

Inflammation and infection

## Segmental renal vein thrombosis: An unusual complication of acute pyelonephritis

Mohamed Ben Hassine, Housseem Ben Hadj Alouane<sup>\*</sup>, Mohamed Amine Oueslati, El Mamoun Fassi Fihri, Chiraz Chammakhi, Sami Ben Rhouma

Habib Thameur Hospital, Department of Urology, 1089 Ali Ben Ayed St, Tunis, Tunisia

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### ABSTRACT

Renal vein thrombosis is not a common manifestation in the context of acute pyelonephritis. We report the case of a 29-year-old female diabetic patient that was admitted to our department for an episode of complicated acute pyelonephritis. Initial imaging showed a left lower polar abscess of 27 mm and urine cultures grew community acquired *K. Pneumoniae*. Two days after the patient was discharged, she was readmitted with worsening symptoms. Repeat imaging showed stability in the size of the abscess and revealed a left lower segmental vein thrombosis. The patient responded favorably to antibiotics and heparin-warfarin therapy.

### 1. Introduction

Renal vein thrombosis is a common manifestation of renal neoplasms or nephrotic syndrome. However, it is rarely reported as being secondary to acute pyelonephritis. In this context it can be potentially life-threatening. We herein present the case of a patient presenting with acute pyelonephritis associated with segmental renal vein thrombosis.

### 2. Case presentation

A 29-year-old patient with a past medical history of type 1 diabetes presented with left flank pain that had been evolving for one week. Initial examination physical examination revealed a fever 39 °C along with left costo-vertebral angle tenderness. Vital signs were stable. Blood testing showed leukocytosis of 13 090/mm<sup>3</sup> with CRP levels of 71 UI/l along with hyperglycemia at 22 mmol/l with ketosis on dipstick. GFR was conserved at 124 ml/min/1.73m<sup>2</sup>. Urinalysis showed 570 white blood cells per mm<sup>3</sup> and 100 000 bacteria per ml. Renal ultrasound revealed a left lower polar renal formation with echogenic contents. Next, an abdominal computed tomography was performed which showed bilateral focal nephritis associated with a left thick-walled hypodense collection measuring 27 × 25 mm that corresponded to a lower polar renal abscess. Both renal veins and arteries were patent. Intravenous antibiotherapy based on 3rd generation cephalosporin and aminoglycoside was initiated. Urine culture grew community acquired

*K. Pneumoniae* and the patient was discharged with an oral prescription oral antibiotics 2 days after admission. She presented two days later with a fever of 39 °C and worsening left-flank pain. The patient was readmitted and a second abdominal CT scan was performed. Imaging showed a relative stability in the size of the lower pole abscess (Fig. 1) and the appearance of a thrombosis of the inferior segmental branches of the left renal vein (Fig. 2). The Thrombosis was limited to the inferior segmental veins and did not protrude in the renal vein which remained patent (Fig. 3). In the light of these observations, a curative dose of low-molecular-weight heparin was prescribed along with an IV antibiotics course of Tazocillin. Evolution was marked by the disappearance of fever and pain along with the regression abscess size on ultrasound control. The patient was discharged after warfarin overlap that would be continued for 6 months. The patient remained asymptomatic after the resolution of this episode.

### 3. Discussion

Renal vein thrombosis secondary to bacterial kidney infection is very uncommon. A limited number of case reports describing the association being published with more than half the cases showing cultures positive for *Klebsiella Pneumoniae*.<sup>1</sup> Indeed, KP seems to be implicated in the RVT pathogenesis by a state of hypercoagulability induced by immune cell recognition of pathogen-associated antigens which activates an inflammatory cascade resulting in the release of tissue factor, a pro-coagulant

<sup>\*</sup> Corresponding author. 17 rue de la méditerranée Jardins d'el Menzeh 2, Ariana, Tunis, Tunisia.

E-mail addresses: [drbenhassine.mohamed@gmail.com](mailto:drbenhassine.mohamed@gmail.com) (M. Ben Hassine), [hadjalouane.housseem@gmail.com](mailto:hadjalouane.housseem@gmail.com) (H. Ben Hadj Alouane), [damine.oueslati.ao@gmail.com](mailto:damine.oueslati.ao@gmail.com) (M.A. Oueslati), [chammakhichiraz@gmail.com](mailto:chammakhichiraz@gmail.com) (C. Chammakhi), [sbenrhouma@yahoo.fr](mailto:sbenrhouma@yahoo.fr) (S. Ben Rhouma).

