Kalra, J. K., Jain, V., Bagga, R., Gopalan, S., Bhansali, A. K., Behera, A., & Batra, Y. K. (2003). Pheochromocytoma associated with pregnancy. *Journal of Obstetrics and Gynaecology Research,* 29(5), 305-308.

10. Townsend, C. M. (2021). *Sabiston textbook of surgery E-Book: the biological basis of modern surgical practice.* Elsevier Health Sciences.
11. Dugas, G., Fuller, J., Singh, S., & Watson, J. (2004). Pheochromocytoma and pregnancy: a case report and review of anesthetic management. *Canadian Journal of Anesthesia,* 51(2), 134-138.