

EXTENSIVE RENAL DESTRUCTION DUE TO SEVERE EMPHYSEMATOUS PYELONEPHRITIS

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SUMMARY: Emphysematous pyelonephritis (EPN) is a severe necrotizing infection of the kidney characterized by the presence of gas in renal parenchyma, collecting system or perinephric tissue. It can be life threatening if not recognized and treated promptly. We have reported the case of a 56-year-old woman with a previous history of diabetes mellitus, who was suffering from left-sided flank pain and fever. Diagnosis workup revealed an extensive destruction of the left kidney secondary to an EPN. We opted for a left nephrectomy and intravenous antibiotics. The immediate postoperative course was uncomplicated but the patient developed a chronic renal failure within 1 year.

Key Words: emphysematous, pyelonephritis, renal destruction, diabetes mellitus.

INTRODUCTION

Emphysematous pyelonephritis (EPN) is a severe necrotizing infection of the renal parenchyma and/or its surrounding tissues that results in the presence of gas in the renal parenchyma, collecting system, or perinephric tissue. The clinical course of EPN can be severe and life threatening if not recognized and treated promptly.

CASE REPORT

A 56-year-old woman with history of poorly controlled diabetes mellitus admitted to emergency with a left-sided flank pain and fever that lasted for the last 7 days. She was febrile (39°C), tachypneic, tachycardic,

and hypotensive. After physical examination, we observed flank tenderness and palpable mass.

Her laboratory investigations revealed a leucocytosis (17.103/ml) with thrombocytopenia (60.103/ml), hyperglycemia 320 mg/dl but no renal failure (creatinin level 1,3 mg/dl). Blood and urine cultures were positive for *Escherichia coli*. Plain abdominal X-ray showed reniform-shaped presence of air in the left renal area (Figure 1), and abdominal CT revealed an extensive destruction of the left kidney and presence of air within Gerota's fascia (Figures 2, 3). After resuscitation measures and culture-specific parenteral antibiotics, we opted for a nephrectomy. The immediate postoperative course was uncomplicated.

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Figure 1: Plain abdominal radiography, reniform-shaped presence of air in the left renal area (arrow).

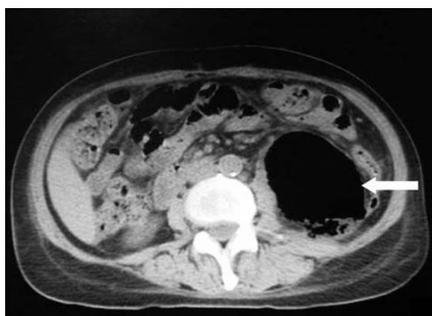


Figure 2: Computerized tomography of the abdomen, noncontrast sagittal image. Extensive destruction of the left kidney with massive air collection within Gerota's fascia (arrow).



Figure 3: computed tomography of the abdomen, noncontrast coronal reconstruction image. Extensive destruction of the left kidney with massive air collection within Gerota's fascia (arrow).

DISCUSSION

EPN is an acute, necrotizing and fast-developing infection of renal and perirenal tissues, caused by gas-

Table 1: Huang and Tseng scanographic classification of emphysematous pyelonephritis (5).

I:	Gas in the collecting system (emphysematous pyelitis)
II:	Air in the parenchyma without extrarenal extension
IIIA:	Gas or abscess in the perirenal space
IIIB:	Gas or abscess in the pararenal space
IV:	Bilateral disease or in a unique kidney

producing Enterobacteriaceae organisms (1). This disease generally affects one kidney, but is bilateral in 5%-7% of the cases. The frequency is higher among females between 40 and 60 years old (2). The most known risk factors for the development of emphysematous infection of the upper urinary tract consist in diabetes – observed in 87% of the cases– and urinary tract obstruction – found in 20-40% of the cases. The main hypothesis explaining gas formation in the urinary tract is the intrarenal glucose fermentation. Four factors are thought to be responsible: anaerobic organisms, elevated intratissular glucose level, deterioration of tissular perfusion, and altered immune response (1). Microorganisms identified during EPN are quite similar to those found in the other urinary tract infections. Gram-negative bacilli are the most incriminated bacteria. *E. coli* is the most frequently isolated organism, with a frequency ranging between 50% and 75%, followed by *Klebsiella pneumoniae*, *Proteus mirabilis*, *Morganella morganii*, *Pseudomonas aeruginosa*, and *Enterobacter*. Fungus or anaerobic bacteria seldom appear, and in 20% of the cases, more than one agent can be located (1, 2).

Clinical findings are not specific; symptoms and signs are those observed in any acute pyelonephritis and are dominated by lumbar pain associated with fever (1). Physical examination locates lumbar tenderness or guarding. A delay in diagnosis of 7-21 days is common in diabetic patients due to symptoms attenuation. In such patients presenting recent impairment of the general state associated with diabetes decompensation (3). Laboratory serum analysis confirms the sepsis by showing elevated white blood cell count over 10,000/mm³, leucopenia less than 4,000/mm³, or thrombocytopenia.

Initial diagnosis is made by ultrasound and plain X-

ray, but computed tomography (CT) with intravenous contrast is the "gold-standard" since it identifies the gas, evaluates renal parenchyma and perirenal tissues as well as the urinary tract and surrounding vessels, and also helps in surgical planning (2, 3, 4). In fact, Huang and Tseng (5) established a scanographic classification having a prognostic value and an impact on the therapeutic decision of EPN.

Prognostic factors indicating a poor response to therapy and risk of death have been suggested. Among these we can cite the following: thrombocytopenia (less than 120,000 platelets), acute renal failure (serum creatinin >3 mg/dl), disturbance of consciousness, and signs of septic shock (6, 7). Whenever two or more of these are present, conservative management is contraindicated since the failure rate reaches 92% (vs 15% with only one factor) (8).

Management of EPN includes general support; antibiotics; and percutaneous, endoscopic, or open drainage according to disease severity and local progression. In many cases, immediate or deferred

nephrectomy is required (1-8).

A tailored treatment according to the CT stage has been suggested, using only antibiotics and percutaneous or endoscopic drainage if required, for stages I and II. For upper stages, a more aggressive approach has been suggested with nephrectomy or wide surgical drainage, due to high failure rates of conservative therapies (8).

With the medical treatment alone, the risk of mortality is 50% versus 25% when it is combined with emergency nephrectomy. Percutaneous drainage associated with the medical treatment decreases mortality to 13.5%, and the deferred nephrectomy becomes necessary only in 6.6% of the cases (9).

CONCLUSION

EPN should be suspected in rapidly deteriorating diabetic patients with pyelonephritis not responding to treatment. CT scan is the method of choice to evaluate local and perirenal tissues. Early diagnosis and management make the difference in survival rates of these patients.

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