Spontaneous perirenal hemorrhage due to ruptured renal arteriovenous malformation: A case report

Ferry Safriadi *, Richardo R. Handoko

Department of Urology, Faculty of Medicine, Hasan Sadikin Academic Medical Center/Universitas Padjadjaran, Bandung, Indonesia

ARTICLE INFO

Keywords:
Spontaneous perirenal hemorrhage
Ruptured arteriovenous malformation
Surgical exploration

ABSTRACT

Spontaneous perirenal hemorrhage is bleeding in perirenal space with no associated trauma or iatrogenic manipulation. It is a rare condition, prevalence of renal arteriovenous malformation (AVMs) was <0.04%. A 51-year-old man presented with a dull pain at right flank for 4 days before admission. Physical examination revealed tenderness in the right flank area. An abdominal CT showed large right perirenal hematoma. The patient underwent surgical exploration, and an active source of bleeding was found at the posterior aspect of the right kidney. Pathology showed evidence of ruptured arteriovenous malformation. Open surgery was performed due to the large hematoma with pain.

Introduction

Spontaneous perirenal hemorrhage is rare condition and often present with a variety of nonspecific symptoms, which may delay diagnosis and increase morbidity and mortality. Angiomyolipoma and renal cell carcinoma are the most common causes of spontaneous perirenal hemorrhage. Other reported etiologies of spontaneous perirenal bleeding were a hematologic disease, anticoagulant state, and hemodialysis. We reported a 51-year-old man presented with spontaneous perirenal hemorrhage due to ruptured arteriovenous malformation (AVMs).

Case presentation

A 51-year-old Asian man presented persistent dull pain at the right flank region for four days before admission. It was sudden in onset and moderated in intensity. The patient also experienced an episode of hematuria in the first day of the flank pain. He routinely took an antihypertensive drug. There were no histories of trauma, anticoagulant therapy, or previous surgical intervention. Physical examination revealed tenderness and hematoma in the right flank area (Fig. 1). Blood pressure at the time of presentation was 140/90 mmHg, and heart rate was 88/min. Blood analysis showed hemoglobin 9.9 g/dL, prothrombin time/PT 9.6 sec, activated partial thromboplastin time/aPTT 29.4 sec, and international normalized ratio/INR 0.94. His biochemical parameters were within normal limits. Urine analysis showed macroscopically clear yellowish urine with erythrocyte sediment 13,5/μL.

Ultrasound examination showed no evidence of hydronephrosis or urolithiasis. Echodensity of renal parenchyma was normal. A large blood clot was found at the right perirenal with an irregular hyperechoic structure.

An abdominal CT demonstrated a large right perirenal hematoma collected mainly at posteroinferior region of the right kidney (Fig. 2). There was no suspicious renal neoplasm or vascular abnormalities. All other abdominal organs were unremarkable.

The patient underwent surgical exploration. Gerota’s fascia was incised, and about 500 ml of hematoma was evacuated. An active source of bleeding was identified at the posterior aspect of the right kidney. The bleeding was successfully ligated. A biopsy was performed at the bleeding area. Histopathology results showed evidence of ruptured AVMs (Fig. 3). The patient recovered well and was discharged from the hospital on the 3rd postoperative day.

Discussion

Bonet initially reported spontaneous renal hemorrhages in 1679. Wunderlich later described it in 1856 with the “Lenk’s triad” (acute flank pain, flank mass, and hypovolemic shock) as clinical manifestation, which may mimic acute abdominal conditions. Hematuria may also be one of the symptoms of spontaneous renal hemorrhage.

A meta-analysis done by Zhang et al. found that the etiologies of...
spontaneous perirenal hemorrhage were malignant tumors (31.5%), benign tumors (29.7%), vascular disease (17%), infection (2.4%), and idiopathic (6.7%).

Renal AVMs are abnormal communications between intrarenal arterial and venous systems (outside the capillary level), with congenital and acquired causes. Most of the renal AVMs (75%) are acquired and have been associated with surgical interventions (renal biopsy, renal surgery), malignancy, inflammation, and exogenous trauma. The estimated prevalence of renal AVMs was <0.04%, with a peak incidence in patients aged 30–40 years.

The malformation is usually located in the collecting system rather than in the renal parenchyma, with most of the cases on the upper renal pole (45%).

The most common clinical presentation of renal AVMs is hematuria (72%). Other possible clinical presentations are flank pain, flank bruit, hypertension, perirenal hematoma, high-output heart failure, and asymptomatic.

AVMs produces relative ischemia in the renal parenchyma distal to the abnormal vessels. The ischemia causes renin release, which facilitates systemic vasoconstriction and diastolic hypertension. The subcapsular hematoma will not reach the size of perirenal hematoma due to the tamponade effect of the renal capsule. Gerota’s fascia is distensible, and hence the perirenal hematoma may attain a huge size.

Arteriography with selective angioembolization is considered the primary diagnostic and therapeutic option for suspected renal AVMs. Visualization of the inferior vena cava within seconds of the arteriogram phase is the hallmark of renal AVMs. A decreased nephrogram seen in the parenchyma distal to the fistula is most likely due to the reduced flow to the renal segment because of the shunt in the fistula.

Computed tomography (CT) is a very useful tool for the evaluation of Renal AVMs. A biphasic scan is carried out in arterial and delayed venous phase (90–120 s) as per the hematuria protocol to investigate other potential causes of hematuria. Small Renal AVMs may not be detectable with CT scans. Magnetic resonance imaging (MRI) may also be used. Renal AVM appears as a flow-void area on T2-weighted (T2-w) images. MRI might be indicated in young patients because of the lack of ionizing radiation.

The goal of AVM treatment is maximal preservation of functioning renal parenchyma and eradication of symptoms and hemodynamic effects. In hemodynamically stable patients, conservative approach with bed rest, correction of the coagulation abnormalities, and volume resuscitation can be implemented. Transcatheter arterial embolization
has become the management of choice, especially when active bleeding is recognized on angiography. Selective embolization techniques, aim at permanent occlusion of multiple small channels between arteries and veins that form the nidus of AVMs and all the arterial feeders, allow maximal preservation of renal parenchyma.

Surgical treatment, including partial nephrectomy, nephrectomy, renal auto-transplantation, or vessel ligation, used to be the standard care of perirenal hemorrhages. Nowadays, surgery remains a reasonable choice in rapidly deteriorating patients, in patients whose renovascular anatomy is not favorable for endovascular treatment, in cases where interventional radiology is unsuccessful, and in cases related to malignancy. AVMs associated with neoplasms are best treated with nephrectomy.

In this case, the patient was male in his fifth decade of life, as ruptured angiomyolipoma was first suspected etiology. Due to the large size of the hematoma, the patient underwent surgical exploration. Ruptured renal AVM might be related to the abnormal structure of the blood vessels and the patient’s history of hypertension. However, hypertension might be renin-mediated caused by the renal AVM itself.

Conclusions

Spontaneous perirenal hemorrhage due to renal AVM rupture is an infrequent entity, and only a limited number of cases have been described in the literature. Although transcatheter arterial embolization is considered the primary diagnostic and therapeutic option for renal AVMs, surgical exploration remains a reasonable choice in selected conditions.

Consent

Ethical permission was obtained from the Health Research Ethics Committee and the Director of Human Resources and Education at Hasan Sadikin Academic Medical Center-Indonesia as well as written informed consent letter from the patient.

Funding

The authors received no financial support for the research, author-ship, and/or publication of this article.

Declaration of competing interest

The authors declare that there is no conflict of interest.

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