Section: Miscellaneous

Case Report

RENAL VEIN THROMBOSIS: AN UNUSUAL COMPLICATION OF ACUTE PYELONEPHRITIS

Chetankumar V. Vaghani[1], Ankita C. Vaghani[2], Jaydeep Patel[3], Hemil Patel[4]

[1]*Consultant Physician, Vaghani Hospital and Maternity Home, Surat, Gujarat, India*
[2]*MBBS, Primary Care Physician, DGO, Obstetrician and Gynecologist, Vaghani Hospital and Maternity Home, Surat, Gujarat, India*
[3]*MD, DM, (Nephrology), Nephron Kidney Care, Surat, Gujarat, India*
[4]*Consultant Vascular and Endovascular Surgeon, Vascular First, Vein and Artery Clinic, Surat, Gujarat, India*

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Corresponding Author:
Dr. Chetankumar V,
Consultant Physician, Vaghani Hospital and Maternity Home, Surat, Gujarat, India
Email: chetanvaghani@gmail.com

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ABSTRACT

Renal vein thrombosis (RVT) is a relatively uncommon condition that is most frequently observed in individuals with nephrotic syndrome. While rare, pyelonephritis (PN) may serve as a predisposing factor for secondary RVT. A 44-year-old male presented with 3-day history of left flank pain, nausea, vomiting, and fever with chills. Physical examination showed - Fever (101.2°F) and Left costo-vertebral angle tenderness. Laboratory test results showed elevated CRP level, white blood cell count at 14,200/mm3. Urinalysis showed - 25-30 pus cells/hpf. Abdominal CT scan showed left renal vein thrombosis The patient improved after intravenous antibiotics and anticoagulation treatment. His condition improved with reduced pain and his renal function stabilized. Patient remained asymptomatic after resolution of the episode.

Keywords: Acute Pyelonephritis, Anticoagulation Therapy, Renal Vein Thrombosis.

INTRODUCTION

Renal vein thrombosis (RVT) is a rare but serious condition that can lead to significant renal dysfunction and complications if left untreated. RVT typically results from a variety of factors such as hypercoagulable states, renal tumors, trauma, or infections. While the presence of acute pyelonephritis as a contributing factor to renal vein thrombosis is uncommon, it has been increasingly recognized in clinical practice. Renal vein thrombosis, in particular, has been described as an unusual yet significant complication of acute pyelonephritis, a common bacterial infection of the kidneys that primarily affects the renal parenchyma and pelvis.[1]

Acute pyelonephritis is a well-documented condition, often presenting with fever, flank pain, and dysuria, caused by ascending bacterial infections, most commonly by Escherichia coli (E. coli). However, the pathophysiological mechanisms leading to RVT in the context of pyelonephritis are not fully understood. Inflammation associated with infection can result in venous stasis, endothelial injury, and hypercoagulability, all of which predispose individuals to the development of thrombotic events.[2,3] This complication may present with nonspecific symptoms such as hematuria, abdominal pain, and flank tenderness, making early diagnosis challenging.[4] Furthermore, renal vein thrombosis may be associated with other complications, such as impaired renal function, the risk of pulmonary embolism, and, if untreated, long-term renal damage.[1,5]

The management of RVT associated with acute pyelonephritis generally involves anticoagulation therapy, which helps to prevent further thrombus formation and promotes thrombus resolution.[6] Prompt recognition and early intervention are key to reducing the risk of irreversible kidney damage and systemic complications. Imaging modalities such as Doppler ultrasound and CT scan are vital in diagnosing and evaluating the extent of thrombosis, which guides therapeutic strategies.[7] This case report highlights the importance of considering renal vein thrombosis as a differential diagnosis in patients with acute pyelonephritis, especially when there are persistent or worsening renal symptoms.

Case presentation

A 44-year-old male patient presented to the emergency department with complaints of left-sided abdominal pain nausea, vomiting, and fever with chills for 3 days. The abdominal pain began 3 days ago and gradually worsened, with the pain becoming more severe over the past two days. Upon admission,

the patient had a fever (101◦ F), a pulse rate of 110/min.

