Reversible renal infarctions associated with pheochromocytoma: a case report

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To the Editor: The complications of pheochromocytoma caused by barely controlled hypertension and the overproduction of catecholamine can reduce patients' life expectancy and quality of life. Herein, we report a case of bilateral multiple renal infarctions on computed tomography (CT) scan related to pheochromocytoma, which achieved complete relief on follow-up after tumor removal. A 47-year-old male with a 3-year history of uncontrolled hypertension (the highest value recorded was 210/160 mmHg) and intermittent severe headache, pallor, and sweating presented to our hospital on April 15, 2014. He did not monitor his blood pressure regularly but occasionally took dihydropyridine calcium-channel blockers. There was no history of kidney disease, thromboembolic disease, or renal artery injury. On admission, physical examination showed a blood pressure of 160/80 mmHg. His heart rate was 90 beats/min, and his respiratory rate was 18 breaths/min. The urinalysis showed slight hematuria. A transient elevation in serum creatinine and blood urea nitrogen was noted, which normalized within 2 days after fluid replacement. The prothrombin time, activated partial thromboplastin time and D-dimer levels were all within the normal range [Supplemental Table 1, http://links.lww.com/CM9/A206], while the plasma level of epinephrine was 7829.60 (reference interval: 9.16–254.60) pg/mL and that of norepinephrine was 6121.70 (86.30–551.60) pg/mL. An abdominal CT revealed an 8.5 cm tumor on the right adrenal gland and multiple wedge-shaped perfusion defects on the bilateral kidneys [Figure 1A]. The echocardiogram showed no arterial thrombus, and a 24-h Holter study revealed no arrhythmia.

The patient was diagnosed with pheochromocytoma and multiple kidney infarctions. Oral phenoxybenzamine was administered to control his blood pressure. After 2 weeks of anti-hypertensive treatment, he underwent surgical resection of the tumor on April 29, 2014. A histological examination confirmed the diagnosis of pheochromocytoma [Supplemental Figure 1, http://links.lww.com/CM9/A205]. No special treatment for renal infarction was applied. During a 4-year follow-up, the patient remained normotensive with normal serum creatinine levels [Supplemental Table 1, http://links.lww.com/CM9/A206]. No thromboembolic events had occurred. An abdominal CT scan was repeated on May 15, 2018 and showed the disappearance of wedge-shaped perfusion defects [Figure 1B].

Pheochromocytoma can cause multiple target organ injury; kidney involvement is a less frequent clinical manifestation, mainly presenting as renal failure or polyuria due to severe hypertension. However, renal infarctions were noticed in this patient due to the classic finding of multiple wedge-shaped perfusion defects on CT scan. Renal infarction is a rare disease resulting from acute disruption of renal blood flow. Studies have shown that its incidence among all emergency admissions is as low as 0.007%.[1] Although cardioembolic diseases, renal artery lesions and hypercoagulable status are the most frequent etiologies, more than half of renal infarctions remain unclassified. The diagnosis of renal infarction usually depends on typical findings on CT scans. Despite aggressive treatment such as thrombolysis, renal infarction is usually irreversible and can lead to repeat thromboembolic events, mild to severe renal impairment and even death. To our knowledge, renal infarctions associated with pheochromocytoma in adults have only been reported in four cases in the literature.[2-5] Atrial thrombosis,[3] renal artery embolism,[2-4] and vasospasm[4,5] were considered possible causes. Neither long-term follow-up nor reversible outcomes have been reported. In our case, those common causes were excluded because the patient had no history of those diseases, and coagulation function and echocardiogram appeared normal. Most importantly, those imaging findings were completely relieved after pheochromocyto-

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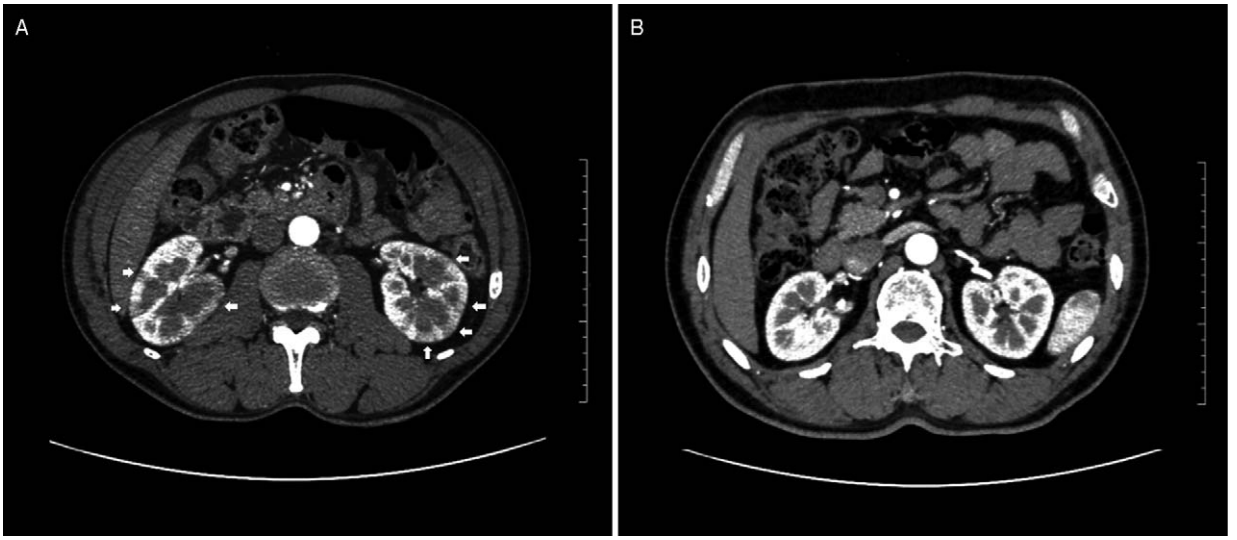

Figure 1: CT scans of the patient. (A) On admission (April 15, 2014), CT scan of the abdomen showed multiple low-enhanced wedge-shaped areas on the bilateral renal cortex. (B) Four years after tumor resection (May 15, 2018), a repeat abdominal CT showed normal kidney on both sides, and all the low-enhanced wedge-shaped areas had completely disappeared. CT: Computed tomography.

ma removal, and there was no recurrence. Therefore, we assumed that kidney infarction was a consequence of catecholamine-mediated vasoconstriction. Tumor resection removed the overproduction of catecholamine, resulting in the reversal of renal infarction.

Our case presented an uncommon presentation of renal infarctions caused by pheochromocytoma. For patients with unexpected renal infarction and severe hypertension, screening for pheochromocytoma is needed, and early tumor resection can achieve complete remission with a good prognosis. More attention should be paid to renal injury in patients with pheochromocytoma in clinical practice.

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Conflicts of interest

None.

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