

Case Report

Emphysematous Pyelonephritis: Radiological Perspective

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Abstract:

Emphysematous pyelonephritis (EPN) is an acute necrotizing parenchymal and perirenal infection and is caused by gas-forming organisms. Diabetes mellitus and ureteric obstruction are the predisposing factors for EPN. Computerized tomography (CT) scan is the modality of choice in diagnosing the disease, determining the extent of infection and helps in management. We report a case of emphysematous pyelonephritis in 52 years old man with emphasis on plain radiographic and CT scan findings.

Key Words: Emphysematous pyelonephritis, Nephrectomy, Computed tomography, Plain radiograph

Introduction:

In 1962 Schultz et al was first to describe emphysematous pyelonephritis (EPN) as presence of gas in renal parenchyma. It is a life-threatening, acute necrotizing infection of the renal parenchyma and perirenal tissue with a high mortality rate. The presence of gas within the renal parenchyma, collecting system or perinephric tissue is the characteristic features. According to several literatures, 70 to 90 % of reported cases are found in diabetic patients^{2,3}. EPN in non-diabetic patient had rarely been reported in literature, and the predisposing factors are urinary tract obstruction secondary to stones, immunosuppression, renal tumor or sloughed papilla⁴.

We herein report a case of emphysematous pyelonephritis in a 52 years old male with type II diabetes mellitus who was successfully managed by nephrectomy.

Case Presentation:

A 52 years old male patient presented with complaints of fever with chills and rigors, abdominal pain and dysuria of three days duration. Blood pres-

sure, pulse rate and respiratory rate were within normal limits. He was conscious and well oriented with time, place and person. Abdominal examination revealed tenderness at the left renal angle and palpable lump at the left upper abdomen. Laboratory investigation revealed leukocytosis and deranged kidney function. Urine microscopic examination revealed numerous pus cells and culture shows escherichia coli.

Plain radiograph (AP view) of the abdomen revealed enlarged left kidney with crescent shaped radiolucent area in the left renal area (Figure 1). Ultrasound of abdomen shows enlarged left kidney with destruction of renal parenchyma and presence of air in the renal and perirenal area. With the suspicion of EPN, non-contrast Computed tomography (CT) scan of abdomen was done, which revealed enlarged left kidney with presence of air in the renal and perirenal area with renal parenchymal destruction (Figure 2). The diagnosis of left kidney emphysematous pyelonephritis was made, the patient undergone nephrectomy. Post-operative period was uneventful.

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Discussion:

Emphysematous pyelonephritis (EPN) is a rare necrotizing infection of the upper urinary tract. It is seen in 90% patients with diabetes mellitus and is predominantly seen in females⁷. Female to male ratio is approximately 3:1. Left kidney is more commonly involved (60%) than the right kidney (35 %); bilateral renal involvement is found to be 5%⁸. Urinary tract obstruction is seen 30% patients. *E coli*, *Klebsiella pneumonia* and *Proteus mirabilis* are the most common organisms causing EPN⁶. Gas in the renal tissues is pathognomonic of EPN.

In patients with flank pain, fever and history of diabetes mellitus and calculus disease, EPN should be strongly suspected. Renal or perirenal air can be detected on x-ray film and on ultrasound; however CT scan is the modality of choice in the diagnosis and staging of the disease and is recommended in all patients in whom EPN is suspected. CT scan also helps to exclude the possibility of obstruction and urinary tract stones. Usually plain CT scan is sufficient to provide adequate information; however, contrast study should be performed unless contraindicated as it can more precisely localize gas in the renal parenchyma which helps in the classification of the disease⁵. CT scan of abdomen shows parenchymal enlargement and destruction, small bubbly or linear streaks of gas, fluid collections, gas-fluid levels and focal tissue necrosis with or without abscess^{12,13}. On the basis of CT scan, EPN can be classified into two types¹². Type 1 EPN is characterized by renal parenchymal destruction with either absence of fluid collection or presence of streaky or mottled gas and has a fulminant course with mortality of 69%. Type 2 EPN is characterized by either renal or perinephric fluid collection with bubbly or loculated gas or gas in the collecting system and has mortality of 18%.

Plain radiograph abdomen shows crescent shaped radiolucent areas in perirenal area (suggesting perinephric gas collection) and mottled radiolucent shadows in the renal parenchyma (suggesting gas in the renal parenchyma). Radio-opaque shadows indicating stone can also be seen. On ultrasound, enlarged kidney with parenchymal destruction and echogenic gas locules within the renal parenchyma and perirenal area casting dirty shadows can be seen⁹.

EPN is a rapidly progressive disease and carries a

high mortality rate if not treated early. According to some authors, aggressive medical and interventional therapy is advised in considering high mortality rate with medical therapy¹⁰. Successful treatment with CT-guided percutaneous nephrostomy drainage combined with antibiotics has been reported by many authors¹³. However, nephrectomy is the treatment of choice in EPN and most of the patients still require nephrectomy inspite of improved renal function after medical therapy combined with relief of obstruction.

Conclusion:

Emphysematous pyelonephritis is a severe and life threatening disease with high mortality rate. CT scan is the modality of choice in emphysematous pyelonephritis for not only making a proper diagnosis but also in planning the treatment option and nephrectomy is the treatment of choice.

Figure I: Plain radiograph of abdomen showing enlarged left kidney with surrounding crescent shaped radiolucent area suggesting collection of air.



Figure IIa and IIb: Non-contrast CT abdomen (axial section) showing enlarged left kidney with parenchymal destruction and air within the renal parenchyma, collecting system and perinephric region.

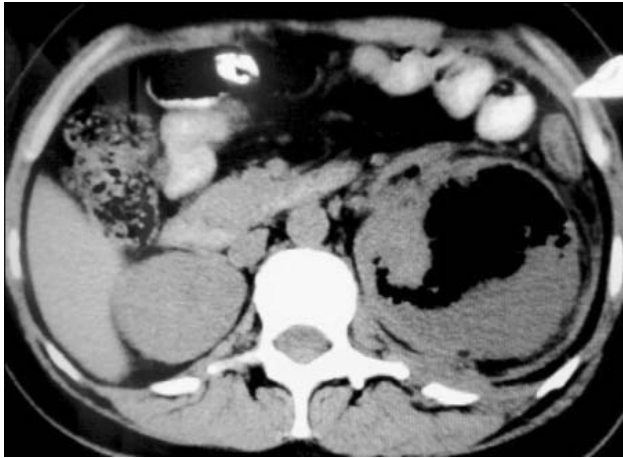


Figure IIa



Figure IIb

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