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CASE REPORT

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Intrapartum adrenalectomy for pheochromocytoma presenting in pregnancy: A case report

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Abstract

Pheochromocytoma is one of the rare causes of hypertension in pregnancy, occurring in one in every 50,000 pregnancies. The aim of this case report is to describe an atypical presentation of pheochromocytoma at 35 weeks gestation, where it presented with right flank pain and seizures, its preoperative medical optimization, and intrapartum concurrent surgical management. It also discusses various clinical presentations of pheochromocytoma in pregnancy, appropriate laboratory and radiological investigations, and different modalities of treatment. It is important to consider the possibility of the diagnosis of pheochromocytoma when considering the different causes of high blood pressure in a term pregnancy. Prompt antenatal diagnosis and timely management are critical to reducing maternal and perinatal morbidity and mortality rates.

KEYWORDS

adrenal mass, hypertension, pheochromocytoma, preeclampsia, pregnancy

1 | INTRODUCTION

Pheochromocytoma is a catecholamine-secreting tumor 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%–0.4% of people and can cause a severe or fatal hypertensive crisis. During pregnancy, it affects about one in 50,000 women. A timely diagnosis and adequate care of this condition can reduce maternal and fetal mortality and morbidity from over 50% to <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 nonpregnant 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 tumor 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 tumor surgically.[4]

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The aim of this study is to discuss an atypical presentation of pheochromocytoma in pregnancy as well as the diagnosis, preoperative optimization, and surgical management.

2 | CASE REPORT

At 35 weeks and 2 days gestation, a 28-year-old previously healthy pregnant lady (gravida 2, para 1), who had a spontaneous natural conception, presented to the obstetrical triage of our tertiary care center with a 1-week onset of severe hypertension (>160/110 mmHg). She reported having previous episodes of moderately high BP dating back to 25-week 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, all came back within the 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 Doppler were done and showed no signs of fetal growth restriction. 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 6×4.5 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

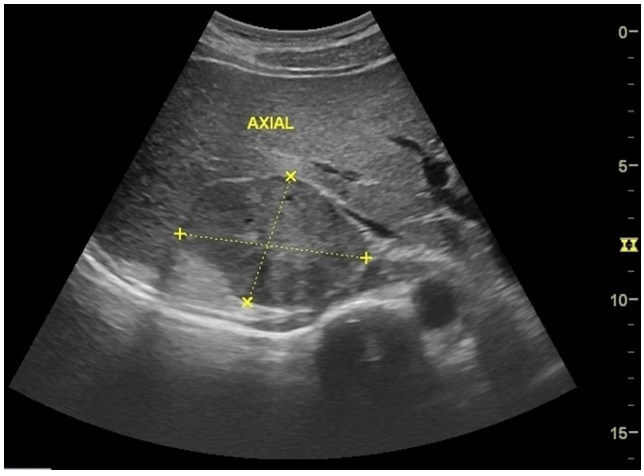

FIGURE 1 Abdominal ultrasound showing a right suprarenal mass.

below. CBC, coagulation profile, liver profile, electrolytes, urea, and creatinine were all normal. Urinary proteins were 165 mg/24 h, 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. Twenty-four-hour urine collection was sent for metanephrine and vanillylmandelic acid (VMA) to confirm the diagnosis which came back markedly elevated being 703 µg/24 h (normal range is 24–96 µg/24 h) and 82 µmol/24 h (normal range is 10–35 µmol/24 h), respectively. This was followed by an abdominal MRI, revealing a 5.5×4 cm right adrenal mass, and a normal left adrenal gland and no extra-adrenal tumors were discovered.

The patient was admitted to the obstetrical intensive care unit (ICU) for close monitoring of her BP. The decision was to deliver the patient via cesarean section in the attendance of the 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. The 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 seizure that was aborted by 2 mg of lorazepam. There were no postictal neurological lateralizing signs, and an 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.

The patient was counseled about the possibility of performing a concurrent surgery for pheochromocytoma (right adrenalectomy) with her cesarean section, which would require performing a midline skin incision for optimal surgical field, versus delayed postpartum laparoscopic adrenalectomy with maintenance of medical therapy for pheochromocytoma until the time of the surgery. The risks and benefits of each treatment option were discussed thoroughly with the patient. She opted for the first option (concurrent surgery).

After optimization of the patient's condition, a cesarean 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) was 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 3 min 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, a live female 2750 g infant whose APGAR scores were 9 at 1 min and 9 at 5 min, closure of the uterus and ensuring hemostasis, the 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, as shown in Figure 2, 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 the normalization of her BP. She was discharged home 6 days following the surgery with her neonate, and both were in stable condition.

Outpatient follow-up visits were arranged at 2 and 6 weeks following her surgery to ensure adequate wound healing and review the histopathology report, which confirmed the diagnosis of right-sided pheochromocytoma. The patient was doing well with stable BP and no postoperative complications.

