



In response to “Emphysematous Urinary Tract Infections in Diabetics”

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Dear Editor,

We sincerely value the insightful comments offered by the author of the letter concerning our article.¹ We are grateful for the opportunity to engage in further discussion about this disease. Emphysematous pyelonephritis (EPN) represents a severe acute kidney infection. Over the past two to three decades, the treatment paradigm for EPN has transitioned from invasive surgical interventions to a more conservative approach. This shift is attributed to advancements in imaging techniques, antibiotics, and drainage technologies, resulting in a significant reduction in associated mortality rates.

Huang and Tseng² proposed an imaging grading system to aid clinical decision making. According to computed tomography (CT) findings, EPN is categorized into the following grades: Grade 1, indicating the presence of gas solely within the collecting system; Grade 2, denoting intraparenchymal gas without extension into the perinephric space; Grade 3A, where gas or abscess extends into the perinephric space; Grade 3B, where gas or abscess extends into the pararenal space; and Grade 4, which encompasses bilateral EPN or EPN in a solitary kidney. The therapeutic approach for EPN is customized according to the severity of the patient's condition. Patients with Grade 1 and Grade 2 EPN typically respond favorably to treatment with antibiotics and percutaneous drainage (PCD). In cases of severe EPN (Grade 3 or Grade 4), if PCD combined with antibiotic therapy proves ineffective, nephrectomy serves as a final resort.

A systematic review was conducted to evaluate the impact of risk factors and treatment modalities on the outcomes of EPN. The review revealed that the mortality rate for patients undergoing emergency nephrectomy was 26%. For those treated solely with medical therapy, the rate stood at 9.7%, while it was 10% for those who received medical treatment in conjunction with minimally invasive therapy.³ However, patients who did not respond to medical or minimally invasive interventions and necessitated salvage emergency nephrectomy experienced a mortality rate exceeding 27%.

In a study conducted by Rahim MA et al.,⁴ comprising 20 patients with EPN, all participants initially underwent antimicrobial therapy. Of these, 2% required dialysis, 3% underwent nephrectomy, and 1% underwent drainage procedures. Notably, the cure rate reached an impressive 100%. It is worth mentioning that most patients (80%) presented with Grade 2 EPN, indicating a relatively mild overall severity of the disease among the cohort.

Despite its declining usage, nephrectomy remains a critical therapeutic option for patients unresponsive to conservative treatments. For patients with poorly controlled EPN, especially those with Grade 3 or Grade 4 severity, subsequent nephrectomy may still be necessary if medical therapy and PCD prove ineffective.⁵ The prognosis of EPN is influenced by various factors. Numerous studies have demonstrated that certain initial presentations are significantly associated with mortality. These include thrombocytopenia upon admission, altered mental status, shock, and obesity. Additionally, complications, such as polymicrobial infection, bacteremia, hypoalbuminemia, and acute kidney injury are also strongly associated with mortality. These complications may necessitate hemodialysis due to renal parenchymal damage, resulting in hematuria and proteinuria.^{2,4,6}

Our case pertains to an elderly woman who presented with severe bilateral EPN and emphysematous cystitis. Upon admission, she exhibited severe sepsis, including severe pneumonia and a hepatic abscess. Subsequently, she developed electrolyte imbalances, septic shock, and type I respiratory failure, accompanied by various complications. Due to her unstable clinical condition, she received medical management in the intensive care unit, which included broad-spectrum antibiotics, antifungal therapy, and renal replacement therapy (RRT). Unfortunately, despite aggressive treatment, the patient succumbed to the severe infection.

Treating bilateral EPN poses a significant challenge. Most Grade 4 patients exhibit poor baseline conditions and may not tolerate surgical intervention. While there have been reported cases where bilateral nephrectomy saved patients' lives,⁷ it's important to note that

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such procedures can lead to various postoperative complications, including pyogenic cystitis, anemia, persistent urinary retention, and dependence on dialysis. Hollingshead et al.⁸ documented a case of bilateral EPN that achieved a complete cure without residual sequelae through an 8-week course of antimicrobial therapy, bilateral nephrostomy tube drainage, and RRT.

Nevertheless, acknowledging the limitations of the current research on EPN is crucial. These limitations primarily stem from predominantly single-center studies, a lack of large sample cases, and mostly retrospective study designs. To address these limitations and enhance our understanding of EPN management, protocol-based, multicenter, larger-sample prospective studies are warranted. Such studies have the potential to offer valuable insights into clinical practice and help establish management guidelines for EPN patients.

We stress the importance of early recognition of EPN. In elderly patients with poorly controlled diabetes, any signs of infection or urinary symptoms should prompt immediate medical attention and early CT scanning. It is imperative to devise appropriate management strategies, including early initiation of antibiotic therapy and ensuring adequate drainage through interventions, such as ureteral stenting or PCD. These measures are crucial for

improving prognosis and preventing progression to Grade 3 or Grade 4 EPN.

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