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Case report

Renal artery aneurysm misdiagnosed as a pelvic stone: A case report

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ABSTRACT

Introduction and importance: Renal artery aneurysm (RAA) is an extremely rare condition that is usually symptomless and may be diagnosed by a chance in imaging. However, misdiagnosis is not out of mind and few cases of misdiagnosis of RAA with renal stone have been reported. Misdiagnosis leads to wrong treatment, so it is very important for the correct diagnosis.

Case presentation: We reported a similar case in a 57 years old female that referred with right flank pain and ultrasonography and computed tomography (CT) scan reported a calcified mass, resembling renal stone. Through the operation the RAA was diagnosed; however, the mass was damaged and the patient underwent aneurysmectomy. Although she was a single kidney case, collateral circulation saved the kidney.

Clinical discussion: The patients may be asymptomatic or may present symptoms like treatment-resistant hypertension, hematuria, thrombosis, renal infarction, abdominal, or flank pain. As literature shows the diagnosis of RAA is challenging and affects patients' timely treatment. Our patient, who was a single kidney person, also survived the condition with no nephrectomy. The case of our study was single kidney and the collateral vessels give a further chance to kidney for survival. Although the affected artery was not further used, the collateral vessels circulation helped the kidney and the patient survived nephrectomy. She was discharged with a normal state and normal urination.

Conclusion: The timely diagnosis may help the patient with less invasive treatments.

1. Introduction

Renal artery aneurysm (RAA) is an abnormal bulging of the weak area in the wall of an artery to the kidney. This condition is uncommon and affects 0.01% to 0.09% of the general population according to the autopsies [1] and 0.3% to 0.7% according to the angiography studies [2]. However, still, RAA is the second most common type of visceral aneurysm, lying after splenic artery aneurysm as the most common [3]. Renal artery aneurysms are categorized as true and false. The true aneurysm contains all artery walls including intima, media, and adventitia, while it is not applied for false aneurysms. Different etiologies have been proposed for true aneurysms including fibromuscular dysplasia and atherosclerosis; however, the false aneurysms are mainly due to iatrogenic trauma and infection [4].

The patients are usually asymptomatic, but may present symptoms like hypertension, abdominal pain, hematuria, and renal artery thrombosis. The diagnosis may be done by imaging; however, some cases may be misdiagnosed. Kidney, ureter, bladder (KUB) X-ray can be diagnostic only in half or less than half of the cases. The diagnosis of the stone in a CT scan may be confirmed by annular calcification of the aneurysm. However, angiography with the intra-arterial injection of contrast material is the gold standard [5].

Still, there are cases of RAA that are misdiagnosed as kidney stones. Even some cases presented flank pain and had hydronephrosis in imaging [6–8]. Moreover, a case mistakenly underwent percutaneous nephrolithotomy (PCNL) [6]. Here we present an intra-pelvic aneurysm in a 57 years old woman presented itself similar to a pelvic stone.

2. Case presentation

A 57-year-old Persian woman presented to a private clinic with right flank colic pain several months ago. Chills and fever, nausea and vomiting, hematuria, irritative symptoms, and obstructive symptoms were absent. Past medical, drug, social, and family histories had no notable findings. The patient was mentally healthy. In the case of physical examination, the vital signs were normal, the patient was afebrile, the

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blood pressure was 110/70 mm Hg, the pulse rate was 80 beats per minute, and the respiratory rate was 15 per minute. The general physical examination was normal, too. Urine sediment was checked. The first assessment of the patient was conducted by a urology surgeon specialist with 15 years of experience. Also, a CT scan was taken by an experienced radiologist.

Laboratory findings revealed a white blood cell (WBC) count of 13,000/μl, red blood cell (RBC) count of 5.3 million/μl, hemoglobin of 13.5 g/dl, platelet of 235,000/μl, blood urea nitrogen (BUN) of 44 mg/dl, creatinine of 1.5 mg/dl, sodium of 141 mEq/l, potassium of 3.6 mEq/l, prothrombin time of 13 s, partial thrombin time (PTT) of 40 s, an INR of 1. As the patient was suspicious of renal calculus, she underwent sonography. The ultrasonography revealed a single kidney patient with a 20 × 15 mm renal stone in the middle calyx of the right kidney. The right kidney parenchymal echo was normal. For further assessment of the renal stone, a CT scan was conducted that showed a 30 × 25 mm stone in the middle renal pelvis of the right kidney. The right kidney size was normal (Fig. 1).