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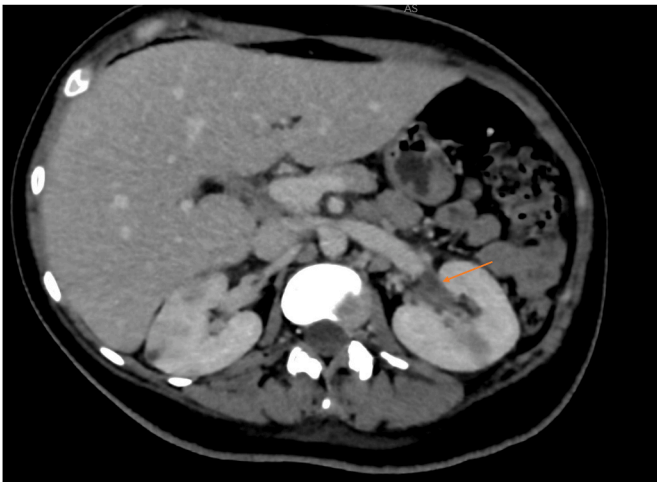
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**Fig. 1.** Coronal CT-scan view showing nephritis foci in the left kidney with a lower pole 27 mm abscess (green arrow). (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)



**Fig. 2.** Axial CT-scan view showing a left lower segmental renal vein thrombosis (orange arrow). (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

of the extrinsic pathway.<sup>2</sup> Clinically it is hard to distinguish the RVT symptoms from those of APN. Computed tomography allows the diagnosis in the majority of cases; however, visualization of thrombosis is not always straightforward especially when the segmental veins are concerned. RVT secondary to APN is sign of severity and could be potentially life threatening. Two cases of inferior vena cava extension have been reported. One was managed surgically<sup>3</sup> and the other conservatively.<sup>4</sup> Percutaneous treatment also seems to be an option in some cases of life-threatening extensive thrombosis.<sup>5</sup> In most cases of thrombosis



**Fig. 3.** Coronal view of the thrombosis which arrives at the insertion in the renal vein without protrusion (orange arrow). Note that the superior segmental branches (blue arrow) and the renal vein (star) remain patent. (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

limited to the renal vein and segmental branches, conservative management with heparin-warfarin therapy with a duration of 3 months suffices.<sup>1</sup> The main differential diagnosis when confronted with a patient presenting with a renal abscess and RVT is a malignant process of the kidney.<sup>3</sup> Repeat imaging after resolution of the septic episode would help unmasking an underlying neoplasm.

#### 4. Conclusion

RVT is a rare manifestation of acute pyelonephritis and KP is the most commonly implicated pathogen. Diagnosis is primordial as IVC extension and septic pulmonary embolism are life threatening possible outcomes if left untreated. An underlying neoplasm remains a possibility.

#### References

1. Yildiz H, Van Nieuwenhove S, Doyen M, Yombi JC. Acute pyelonephritis and renal vein thrombosis: a case report and review of the literature. *J Infect Chemother.* 2016; 22(11):759–761. <https://doi.org/10.1016/j.jiac.2016.04.009>. Epub 2016 May 24. PMID: 27234357.
2. Lurz KL, Hanna DN, McGreen BH, Schanne FJ. A rare case of renal vein thrombosis secondary to *Klebsiella pneumoniae* pyelonephritis. *Urol Ann.* 2018;10(1):103–105. [https://doi.org/10.4103/UA.UA\\_123\\_17](https://doi.org/10.4103/UA.UA_123_17). PMID: 29416285; PMCID: PMC5791445.
3. Eijsten A, Leisinger HJ, Jucker A. Unilateral pyelonephrosis with septic thrombosis of the renal vein and vena cava. *Urol Int.* 1986;41:77–79. <https://doi.org/10.1159/000281167>.
4. Kumar S, Singh SK, Mavuduru RS, et al. Acute pyelonephritis with renal vein and inferior vena cava thrombosis in a case of hyperhomocysteinemia. *Int Urol Nephrol.* 2009;41(1):185–188. <https://doi.org/10.1007/s11255-008-9366-3>. Epub 2008 Apr 1. PMID: 18379893.
5. Novelli L, Raynaud A, Pellerin O, et al. Percutaneous manual aspiration embolectomy of renal vein thrombosis due to acute pyelonephritis. *Cardiovasc Intervent Radiol.* 2007;30:1075–1078. <https://doi.org/10.1007/s00270-007-9035-4>.