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Sepsis-Induced Left-Sided Acute Pyelonephritis Complicated by Left Renal Abscess Left Pleural Effusion and Left Renal Vein Thrombosis - A Multidisciplinary Management Case Report

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Abstract: ***Pyelonephritis leading to urosepsis is a serious and potentially life-threatening condition, particularly in the presence of urinary tract obstruction and following urological interventions. We report the case of a 22-year-old female who initially presented with high- grade fever and thrombocytopenia. During hospitalization, she was diagnosed with obstructive uropathy and left Pyelonephritis for which she underwent cystoscopy with double J (DJ) stenting. Subsequently, the patient developed urosepsis. Her condition was further complicated by left pleural effusion and left renal vein thrombosis. She was managed with broad-spectrum intravenous antibiotics, respiratory support, anticoagulation, and multidisciplinary care. Gradual clinical improvement was achieved, and the patient was discharged in stable condition. This case highlights the importance of early recognition of post-procedural complications and improve patient outcomes.***

Keywords: Pyelonephritis, Cystoscopy Double J stenting, Ureteric calculus, left Obstructive uropathy, left Renal vein thrombosis, left pleural effusion

1. Introduction

Acute pyelonephritis is a bacterial infection involving the renal parenchyma and collecting system, most commonly resulting from ascending urinary tract infection. It is a significant clinical condition that can range from mild illness to severe sepsis, particularly in young women and vulnerable populations.[1][2] The global burden of urinary tract infections remains high, contributing substantially to morbidity and healthcare utilization worldwide.[1]

If not treated promptly, acute pyelonephritis may progress to complications such as renal abscess, emphysematous pyelonephritis, and systemic sepsis.[2] Renal abscess formation typically occurs due to delayed diagnosis or inadequate antimicrobial therapy and often requires interventional procedures in addition to antibiotics.[3] Sepsis secondary to urinary tract infection is a major contributor to hospital admissions and is associated with significant mortality if not recognized early.[5] Early imaging modalities such as ultrasonography and computed tomography are essential in identifying complications and guiding management strategies.[4]

Rarely, severe infections may be associated with extra-renal manifestations such as pleural effusion due to systemic inflammatory response or contiguous spread.[6] Prompt initiation of broad-spectrum antibiotics along with timely urological intervention is crucial in improving outcomes and preventing disease progression.[5]

In addition, the presence urinary tract obstruction, renal calculi, and recent urological instrumentation significantly increase the risk of severe infection and urosepsis. Obstructive uropathy leads to urinary stasis and increased intrarenal pressure, creating an environment favourable for bacterial proliferation and systemic dissemination.[7][8] Procedures such as cystoscopy and double J (DJ) stenting, although essential for relieving obstruction, may further increase the risk of bacteraemia and post-procedural infections, particularly in already infected systems.[7] Urosepsis can contribute to venous thromboembolism (VTE) through sepsis-induced inflammation, endothelial injury, activation of the coagulation cascade, and prolonged immobilization. These mechanisms create a hypercoagulable state that increases the risk of deep vein thrombosis, including involvement of the left lower limb veins. [10]

Microbiologically, Escherichia coli remains the most common causative organism, followed by other Gram-negative bacilli, with increasing antimicrobial resistance posing a challenge in management.[9] Therefore, early identification of high-risk patients, appropriate empirical antibiotic therapy based on local resistance patterns, and timely source control are essential in reducing morbidity and improving clinical outcomes.[8]

2. Case Presentation

A 22-year-old female with no significant past medical history presented with complaints of high-grade fever for five days, which persisted despite prior outpatient treatment, and on admission she was febrile with a temperature of 39.3°C and laboratory investigations revealed thrombocytopenia, for which she was admitted and managed. Radiological evaluation revealed features suggestive of left-sided pyelonephritis with associated perinephric inflammation was 367mg/dl, total counts 17k. Urine culture findings were suggestive of urosepsis secondary to severe urinary tract infection. Elevated CRP levels (>40 mg/L) indicated bacterial infection, while markedly increased levels (>200 mg/L) are suggestive of severe sepsis. An obstructive left ureteric calculus measuring approximately 6.3 × 5.4 mm at the L4–L5 vertebral level was identified, causing mild upstream hydroureteronephrosis, indicating obstructive uropathy. Additionally, there was evidence of bilateral pleural effusion,

more pronounced on the left side, with underlying passive atelectasis. Minimal pericholecystic fluid was noted, likely reactive in nature. The imaging also demonstrated hepatomegaly, for which liver function correlation was advised. No significant abnormalities were detected in the brain and neck regions. These findings collectively support the diagnosis of obstructive pyelonephritis with systemic complications. During the course of hospitalization, she developed urinary symptoms and further evaluation revealed left-sided ureteric calculus with obstructive uropathy, for which she underwent cystoscopy with left double J (DJ) stenting to relieve the obstruction. Following the procedure, her condition worsened with persistent fever, tachycardia, and signs of systemic infection, and she was diagnosed with urosepsis secondary to urinary tract infection, necessitating transfer to the intensive care unit where she required oxygen support including BiPAP ventilation, intravenous fluid resuscitation, and close monitoring. She was started on broad-spectrum intravenous antibiotics underwent Foley catheterization for urine output monitoring and central venous access for critical care management. During her hospital stay, further complications including left-sided pleural effusion and left renal vein thrombosis were identified, for which appropriate management including anticoagulation therapy and the patient underwent intercostal drainage (ICD) insertion (pleural fluid drainage) for therapeutic management. multidisciplinary care involving urology, pulmonology, and critical care teams was provided, following which the patient showed gradual clinical improvement with stabilization of vital parameters and resolution of acute symptoms. At the time of discharge, the patient was hemodynamically stable, afebrile, and clinically improved, and was discharged on oral antibiotics as step-down therapy, anticoagulants for renal vein thrombosis, analgesics, proton pump inhibitors, and supportive medications with advice for regular follow-up and further evaluation.

3. Discussion

Acute pyelonephritis represents a serious infection of the upper urinary tract that may progress to urosepsis, especially when associated with urinary obstruction such as ureteric calculi. Obstruction impairs urine flow and increases intrarenal pressure, creating conditions that favour bacterial growth and systemic spread of infection.[7][8] In this case, the presence of obstructive uropathy combined with urological intervention in the form of cystoscopy and DJ stenting likely contributed to the development of infection, as instrumentation of the urinary tract can facilitate microbial entry[9] The occurrence of complications including pleural effusion and renal vein thrombosis indicates a severe systemic inflammatory response and associated prothrombotic state. Effective management depends on early identification, timely administration of appropriate antibiotics, and adequate source control to reduce the risk of adverse outcomes.[8] This case emphasizes the importance of early identification of high-risk patients, close post-procedural monitoring, and timely multidisciplinary intervention to prevent adverse outcomes.

4. Conclusion

This case highlights a severe progression of obstructive uropathy due to ureteric calculus to post-procedural urosepsis following cystoscopy with DJ stenting. It underscores how underlying obstruction combined with urological instrumentation can predispose to rapid systemic infection and serious complications such as respiratory distress, pleural effusion, and renal vein thrombosis. The case emphasizes the importance of early recognition of sepsis, vigilant post-procedural monitoring, and prompt initiation of broad-spectrum antibiotics along with timely supportive care. A multidisciplinary approach played a crucial role in the favourable outcome. Early intervention and effective source control remain key factors in reducing morbidity and preventing life-threatening complications in similar clinical scenarios.

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