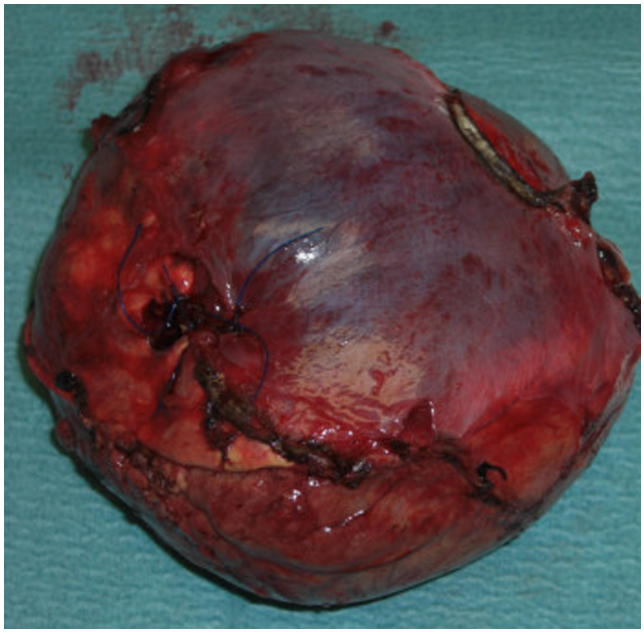

FIGURE 2 Surgical specimen of the right adrenal gland with pheochromocytoma.

3 | DISCUSSION

Our patient had an atypical presentation of pheochromocytoma, 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-h urine collection was negative for proteinuria and her investigations did not show any evidence of end-organ damage.

The challenge to obtain improved predictive tools, able to identify women destined to develop preeclampsia (PE), has raised the researchers' interest and led Capriglione et al. to gather all the evidence reported in scientific literature relating to prediction tests for PE from January 1952 to August 2016, using the terms “preeclampsia,” “gestational preeclampsia,” and “gestational hypertensive disorders” combined with “predictive test” and “risk assessment.” The search identified 203 citations, of which 154 were potentially relevant after the initial evaluation. They concluded that a combination of several features may provide the best predictive accuracy for the identification of PE. Large-scale, multicenter, multiethnic, prospective trials are required to propose an ideal combination of markers for routine screening.[7]

In a similar study to ours published by Agrawal et al., three primigravids were diagnosed before the 20th week of gestation when they presented with the classical triad of pheochromocytoma. The diagnosis was confirmed by 24 h urinary metanephrine/normetanephrine or epinephrine/norepinephrine levels, together with a noncontrast MRI of the abdomen to localize the tumor. One patient had medullary thyroid carcinoma with hyperparathyroidism, indicative of MEN-2A. Another patient had brain stem hemangioblastoma, pancreatic cysts, and a family history of spinal hemangioblastoma, so diagnosed to have Von Hippel–Lindau syndrome, whereas the third patient had sporadic pheochromocytoma. Preoperatively, they required antihypertensive medications including prazosin and metoprolol. They underwent laparoscopic/open

adrenalectomy between the 19th and 21st week of gestation without complication. Histopathology in all three patients revealed low-grade pheochromocytoma by pheochromocytoma of the adrenal gland scaled score. None required antihypertensive medications after surgery. All three newborns were small for gestational age, while one neonate expired due to intra-cardiac rhabdomyoma. So, the timely evaluation and surgical intervention for pheochromocytoma avoid lethal consequences.[8]

A review of the 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 2A) 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 levels, respectively.[9] 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-h urinary levels of catecholamines (norepinephrine, metanephrines, and vanillylmandelic acid) and/or raised plasma catecholamines. Nonspecific 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.[10]

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, GA, or opiates. Hypertensive episodes may occur in pregnancy even when the patient is in a 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 contrary, the perinatal mortality rate is around 26% in undiagnosed cases and 11% in diagnosed cases.[11]

The only curative option for pheochromocytoma is the 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 tumor 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 cesarean section with concurrent or delayed tumor removal is undertaken.[12]

Expert anesthetic 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 at least 3 days prior to the surgery. Phenoxybenzamine IV must be available for a cesarean section. In an emergency, if IV α-blockade is not available, then IV labetalol is the appropriate alternative.[13]

The strengths of this report are discussing pheochromocytoma as an uncommon cause of hypertension in pregnancy, introducing an atypical presentation of the disease, and outlining both the medical and the different surgical modalities of treatment, with an uncommon intervention of performing concurrent adrenalectomy with cesarean section, thus avoiding repeat surgical intervention in the postpartum period.

However, the study is limited by the lack of long-term patient follow-up as well as the failure to compare the maternal and neonatal outcomes of concurrent intrapartum surgical management of pheochromocytoma with delayed postpartum surgery.

4 | CONCLUSION

Even though pheochromocytoma is an 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 CONTRIBUTIONS

The author was involved in data collection, interpretation, drafting of 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.

DATA AVAILABILITY STATEMENT

Data sharing not applicable to this article as no datasets were generated or analysed during the current study

ETHICS STATEMENT

This case report was approved by the Research Ethics Committee (REC) of the 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.

PATIENT PERSPECTIVE

The patient was satisfied with the treatment she received as well as with the good outcomes for her and her neonate.

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