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Perioperative concerns of recurrent urinary bladder phaeochromocytoma with skeletal metastasis

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ABSTRACT We report the perioperative management of a 61-year-old man diagnosed with recurrent urinary bladder phaeochromocytoma with vertebral and rib metastasis following partial cystectomy and nephrectomy. His blood pressure was controlled with antihypertensive agents. Epidural analgesia was avoided in view of vertebral metastasis; instead, analgesia was provided with fentanyl infusion. Intraoperative hypertensive episodes were managed with nitroglycerine, sodium nitroprusside and esmalol. However, after surgery, the patient required inotropic support and was moved to the intensive care unit. Analgesia was maintained with fentanyl infusion, and inotropic support was gradually weaned off. Nuclear ablative therapy was planned for bony metastasis. We recommend that recurrences of extra-adrenal phaeochromocytoma be investigated for bony metastasis and cautiously managed in the perioperative period so as to avoid neurological complications.

Keywords: epidural analgesia, recurrent phaeochromocytoma, vertebral metastasis
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INTRODUCTION

Phaeochromocytomas are usually benign, but approximately 10% are malignant; the incidence of malignancy is 2.5%–13%.[1] Malignant phaeochromocytoma usually metastasises to the bone, lung, kidney and lymph nodules, and rarely to the brain, skin, prostate and urinary bladder. Although bones are the most common site of metastases, vertebral involvement is relatively uncommon in phaeochromocytoma.[2]

We report the perioperative management of a patient with recurrent urinary bladder phaeochromocytoma having vertebral and rib metastasis who was scheduled for partial cystectomy and nephrectomy.

CASE REPORT

A 61-year-old Asian man was scheduled for partial cystectomy and left nephrectomy for recurrence of urinary bladder phaeochromocytoma. He was diagnosed with phaeochromocytoma of the urinary bladder two years back and had undergone robotic partial cystectomy and ureteric re-implantation along with epidural analgesia.[3] Following surgery, the patient remained asymptomatic for next one-and-a-half years and did not require antihypertensive medication. However, for the past four months, he experienced occasional headache and orthostatic hypotension. He was diagnosed with hypertension with a blood pressure of 194/112 mmHg. He was started on antihypertensive drugs that included oral prazosin (2 mg every six hours), atenolol (50 mg twice daily) and amlodipine (5 mg once daily). 24-hour urinary normetanephrine was 5755 µg (normal 80–444 µg/24 hrs). A ^{131}I-Metaiodobenzylguanidine (MIBG) scintiscan revealed increased uptake at the left vesicoureteric junction of the vertebrae (D6, L3, first right rib), which was suggestive of recurrent phaeochromocytoma with bony metastasis. Magnetic resonance imaging of the spine was consistent with D6, L3 vertebrae metastasis. 6-[^{18}F]Fluorodopamine positron emission tomography (^{18}F-DOPA PET) revealed active disease lesion at the left vesicoureteric junction measuring 4.8 × 4.6 cm and multiple lytic sclerotic lesions in the vertebrae (D6, L3) and the first right-sided rib. 99mTc renal dynamic scintiscan revealed a non-functioning left kidney with hydroureteronephrosis.

Preoperative investigations, including haemogram, biochemistry, chest radiograph and echocardiography revealed no abnormality. Electrocardiogram was suggestive of left ventricular hypertrophy. The patient was premedicated with oral diazepam (5 mg) and pantoprazole (40 mg). Antihypertensive therapy was continued as scheduled. In the operating room, intravenous cannulation was secured after attaching standard monitors. Also, under local anaesthesia, the patient's left radial artery and right internal jugular vein were catheterised. Anaesthesia was induced with intravenous administration of midazolam (2 mg), fentanyl (200 µg), propofol (100 mg) and vecuronium (6 mg). After ventilation for three minutes with isoflurane in oxygen, the trachea was intubated with a cuffed endotracheal tube. Anaesthesia was maintained with isoflurane (1–1.2 MAC) in nitrous oxide and oxygen (50:50), vecuronium and fentanyl infusion (1 µg/kg/hr).

