Mobile primary renal vein lipoma with an accelerated growth pattern

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ABSTRACT

Primary intravascular lipoma is a rare proliferation of adipose tissue originating from the wall of blood vessels. We have described an unusual case of a benign, but fast-growing, primary intravascular lipoma of the left renal vein with the mobile edge extending to the cavoatrial junction within just a few months. We have discussed the surgical indications, management, and technical considerations and highlighted the importance of surgical planning for similar cases. (J Vasc Surg Cases Innov Tech 2022;8:670-3.)

Keywords: Intravascular lipoma; Intravascular lipoma of inferior vena cava; Intravascular lipoma of renal vein; Lipoma; Primary intravascular lipoma

Primary intravascular lipoma from intraluminal benign growth of adipocytes is an extremely rare condition with an incidence rate of 0.35% in the general population.[1] Only a few cases have been reported, most of which were treated conservatively, and the information on the natural history of these tumors is even more scarce. In the present report, we have described the case of a mobile, fast-growing, renal vein lipoma that raised concerns for potential cardiac inflow obstruction and required surgical excision. We have also reviewed the current literature on primary intravenous lipomas and their treatment indications. The patient provided written informed consent for the report of her case details and relevant clinical and radiologic images.

CASE REPORT

A 74-year-old woman was found to have an asymptomatic intravascular lipoma of the left renal vein during a computed tomography (CT) scan evaluation of right flank pain. She had a history of hypertension, mild mitral and tricuspid valve regurgitation, and stable left renal cysts with normal preoperative kidney function (creatinine, 0.67 mg/dL; estimated glomerular filtration rate, 92 mL/min/1.73 m^2). She denied any history of cancer. The examination findings were unremarkable, and her family history was not contributory.

The CT scan demonstrated a well-circumscribed, homogenous, low-intensity mass within the left renal vein, originating from segmental venous branches within the renal pelvis (Fig 1, *A*) and extending beyond the renocaval junction (Fig 1, *B*). A simple renal cyst in the left kidney was also identified (Fig 1, *A*). A follow-up magnetic resonance imaging study 5 months later confirmed the fatty consistency of the intravascular mass, which had extended from the segmental branches of the left renal vein into the perihepatic inferior vena cava (IVC; Fig 1, *C*). Follow-up magnetic resonance venography 6 months later showed continuous mass growth that had extended to the cavoatrial junction (Fig 1, *D*). The intravascular mass measured 8 cm in length from the left renal vein and 8 mm in diameter within the IVC. We found no evidence of venous flow obstruction or thrombosis.

Given the significant growth of this intravenous mass and concerns for intracardiac extension, surgical resection was offered to the patient after a multidisciplinary discussion. Intravascular ultrasound was performed before surgical incision and showed a mobile intravascular mass within the IVC, terminating at the right atrial junction without intracardiac involvement (Supplementary Video).

An upper midline laparotomy was performed in the standard fashion, and right medial visceral rotation was performed to expose the IVC and distal left renal vein segment. The intravascular tumor could be seen through the vein wall, free-floating within the IVC. A transverse venotomy was created at the left renocaval junction to extract the tumor from the IVC and distal half of the left renal vein segment, maintaining control of the IVC and renal vein, without clamping to avoid fracturing the tumor. After extraction of the floating tumor mass from the IVC, the venotomy was primarily repaired, and the central left renal vein segment was clamped to prevent tumor embolization. Next, a left medial visceral rotation was performed to expose the peripheral proximal-mid left renal vein segment, several segmental tributaries, and the hilum of the left kidney. Another venotomy was created at the confluence of these tributaries, the remainder of the tumor was extracted from each tributary, and primary repair was performed. The tumor had originated from a small tributary at the renal pelvis, which was ligated to avoid

