RESIDENT'S CORNER

Multiple intra-renal artery aneurysms causing renal obstruction managed with radical nephrectomy

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A 46-year-old male with a history of hypertension presented with symptoms of persistent abdominal fullness and a non-pulsatile abdominal mass. Subsequent computed tomographic angiography studies revealed

Introduction

Renal artery aneurysms (RAAs) are uncommon events, occurring in approximately 1:1000 of the general population.¹ As angiographic imaging studies are being performed more frequently, it is more likely that clinicians will encounter asymptomatic RAAs as an incidental finding.² Considerable debate continues to surround the treatment of RAAs. In particular,

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Address correspondence to Dr. Peter Haddock, Urology Division, Hartford Healthcare Medical Group, 85 Seymour Street, Suite 416, Hartford, CT 06106 USA the presence multiple large renal aneurysms from the segmental branches of the renal artery and an enlarged hydronephrotic kidney with minimal parenchyma. The renal deterioration appeared to be as a result of an obstruction caused by the large intra-renal aneurysms at the level of the renal calyces. Since the right kidney had no function, an open radical nephrectomy was subsequently performed without complications at 3 months follow up.

Key Words: renal aneurysm, nephrectomy

opinions differ regarding operative indications, risk of rupture, and aneurysmal growth rate.³ Cases of obstructing intra-abdominal and retroperitoneal aneurysms have been previously reported.^{4,5} To our knowledge intra-renal aneurysm causing obstruction of the urinary collecting system and significant loss of the renal parenchyma, however, has not been previously described in the literature.

Here we describe a unique case of a patient presenting with symptoms of persistent abdominal fullness and a non-pulsatile abdominal mass. Imaging studies revealed the presence of multiple, large RAAs, severe hydronephrosis and minimal parenchyma that were subsequently managed successfully with nephrectomy.

Case report

A 46-year-old Jamaican-American male with a history significant for hypertension presented describing symptoms of increasing abdominal fullness over the preceding 3 months. There were no associated symptoms including pain, fevers, weight loss, chills, and hematuria. No history of smoking was reported. Physical examination was significant for an elevated systolic blood pressure (169/99) and a right upper quadrant non-pulsatile mass.

The patient subsequently underwent further evaluation with computed tomographic angiography (CTA), which revealed multiple large right renal aneurysms arising from segmental renal arterial branches with significant hydronephrosis and minimal renal parenchyma. The largest was an upper pole aneurysm measuring 9.5 cm x 10.0 cm x 13.0 cm, with an adjacent renal artery aneurysm measuring 4.2 cm x 4.5 cm x 5.0 cm. An additional 11.0 cm x 11.0 cm x 12.5 cm hilar thrombosed aneurysm was also identified, see Figure 1.

The kidney was significantly enlarged (25.0 cm x 16.4 cm x 10.0 cm) and the patient underwent open radical nephrectomy. Intraoperative findings included a significantly enlarged kidney with numerous collateralized venous vessels and a single renal artery with early branching of the upper and lower pole consistent with the CT imaging. Estimated surgical blood loss was 1600 mL, and 4 units of packed red blood cells were administered intra-operatively. Pathologic findings revealed multiple right intra-renal aneurysms without evidence of malignancy.

The patient's postoperative course was uneventful. Pain was initially managed with an epidural that was changed to oral medication on postoperative day 4 once the patient tolerated a regular diet. The patient was discharged on postoperative day 4. At a 3 month follow up visit there were no significant postoperative complications and the patients hypertension was under control (126/88) with oral medication.

Discussion

There are multiple types of renal vascular anomalies that the urologist may be called upon to manage. Therefore, it is useful to be familiar with these clinical entities. Abnormalities of the renal artery and its branches, such as renal artery stenosis, often require medical management or percutaneous vascular intervention. Arteriovenous fistula and intra-renal pseudoaneurysms, however, are typically managed utilizing endovascular surgery and occasionally may require surgical intervention (e.g. selective embolization or nephrectomy). These lesions are often seen after iatrogenic or traumatic events and do not affect the path of urinary drainage.⁶⁻⁸

Renal artery aneurysms are defined as localized dilatations of the renal artery or its branches due to weakening of the structural components of the artery. Intra-renal aneurysms of the segmental branches of the renal artery make up approximately 17% of all renal artery aneurysms.⁹ Etiologies include congenital, neoplastic, iatrogenic, and traumatic. There is also an association with polyarteritis nodosa. These aneurysms do have the capacity to rupture, and therefore should be treated cautiously.

In the case presented here, the underlying causes of the aneurysms are unclear but the etiology appears spontaneous since no inciting event was reported. Of note was the extent of renal parenchymal thinning consistent with long term obstruction. A comprehensive review of the diagnostic CT images was inconclusive in identifying alternate causes of the obstruction. Identifiable calculi or masses were absent and the ureter showed no evidence of dilation or obstruction distally. In addition, the patient did not report flank pain or hematuria that are normally suggestive of a more acute obstruction. As such, it would seem unlikely that the obstruction preceded the aneurysmal dilation of the intra-renal vessels. It seems more plausible that the initial event was the formation of the aneurysms



Figure 1. Computed tomographic images revealing the presence of multiple, large renal aneurysms (white arrows).

that subsequently enlarged to such a degree that the arterial pressure prevented urine flow from the kidneys, resulting in hydronephrosis and nephron loss.

Multiple management strategies for aneurysmal dilation of renal vasculature are available with a normal functioning kidney. These include conservative measures such as observation, and more invasive techniques such as percutaneous vascular procedures or open surgery. In general, renal vascular aneurysms should be treated when they are greater than 2 cm, causing renal ischemia and subsequent hypertension, symptomatic, present in a woman of childbearing age, found to be expanding, or contain thrombus which has embolized the distal aspect of the vessel leading to ischemia.⁹ Given the large size of the aneurysms in this case, there was a moderate to high risk of rupture. As such, an observational approach was not acceptable, and a nephrectomy was performed, as there was no functional parenchyma.

This case highlights a rare clinical entity that resulted in severe renal parenchymal damage in which intrarenal aneurysms caused renal obstruction managed successfully with nephrectomy.

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