During surgery, tumour handling led to a significant increase in the patient's arterial blood pressure (ABP) (up to 220/150 mmHg), which was promptly controlled with a titrated dose of sodium nitroprusside and nitroglycerine infusions, and boluses of esmolol. After tumour resection, there was a sudden drop in ABP (70/40 mmHg). This was treated with fluid

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administration and subsequently titrated infusions of dopamine (5–12.5 μg/kg/min) and noradrenaline (1–12 μg/min). Central venous pressure was maintained at 10–15 cm water. The total duration of surgery was about 3.5 hours. The estimated blood loss was 1,500 ml, which was replaced with 2,000 ml of ringer lactate and two units of packed red cells. At the end of the surgery, arterial blood gas was normal. The trachea was not extubated in view of severe haemodynamic instability. The patient was shifted to the intensive care unit for further management. He was extubated the next day. Deep vein thrombosis prophylaxis was started and inotropic support was gradually weaned off. Analgesia was provided with intravenous fentanyl infusion (0.5–1 μg/kg/hr). Nuclear ablative therapy was planned for bony metastasis. The patient was shifted to the ward and discharged uneventfully seven days later.

DISCUSSION

The concerns with our patient were the presence of recurrent phaeochromocytoma and bony metastasis. He had an active catecholamine-secreting tumour, and fluctuations in haemodynamics were expected in the perioperative period. Perioperative management of extra-adrenal phaeochromocytoma has been well-documented, but skeletal metastasis along with recurrent extra-adrenal (urinary bladder) phaeochromocytoma after robotic cystectomy has not yet been reported.

In phaeochromocytoma, skeletal metastasis is a known entity but vertebral involvement per se is very rare.[2] Metastasis is seen in vertebrae (cervical, thoracic, lumbar vertebra, sacrum) and adjacent tissues (sympathetic chain, paraaortic lymph nodules), and neurological deficits due to vertebra collapse in phaeochromocytoma metastasis have been reported.[1] Such patients should be examined for neurological involvement preoperatively. Reports have also suggested that skeletal metastases of phaeochromocytoma could be hormonally active and are likely to result in haemodynamic instability.[4] Caution should be exercised during positioning of such patients as movement could lead to release of catecholamine. However, in our patient, the tumour metastasis in the vertebrae and rib was not active; no hypertensive episodes were present after the tumour was excised.

Initially, we did not suspect any skeletal metastasis, as our patient had no neurological deficit or manifestations related to vertebral metastasis; he only had urinary symptoms. Vertebral and rib metastasis were incidentally detected on MIBG scintiscan. We avoided epidural analgesia in our patient as there was a risk of sudden catecholamine release when positioning the patient and during direct handling of tumour during epidural needle and catheter placement. This could cause sudden haemodynamic instability. The risk of iatrogenic metastasis of tumour during epidural block was also evident. Also, bony metastatic phaeochromocytomas are highly vascular and thus, the risk of epidural haematoma formation exists.[5] Neurological deficit has been reported after epidural block in patients with vertebral metastasis, as epidural metastasis may lead to fibrosis of the leptomeninges, nerve roots, spinal cord and epidural vessels.[6] The compliance curve of the epidural space may be greatly affected by this pathology. This creates high epidural pressures once a continuous infusion is administered through an epidural catheter, resulting in a high epidural block even with standard doses.[6]

Phaeochromocytoma may be associated with hypercalcaemia, which could have further precipitated by lytic lesion due to metastasis. In our patient, the serum calcium levels were normal. Treatment modalities from bony lesions from phaeochromocytoma include surgical debulking, combination chemotherapy consisting of cyclophosphamide, vincristine and dacarbazine regimen, radiation therapy, and a high dose and repeated doses of ^{131}I-MIBG therapy.[1,7,8] In our case, nuclear ablative therapy was planned.

We conclude that patients with recurrence extra-adrenal phaeochromocytoma should be investigated for metastasis. Axial bony metastasis should be cautiously managed in the perioperative period so as to avoid any neurological complication.

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