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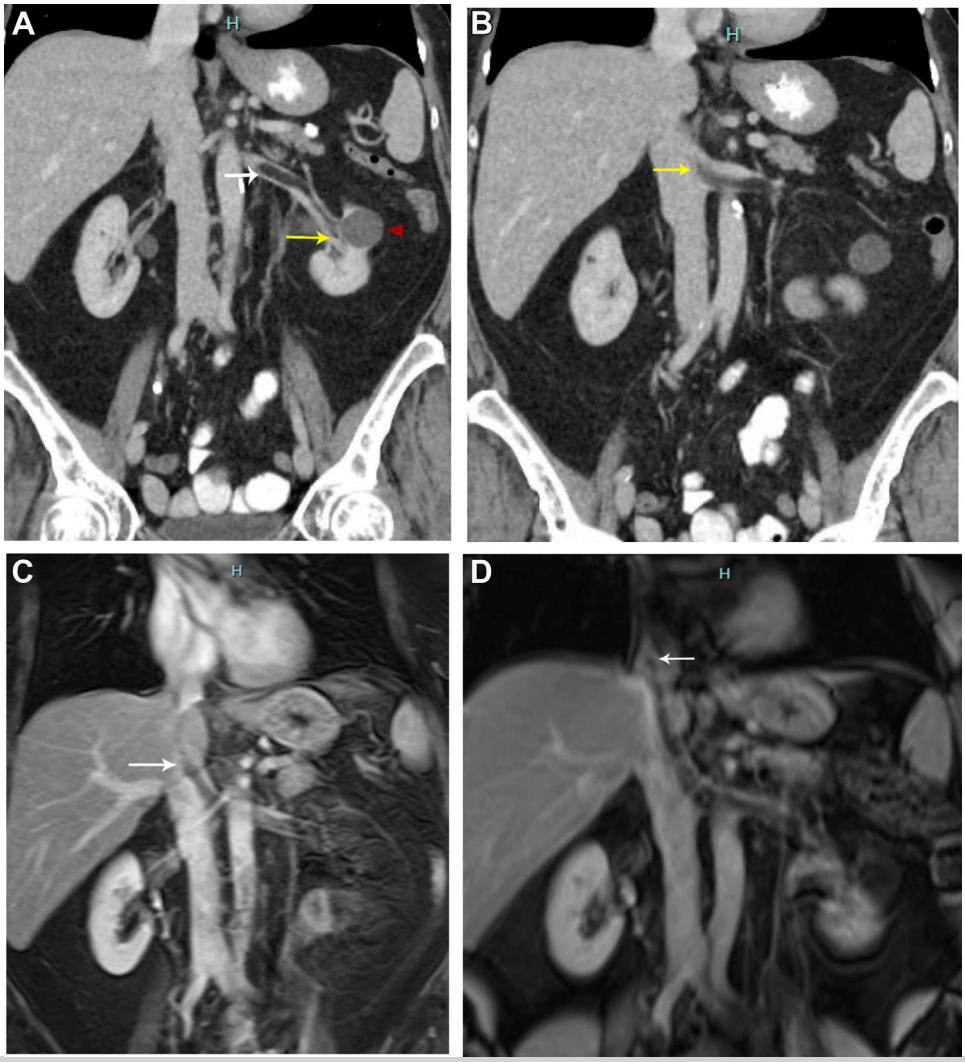

Fig 1. Imaging findings of the primary intravascular lipoma. **A,** Initial contrast-enhanced computed tomography (CT) scan showing a coronal section of a homogenous low-density tumor within the left renal vein (*white arrow*) with its origin (*yellow arrow*). A left renal cyst (*red arrowhead*) can also be seen. **B**, View of intravascular lipoma growing into the inferior vena cava (IVC; *yellow arrow*) on initial contrast-enhanced CT scan. **C,** Initial magnetic resonance image showing a fat-attenuating mass extending into to the perihepatic IVC (*white arrow*). **D,** Follow-up magnetic resonance venography showing extension of the mass into the inferior cavoatrial junction (*white arrow*).

violating the renal parenchyma and preserve the left kidney. The operative time was ~5 hours, with an estimated blood loss of 4.5 L. Her postoperative day 1 creatinine and estimated glomerular filtration rate were 0.86 mg/dL and 71 mL/min/1.73 m^2, respectively. The patient had an uneventful recovery and was discharged on postoperative day 7. At the 4-month follow-up, a non–contrast-enhanced CT scan of the abdomen showed no evidence of the intravenous mass, and the findings from her clinical follow-up at 5 months postoperatively were unremarkable.

The total length of the tumor fragments measured ~10 cm (Fig 2, *A*). Pathologic examination of the specimens revealed a benign lipoma with mature adipose tissue and areas of calcification. No atypical cells were identified (Fig 2, *B*).

DISCUSSION

Primary intravascular lipoma is an uncommon proliferation of adipocytes originating from the wall of blood vessels. Few cases have been reported,[1] with cases of primary renal vein lipoma extremely rare.[2,3] To the best of our knowledge, no previous studies have reported a benign primary renal vein lipoma that was fast-growing, loosely attached to the vessel wall within the renal pelvis, and largely free-floating within the lumen without tissue invasion.

Using the search terms "intravascular lipoma, intravenous lipoma," "intravascular lipoma of renal vein," and "intravascular lipoma of inferior vena cava," we identified only 26 reports of primary intravenous lipomas in