In case of treatment, three options were available including PCNL, laparoscopic surgery, and open pyelolithotomy. As the patient chose an as soon as possible intervention, the open pyelolithotomy was the most available with this regard. During open pyelolithotomy and exploration of the renal pelvis, sudden bleeding occurred and the surgeon tried to stop bleeding by clamping the renal vessels. The misdiagnosed calculus was an aneurysm in the renal artery wall. As the artery received damage, there was no way for the repair and excision of the aneurysm to be conducted (Fig. 2). Although the affected artery was not further used, the collateral vessels circulation helped the kidney and the patient survived nephrectomy. She was discharged with a normal state and normal urination. The work has been reported in line with the SCARE 2020 criteria [9].

3. Discussion

RAA is a very rare condition with an estimated incidence of 0.09%; however, may affect some populations like hypertensive patients for as high as 2.5% [10]. The cases of this anomaly are usually in their 40s to 60s and the condition is more common in females [11]. It was diagnosed by angiography. The patients may be asymptomatic or may present symptoms like treatment-resistant hypertension, hematuria, thrombosis, renal infarction, abdominal, or flank pain [1]. Typically, our case of study was a 57 years old female that presented with flank pain. The most common type of RAA is saccular; however, fusiform and intra-lobar aneurysms are present, too. One out of every five patients may have a bilateral aneurysm. Even one out of ten may present the aneurysm in kidney parenchyma. The location of the aneurysm in our case was also in the pelvis of the kidney [12,13].

As the patients are usually asymptomatic and a vast number of imaging modalities are used nowadays, RAA may be an incidental finding in imaging. Intravenous urography can give a diagnosis in 66% of the cases [2]. The most common signs in the intravenous urography are the filling defect or compression of the collecting system, delayed function and asymmetric nephrograms. Magnetic resonance imaging (MRI) also presents a sensitivity of 78 and specificity of 100% [14]. The colour Doppler imaging modality also may help the diagnosis of aneurysm. The findings in this type of ultrasonography include turbulent blood flow in a hyperechogenic lesion. Still, all these modalities have limitations in detecting aneurysms [15,14]. Brownstein et al. [1] assessed 259 RRAs and they reported that 76% of the aneurysms were calcified. This calcification makes the mass resemble a kidney stone, especially when it is intraparenchymal. Our case of study was also misdiagnosed as a kidney stone.

Similarly, Shanwen et al. [7] reported a 51 years old woman with ultra-sonographic suspicion of left renal pelvis stone and hydronephrosis; however, the patient showed no response to the treatment with a shock wave and a CT scan after a two-week follow up revealed an annular calcified mass and final diagnosis of RAA. However, unlike the results of our study, aneurysmectomy was failed in their case and a left nephrectomy was conducted. Another similar case was reported by Chen et al. in a 69 years old female with no symptoms but an incidental large kidney stone finding. Sonography, KUB, and even CT scan were suggestive for calculus. However, during PCNL, a pulsating mass was discovered and the patient was transferred to the endovascular intervention ward for RAA coil embolization [6].

As literature shows the diagnosis of RAA is challenging and affects patients' timely treatment. The mortal complication of RAA is its rupture that affects less than 3% of the cases [16,1]. In the case of treatment, both endovascular embolization and open resection are safe and useful