On physical examination, the patient was alert and oriented, with vital signs stable: blood pressure 130/80 mmHg, heart rate 110 beats/min, respiratory rate 16 breaths/min, oxygen saturation 98% on room air, and temperature 101°F. Examination of the abdomen revealed revealed tenderness in the left flank and Left costo-vertebral angle tenderness with stable vital signs. The rest of the physical exam was unremarkable, with no peripheral edema and normal pulses in all limbs.

Initial imaging evaluation of the left kidney and ureter with renal ultrasound showed an enlarged globular left kidney, Left-sided pyelonephritis, Upper ureteritis and Perinephric edema. Next, an abdominal computed tomography was performed which showed acute thrombosis of the left renal vein and its branches protruding to the inferior vena cava, 3-mm left renal calculus. Both renal veins and arteries were patent. [Figure 1-3]

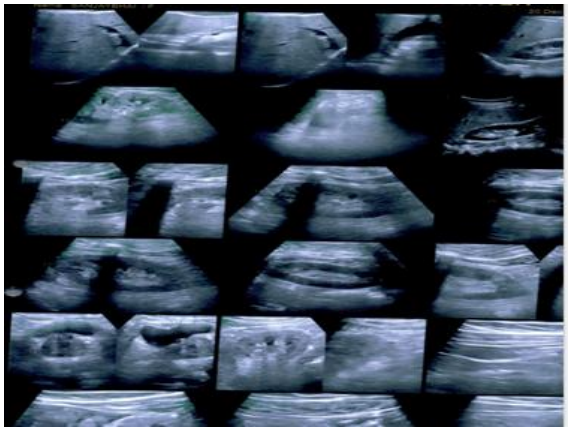

Figure 1

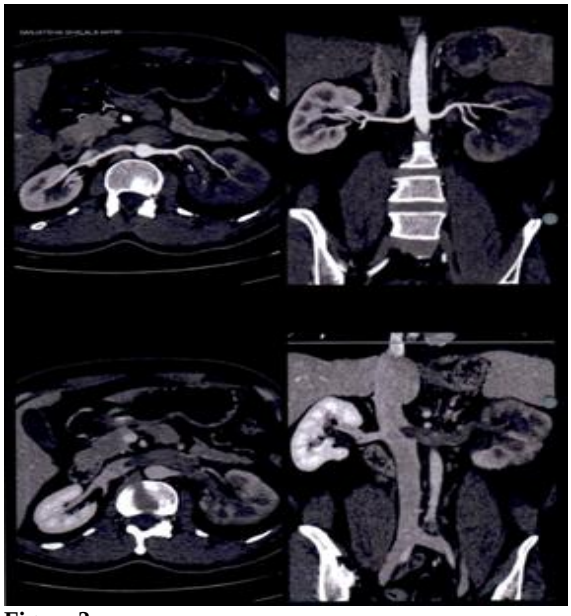

Figure 2

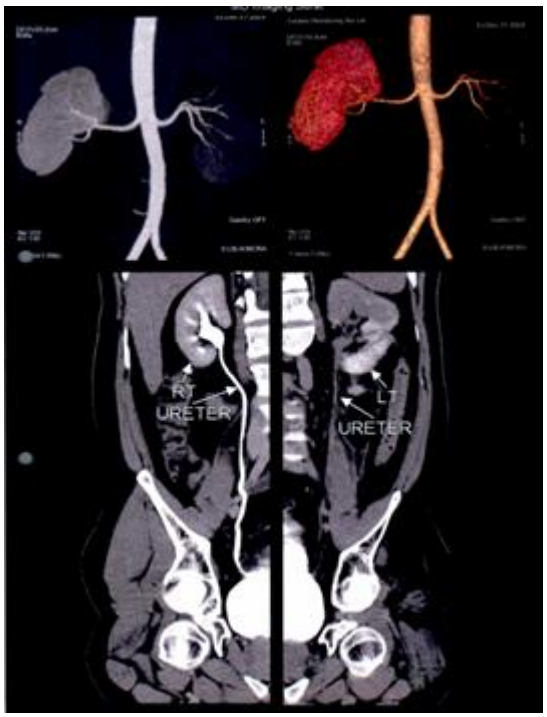

Figure 3

Laboratory tests showed white blood count (WBC) of 14,200/mm3, mild anemia, and elevated inflammatory marker (CRP level 41 UI/L). The urinalysis revealed Urinalysis showed pyuria (25-30 pus cells/hpf) and bacteriuria. we conducted a series of tests, including TSH, ANA-IF, Complement C3 level, antithrombin 3, protein C and S, lipid profile, HIV, HBsAg, and HCV, all of which yielded normal results. However, homocysteine level was elevated at 27.75.