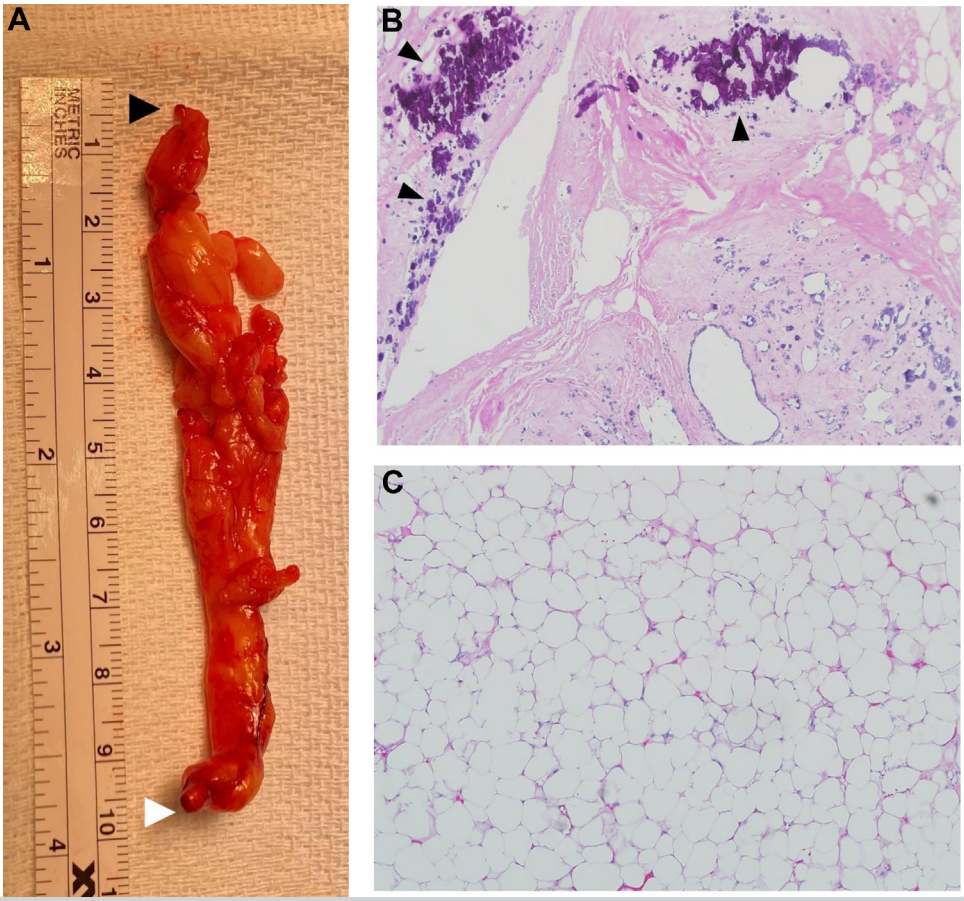

Fig 2. A, Photograph of resected tumor fragments measuring ~10 cm long. *Black arrowhead* indicates portion facing the renal vein; and *white arrowhead,* the portion facing the inferior vena cava (IVC). **B,C,** Photomicrograph of hematoxylin and eosin–stained histologic section confirming the diagnosis of lipoma (original magnification ×200). *Black arrowheads* indicate areas of calcification. **C,** Photomicrograph of hematoxylin and eosin–stained histologic section showing mature adipocytes (original magnification ×200).

PubMed (Supplementary Table). Most cases had been asymptomatic, discovered incidentally on imaging studies, and mainly located within the IVC.[1] Intravenous lipomas have also been less frequently reported in several other locations such as the superior vena cava,[4] and brachiocephalic,[5] subclavian,[6] common femoral,[7] and external iliac[8] veins. We found only two cases that had arisen from the wall of the renal veins, both of which had been managed conservatively.[2,3]

The differential diagnosis for the initial CT findings included atypical lipoma or liposarcoma. Follow-up magnetic resonance imaging showed an appropriate signal for a fat-containing lesion and no abnormal enhancement suggestive of liposarcoma. Unlike intraluminal thrombus, which is typically occlusive, the mass was not adherent to the vessel wall and did not obstruct luminal flow. Additionally, the patient was asymptomatic and did not have a history of a hypercoagulable condition.

The growth rate of primary intravascular lipomas has not been well described in the literature. A few studies have documented the slow-growing nature of this tumor.[4,9] In contrast, our case is unique because the primary renal vein lipoma had exhibited aggressive growth behaving like that of malignant tumors, as evident from the serial imaging studies, but without invading the neighboring tissue and metastasizing. This raised concerns for possible malignancy, especially given our patient's age.

Conservative management is the standard care for centrally located primary intravascular lipomas, with surgical resection only indicated for symptomatic cases.[10] Most large and symptomatic tumors were surgically removed with limited complications.[4,11,12] The commonly reported symptoms included swelling and dyspnea.[13,14,15] A few asymptomatic patients had undergone surgical excision because of concerns for embolization or malignancy.[2,16] We offered surgical resection to our patient after observing the fast tumor growth rate and because of concerns for intracardiac extension. Meticulous case planning is critical to prevent tumor fragmentation during extraction and ensure complete tumor resection.

We involved a multidisciplinary team and used intravascular ultrasound for visualization before laparotomy. The intravascular ultrasound examination confirmed that the tumor was not adherent to the vessel wall of the IVC and had not extended into the right atrium. We also used a staged venotomy approach by first extracting the tumor from the IVC and the distal portion of the left renal vein through a right medial visceral rotation and Kocher maneuver. Next, once the central renal vein segment was tumor-free and protected, we proceeded to explore the proximal renal vein segment, which required a left-sided exposure.

CONCLUSIONS

We have presented a rare case of a benign primary renal vein lipoma that was fast growing and largely mobile. Although intravascular lipomas are considered benign, the present case highlights the potential for a fast growth pattern, concern for venous obstruction, and the need for a meticulous surgical approach. Our report adds valuable information to the current scant information available on intravascular lipoma.

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