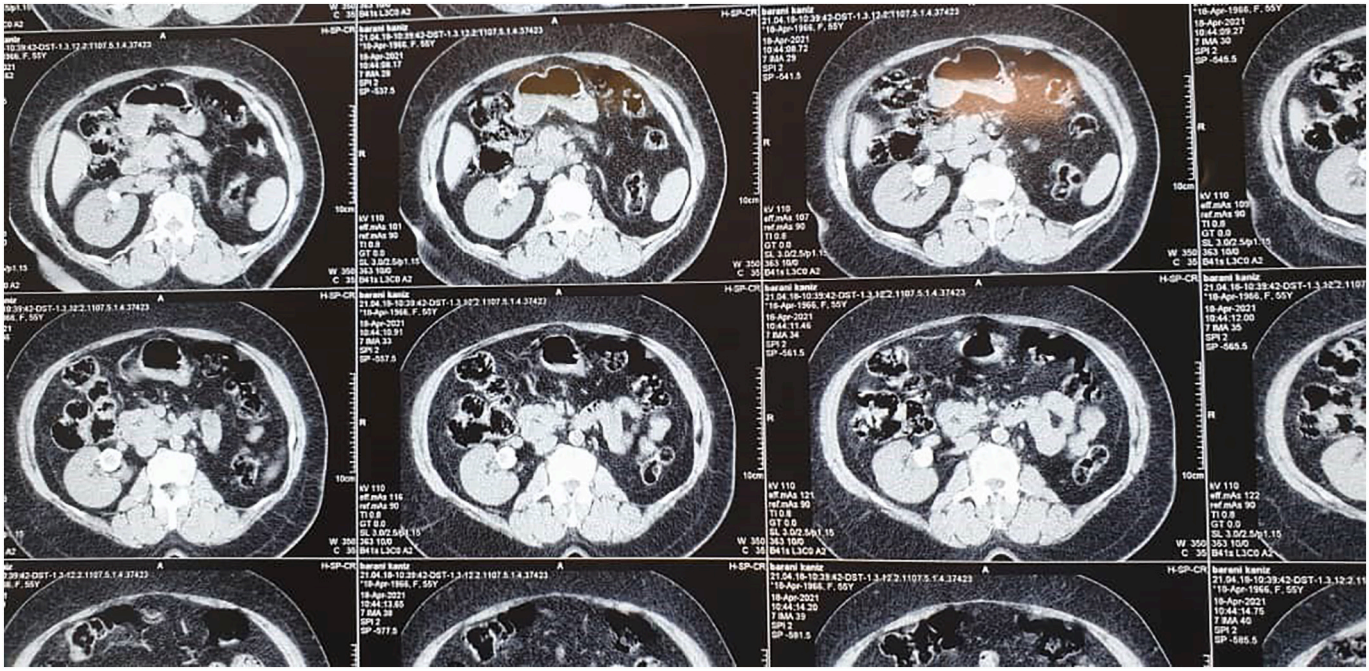

Fig. 1. CT scan findings of the patient.

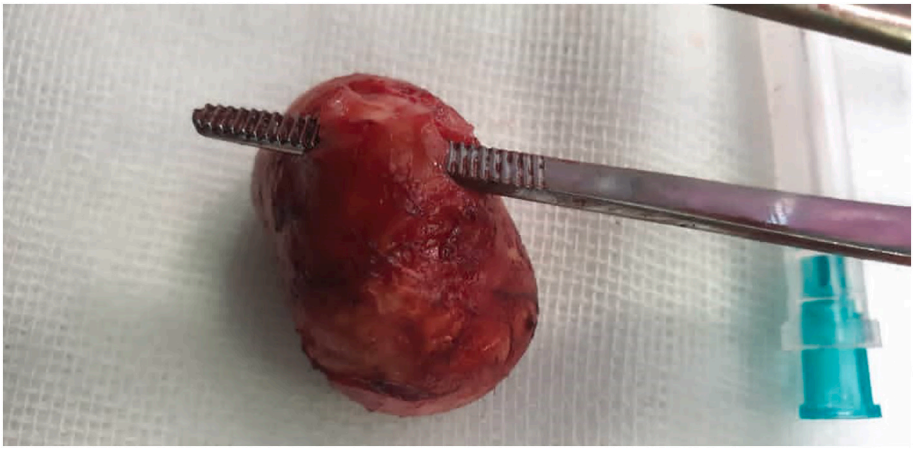

Fig. 2. Resected aneurysmal mass of the right kidney.

methods with low morbidity and mortality. However, the location and shape of the bulging, patient's comorbidities, and surgeons' priorities are important factors in case of choosing a treatment method [1,11]. The prognosis is almost good. Among few cases that reported the misdiagnosis of RAA with renal calculi, two had endovascular repair [6,8] and only one led to nephrectomy [7]. Our patient, who was a single kidney person, also survived the condition with no nephrectomy. The patient's parents were happy and grateful to the operating team.

4. Conclusion

RAA is an uncommon entity that mostly affects females between 40 and 60 years old. The condition is hard for radiologists and urologists in case of diagnosis with routine imaging methods. However, the timely diagnosis may help the patient with less invasive treatments. The case of our study was single kidney and the collateral vessels give a further chance to kidney for survival.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

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Ethical approval

It is our routine standard surgical procedure so ethical clearance was not required.

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Saeed Movahed.

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CRediT authorship contribution statement

Dr Saeed Movahed and Faramarz Fazeli have designed the concept of the study, literature review, data collection and analysis. Dr Yashar Firoozi Jahantigh has contributed to study concept design, treatment of the patient and manuscript writing.

