

Intrinsic Pneumo-Pyeloureterogram: A Rare Radiological Finding in Emphysematous Pyelonephritis

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ABSTRACT

Infection by gas-forming organisms in the urinary system can produce Emphysematous pyelonephritis (EPN) and has been radiologically graded based on the Computed Tomography (CT) appearance. We present rare radiological images of gas collection inside the renal pelvicalyceal system and the ureter (intrinsic pneumo-pyeloureterogram) without obstruction in a case of EPN treated in our center. EPN producing a pneumo-pyeloureterogram has not so far been reported in literature so far.

CASE REPORT

A 64-year-old woman was admitted with high grade fever, tachypnea, tachycardia, sweating and lethargy. There was left sided costovertebral angle tenderness. Blood pressure recordings were 90/60 mm of Hg. She was previously treated for left sided pyelonephritis three months prior and had poorly controlled diabetes mellitus. The Random blood sugar was 420 mg % and HbA1C was 12.1. Routine urine examination showed severe pyuria. Her total WBC count and C-Reactive Protein were 18,900 cells/ μ L and 260 IU/mL respectively. Blood Urea was 102 mg % and Serum Creatinine

was 2.7 mg %. A clinical diagnosis of pyelonephritis with urosepsis and shock was made. A non-contrast Computed Tomography (CT) of the abdomen revealed gas formation in the left renal pelvicalyceal system which confirmed the diagnosis of emphysematous pyelonephritis (EPN) (Fig 1). The CT topogram revealed an unusual finding of left ureteral dilatation by gas collection contiguous from pelvicalyceal system to the level of mid ureter, however with no distal obstruction (intrinsic pneumo-pyeloureterogram) (Fig. 2). The patient was aggressively treated for urosepsis and shock; however, she succumbed to septic shock within 24 hours after admission.



Figure 1. Computed tomography (CT) image showing gas inside left renal pelvicalyceal system and ureter



Figure 2. CT Topogram showing left Pneumo-pyeloureterogram

DISCUSSION

EPN is a gas forming infection of the kidney caused by gram negative organisms, most commonly by *Escherichia coli*, usually contributed by uncontrolled diabetes mellitus. A non-contrast CT is the imaging of choice, which shows the characteristic finding of gas inside the renal pelvicalyceal system / parenchyma and/or perinephric space with increasing grades of severity.¹ CT scan not only helps in grading of the severity of EPN, but also detects the presence of stones or necrosed papillae causing ureteral obstruction. In our case of EPN, we observed a new and rare pattern of gas formation extending into the ureter creating intrinsic pneumo-pyeloureterogram. The ureteral dilatation and gas formation without distal obstruction could be due to the smooth muscle atony as a result of gram negative endotoxemia. Pneumo-pyeloureterogram probably signifies the extreme severity of the infection with probable fatal outcome, as in our case.

Spontaneous pneumo-pyeloureterogram could be observed many conditions. Sheshanarayana and Keats reported spontaneous pneumo-pyeloureterogram in a case of pyonephrosis with ureteric stricture.² Upper urinary tract infection co existing with ureteral obstruction due to various causes like repeated instrumentation, strictures or calculi can cause pneumopyelogram. Spontaneous gas formation inside the urinary system has also been found when uro-

enteric fistula formation occurs, such as enteroureteral fistula in colonic diverticular disease,³ ureterocolic fistula caused by colonic carcinoma,⁴ and in cases of calyx-colon fistula.⁵ However, this is the first report of a case of radiologically visualized intrinsic pneumo-pyeloureterogram in a case of emphysematous pyelonephritis without ureteral obstruction.

REFERENCES

1. Huang JJ, Tseng CC. Emphysematous pyelonephritis: Clinicoradiological classification, management, prognosis, and pathogenesis. *Arch Intern Med* 2000;160:797-805.
2. Sheshanarayana KN, Keats TE. Spontaneous pneumopyelogram in a non diabetic patient. *Am J Roentgenology*. 1969;107:760-62.
3. Martínez-Valls PLG, Villaplana GH, Aparicio TF, López BM. Spontaneous pneumopyelography for enteroureteral fistula. *ArchEsp Urol*. 2003; 56,9: 1062-5.
4. Virseda JA, Vera JA, Recio R, Olle J, Garcia L. Spontaneous pneumopyelography: ureterocolic fistula caused by rectosigmoid carcinoma. *Arch Esp Urol*. 1981;34(4):289-96.
5. Reinhard B. Calix-colon fistula with spontaneous pneumopyelography. *Fortschr Geb Rontgenstr Nuklearmed*. 1973;118(3):348-49.

Citation: Lal Darsan S, Biju S Pillai, H.Krishna Moorthy, "Intrinsic Pneumo-Pyeloureterogram: A Rare Radiological Finding in Emphysematous Pyelonephritis", *American Research Journal of Urology*, Vol 6, no. 1, 2023, pp. 7-8.

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