Given the diagnosis of RVT, the patient was started on low-molecular-weight heparin with the goal of maintaining his PTT between 60–80 seconds and his international normalized ratio (INR) between 2.0 and 3.0.

Intravenous antibiotherapy based on 3rd generation cefalosporin was initiated. Urine cultures grew Escherichia coli and the patient was discharged with an oral prescription oral antibiotics 2 days after admission. Evolution was marked by the disappearance of fever and pain. Molecular Weight Heparin which was transitioned to oral rivaroxaban, a non-vitamin K antagonist oral anticoagulant for 6 months. Patient remained asymptomatic after resolution of the episode. This case underscores the need for vigilant monitoring and management of thrombotic complications.

DISCUSSION

Renal vein thrombosis (RVT) is a rare but serious complication of acute pyelonephritis, an infection that can lead to significant renal damage if not promptly treated. Although acute pyelonephritis is a common condition, the development of RVT remains an unusual and potentially life-threatening

complication. As demonstrated in this case, renal vein thrombosis can arise due to the inflammatory response triggered by the infection, which leads to increased coagulability and impaired blood flow in the renal veins.[8] This can result in significant complications, including renal dysfunction, and even systemic thromboembolic events if left untreated.[9]

The pathophysiology of RVT in the context of acute pyelonephritis is believed to involve endothelial injury caused by the infectious process, leading to local thrombus formation. Inflammation from the infection can promote a hypercoagulable state by increasing procoagulant factors and promoting venous stasis.[10] Renal vein thrombosismay not always present with the typical symptoms of deep venous thrombosis, such as lower limb swelling, which can complicate diagnosis. Instead, it can manifest nonspecific symptoms like hematuria, flank pain, and abdominal tenderness, often delaying proper recognition.[11]

The role of Doppler ultrasound is pivotal in diagnosing RVT, as it can identify the thrombus and assess renal blood flow. This modality remains the preferred initial imaging technique because of its non-invasive nature and ability to detect thrombotic involvement in the renal veins.[12] However, in more complex cases or when further detail is needed, advanced imaging techniques such as CT and MRI are also valuable.[13] In this case, the use of Doppler ultrasound and subsequent CT scan was instrumental in evaluating the extent of the thrombus, as well as ruling out other potential complications.[14]

Treatment of RVT associated with pyelonephritis primarily involves anticoagulation therapy to prevent further thrombus formation and promote the resolution of existing thrombi. Heparin and low-molecular-weight heparin are commonly used in the acute phase, followed by long-term anticoagulation with warfarin or direct oral anticoagulants. However, the use of anticoagulants must be carefully managed, especially in patients with compromised renal function, as renal clearance of these drugs can be impaired.[15] In this patient, the renal function was monitored closely, and anticoagulation was adjusted accordingly to minimize the risk of further complications. This case also highlights the importance of timely antibiotic therapy to address the underlying infection.[8]

Early recognition and intervention in cases of RVT are crucial to minimize the risk of irreversible kidney damage and systemic complications. The patient in this case began to show improvement with a reduction in flank pain appropriate management, including both antimicrobial therapy and anticoagulation. The resolution of symptoms, stabilization of renal function, and continued anticoagulation therapy ensured a positive outcome, illustrating the importance of comprehensive care in managing such complicated cases.

CONCLUSION

Renal vein thrombosis (SRVT) is a rare but serious complication of acute pyelonephritis, which requires prompt recognition and appropriate management to prevent further renal damage and systemic complications. This case highlights the importance of considering RVT in patients with persistent or unusual symptoms despite appropriate antibiotic therapy. Early diagnosis using imaging modalities like Doppler ultrasound and timely anticoagulation therapy are essential in improving patient outcomes. Close monitoring of renal function and careful management of anticoagulation therapy can significantly reduce the risk of long-term complications.

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