Declaration of competing interest

All authors have no conflict of interest.

References

[1] A.J. Brownstein, Y. Erben, S. Rajaee, Y. Li, J.A. Rizzo, H. Mojibian, B.A. Ziganshin, J.A. Elefteriades, Natural history and management of renal artery aneurysms in a single tertiary referral center, J. Vasc. Surg. 68 (2018) 137–144.
[2] V.F. Vitkovskyy, Two cases of the calcified renal artery aneurysm. differential diagnosis and treatment (own experience), Wiad. Lek. (2020) 2086–2089.
[3] A.N. Mbaba, M.P. Ogolodom, R. Abam, B.U. Maduka, M.S. Okpaleke, O. A. Elizabeth, H.T. Okafor, Extra and intraparenchymal renal artery aneurysms causing hydronephrosis: a case report, Health Sci. J. 14 (2020) 1–3.
[4] M. Gacci, O. Saleh, A. Mantella, L. Azas, P. Romagnani, A. Minervini, S. Serni, M. Carini, Giant calcified renal artery aneurysm: traditional RX versus three-dimensional computed tomography, Adv.Comput.Tomogr. 2 (2013) 20–22.
[5] A. Artiles-Medina, M. Hevia-Palacios, I. Laso-García, G. Duque-Ruiz, F. Arias-Funez, F. Burgos-Revilla, Intraparenchymal renal artery pseudoaneurysm following nephrostomy tube insertion in a patient with a solitary kidney: a case report, Urol. Case Rep. 34 (2021), 101471.
[6] C. Chen, X. Wang, F. Xin, L. He, K. Jiang, J. Shao, L. Xie, Large calcified renal artery aneurysm in the renal sinus misdiagnosed as an intrapelvic calculus followed by mistakenly performed PCNL: a case report, BMC Nephrol. 21 (2020) 1–5.
[7] S. Chen, H. Meng, M. Cao, B. Shen, Renal artery aneurysm mimicking renal calculus with hydronephrosis, Am. J. Kidney Dis. 61 (2013) 1036–1040.
[8] S. Sallami, H. Mizouni, E. Mnif, An unusual case of a calcified renal artery aneurysm mimicking a renal calculus, Tunis.Med. 92 (2014) 287–288.
[9] R.A. Agha, T. Franchi, C. Sohrabi, G. Mathew, A. Kerwan, A. Thoma, A.J. Beamish, A. Noureldin, A. Rao, B. Vasudevan, The SCARE 2020 guideline: updating consensus Surgical CAse REport (SCARE) guidelines, Int. J. Surg. 84 (2020) 226–230.
[10] M. Hagihara, A. Kitagawa, Y. Izumi, Y. Ohshima, E. Katsuda, J. Matsuda, S. Kamei, J. Kimura, T. Kawamura, T. Ishiguchi, Emergent coil embolization for ruptured renal artery aneurysm, Jpn. J. Radiol. 27 (2009) 275–279.
[11] D.M. Coleman, J.C. Stanley, Renal artery aneurysms, J. Vasc. Surg. 62 (2015) 779–785.
[12] A. Omranzadeh, S.M. Hoseini Jebeli, A. Ghodsi, M. Mahdavi Rashed, Mediastinal epidermoid cyst in an old man with recurrent pneumonia: a case report, J.Cardio-Thorac.Med. 8 (2020) 666–669.
[13] L.A. Down, D.V. Papavassiliou, E.A. O'Rear, Arterial deformation with renal artery aneurysm as a basis for secondary hypertension, Biorheology 50 (2013) 17–31.

[14] V. Rafailidis, A. Gavriilidou, C. Liouliakis, M. Poultsaki, T. Theodoridis, V. Charalampidis, Imaging of a renal artery aneurysm detected incidentally on ultrasonography, in: Case Rep.Radiol.2014, 2014.
[15] A.D. Tarazjani, A. Fazlinejad, A. Khooei, A. Ghodsi, A. Omranzadeh, A large cardiac fibroma lied in the interventricular septum of an adult with exertional pain and palpitation: a case report, Int.Cardiovasc.Res.J. 15 (2021).
[16] K. Calligaro, M. Dougherty, Renovascular disease: aneurysms and arteriovenous fistulae, in: Rutherford's Vascular Surgery, WB Saunders, Philadelphia, 2010, p. 2329.