Endourology

Intraparenchymal renal artery pseudoaneurysm following nephrostomy tube insertion in a patient with a solitary kidney: A case report

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ABSTRACT

Intraparenchymal renal artery aneurysms are uncommon and represent less than 10% of all renal artery aneurysms. They are caused by trauma or iatrogenic injury, and their rupture can lead to life-threatening hemorrhage. We report the case of a 48-year-old male with history of left solitary kidney and orthotopic neobladder, who presented with massive hematuria 7 days after nephrostomy tube placement because of obstructive uropathy and acute renal failure due to ureteroileal stricture. An abdominal CT angiography revealed an intraparenchymal renal artery aneurysm, and it was successfully treated with superelective endovascular embolization, achieving maximal parenchymal preservation.

Introduction

Renal artery aneurysm (RAA) is a localized dilation of the renal artery or its branches; this entity is rare and it most commonly occurs as a result of trauma, iatrogenic injury, following procedures such as percutaneous renal biopsy, endoscopic stone surgery, percutaneous nephrolithotomy (PCNL), nephrostomy tube insertion, partial nephrectomy, kidney transplantation or endovascular interventions (such as angioplasty or stenting). 1

Intraparenchymal RAAs (IPRAA) are rare and account for <10% of all RAAs. They are classified as true, false, saccular (most common type), fusiform, dissecting, and microaneurysms. Potential complications of IPRAAs include peripheral dissection, thrombosis, hypertension, renal infarction and rupture. The rupture rate occurs in about 30% of cases, with mortality greater than 20%. 2

Case report

A 48-year-old male with history of high grade urothelial carcinoma with associated carcinoma in situ, who underwent a radical cystectomy and orthotopic Studer ileal neobladder at age of 44 and right laparoscopic nephroureterectomy for upper urinary tract urothelial carcinoma at age of 46, was referred to emergency department by the urologist for evaluation of impaired kidney function detected in a routine kidney blood test (serum creatinine: 3.5 mg/dL, with a normal baseline creatinine).

The patient had no flank pain, gross hematuria or fever. He needs clean intermittent self-catheterization (CIC) every 4 hours and denied decreased output of urine. A urinary catheter was placed in the emergency department setting.

A further blood test confirmed the kidney failure (serum creatinine: 4 mg/dL) and a renal ultrasound revealed a severe hydronephrosis in a left solitary kidney. A computed tomography (CT) scan was performed and it showed a smooth-walled stricture of the distal left ureter with severe dilatation of the urinary tract above the stricture and an empty Studer-type neobladder. The presumptive diagnosis was benign ureteroileal stricture.

A 10F percutaneous nephrostomy (PN) tube was successfully placed. After nephrostomy tube insertion, the patient started with shaking chills and tachycardia, and it progressed to septic shock post-procedurally. Given the patient’s clinical status, anesthesia was consulted to provide hemodynamic support. Two days later, the patient was discharged from intensive care unit (ICU). He presented a multifactorial acute kidney failure, with a persistently elevated serum creatinine around 8 mg/dL.

Patient follow-up after intensive care unit (ICU) discharge was favourable, but 7 days following PN he developed an episode of massive and life-threatening hematuria, with an important bleeding through the PN tube (approximately 700ml). An urgent CT angiography was...
performed, demonstrating a renal pseudoaneurysm of a segmental renal artery (Fig. 1A–D) and hyperdense material indicative of blood clots in the collecting system. A superselective endovascular embolization with Onyx® was indicated and successfully performed, achieving exclusion of the pseudoaneurysm (Fig. 2A and B).

His prior hemoglobin level was 12.8 g/dL, dropping to 7.2 g/dL after bleeding. After transfusion of 2 red blood cells (RBC) units, hemoglobin increased to 9 g/dL and it continued to be stable at discharge. The urine remained clear and the renal function progressively improved up to creatinine of 3 mg/dL.

Discussion

Transient hematuria is frequent after percutaneous nephrostomy or
other percutaneous renal procedures, but severe bleeding that requires transfusion or intervention is unusual and must lead to imaging investigations. Hematuria may be caused due to a rupture of the IPRAA into the collecting system or to embolic renal infarction.

Renal pseudoaneurysm can be asymptomatic, but it typically presents as flank pain, hematuria or anemia. Furthermore, pseudoaneurysm should be considered as a possible differential diagnosis in patients who develop hemorrhage after endovascular procedures. Renal pseudoaneurysm, renal haematoma and arteriovenous fistula should be included in the differential diagnosis of massive hematuria after percutaneous renal procedures. Severe hemorrhagic complication occurs in 2% of patients who need a percutaneous nephrostomy tube insertion, but the proportion of this complication that result from pseudoaneurysm rupture has not been reported.

Percutaneous angiography with selective coil embolization is the treatment of choice. This procedure is preferred over open surgical exploration. Renal artery embolization has been used for treating renal bleeding since the 1970s. This technique has improved with the introduction of smaller delivery catheters and more precise embolic agents. Nowadays, it is possible to perform superselective renal arterial embolization (SRAE), which minimizes the loss of renal function. After selective angioembolization, hemoglobin levels should be monitored closely.

Occasionally, in hospitals lacking interventional radiology unit, surgical evacuation of the haematoma and closure of the arterial defect should be considered. Nephrectomy should be considered only as a last treatment option. Darbyshire et al. reported a case of renal artery pseudoaneurysm successfully managed conservatively, giving another potential management option in non-torrential hemorrhage.

Venkateswarlu et al. described the findings of renal angiography in 159 consecutive patients who underwent PCNL and who presented with significant post-PCNL hemorrhage; 83 (52.2%) of them showed pseudoaneurysm.

Conclusion

Intraparenchymal renal pseudoaneurysm is an unusual vascular lesion, with potentially life-threatening consequences. It commonly occurs as a complication of certain renal interventional procedures. Superselective renal arterial embolization is the best treatment, especially in patients with a solitary kidney or low functional reserve of the kidneys, because it reduces the loss of renal parenchyma.

Declaration of competing interest

The authors declare no conflict of interests.

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