CASE REPORT

MANAGING PATIENT WITH COEXISTING EMPHYSEMATOUS PYELONEPHRITIS AND CYSTITIS

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Emphysematous pyelonephritis (EPN) is a type of critical renal infection having dire consequences at times. It is said to be result of gases produced inside renal parenchymal tissue or pelvicalyceal system. Rarely coexistence of emphysematous pyelonephritis and emphysematous cystitis (EC) may lead to an intimidating condition in case it is not dealt with swiftly. The resent case report narrates the management of a 45-year-old female patient who suffered from EPN with concomitant EC. Right-sided emergency percutaneous nephrostomy was passed. Afterwards, Double J stent was passed under general anaesthesia. Although she had an initial improvement clinically but later on due to recurrent urinary tract infections and non-resolving right kidney abscess and fever right sided nephrectomy was done. This is a very rare presentation and has not previously reported much in literature.

Keywords: Emphysematous pyelonephritis; Emphysematous cystitis; Nephrectomy

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INTRODUCTION

Emphysematous pyelonephritis (EPN) is a sort of grave renal infection having dire consequences at times. It is said to be the result of gases produced inside the renal parenchymal tissue or pelvicalyceal system. In some cases, this gas may extend beyond the site of inflammation to the sub-capsular, perinephric and para renal spaces.[1] In most cases, the single culprit is assumed to be uncontrolled diabetes mellitus.[2] Various elements have been tangled in the pathogenesis of this critical condition such as elevated levels of glucose within the tissues, the existence of gas forming micro-organisms in the tissue, blunted vascular supply and so the tissue perfusion, diminished strength of host immunity. The most commonly implicated bacteria types are ~~the~~ *Escherichia coli* and *Klebsiella pneumonia* for its pathogenesis.

Emphysematous pyelonephritis may be complicated at very rare occasions by concurrent emphysematous cystitis (EC). Such kind of this coexistence may lead to an intimidating condition in case it is not dealt with swiftly. In absence of proper steps of management, it can progress so rapidly and gravely that it can become a life-threatening phenomenon.[3,4]

The present case report narrates the management of a 45-year-old female patient who suffered from EPN with concomitant EC.

CASE REPORT

A 45 old lady patient presented to urology department at Pakistan kidney and Liver Institute. In comorbid she had hypertension type 2 diabetes mellitus. She presented with sudden onset and excruciating pain in abdomen. There was nausea at initial presentation without any vomiting. Fever was also present on initial admission.

On physical examination she had pulse of 103/minute while blood pressure was 145/83 mm of mercury. Respiratory rate was 24/minute and oxygen saturation on room air was 93%. Her temperature was 101.3 Fahrenheit. On further examination, her abdomen was not distended and right flank was tender on percussion.

Immediate laboratory investigations were ordered and results illustrated haemoglobin level at 10.26 gram/dl, white cell count 14,330/microliter, platelets 483,000/ microliter of blood. Hepatitis B and C profile was negative. While serum electrolytes were within normal range (Chloride - Serum: 97/ mmol/L, Sodium - Serum: 131/ mmol/L, Potassium - Serum: 4.7/ mmol/L). Blood glucose random was 311 (high). In renal functions test, creatinine was 1.1mg/dl. Urine culture showed *E. coli* growth. In addition to this, Candida albicans was seen in urine culture. On ultrasound abdomen, renal calculi were reported in right kidney. Computed tomography was done that showed 3 cm upper ureter stone with associated hydro nephrosis and furthermore it was noted that there were coexisting emphysematous pyelonephritis and cystitis (Figure 1 and 2).

Initially, Ceftriaxone 1 gram twice daily was started along with foley catheterization of patient. Vital monitoring and supportive treatment were also instituted. Right sided emergency percutaneous nephrostomy was passed. She improved after this

initial treatment in first week of admission and was discharged home. Afterwards, Double J stent was passed under general anaesthesia. Although she had an initial improvement clinically but later on due to recurrent urinary tract infections and non-resolving right kidney abscess and fever right sided nephrectomy was done. After that patient was followed up in clinic (Figure-3). She was doing well and her renal function tests were in normal range.

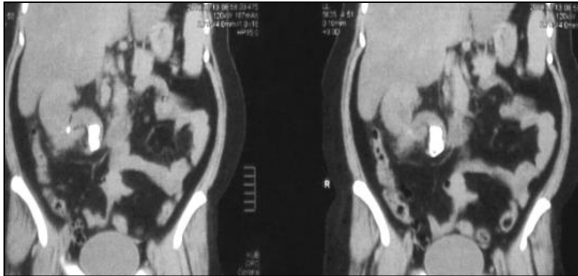

Figure-1: Right renal specks of air seen on non-contrast computed tomography imaging

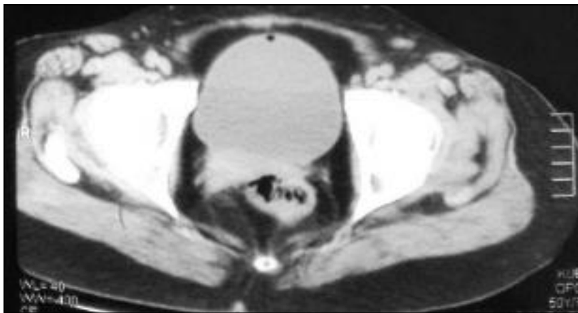

Figure-2: Emphysematous cystitis (speck air seen anterior wall of urinary bladder on computed tomography axial view)

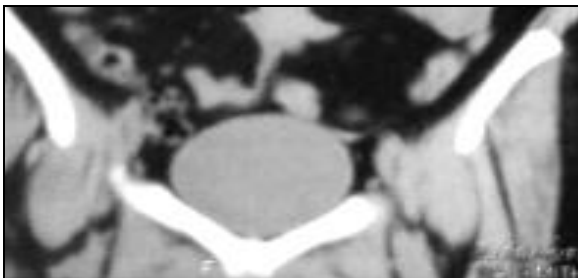

Figure-3. Emphysematous cystitis resolved (computed tomography)

DISCUSSION

As mentioned earlier, Emphysematous pyelonephritis (EC) dreadful necrotizing renal parenchymal infection.[4] It was at first recounted in 1898.[5] It is a sort of severe gas producing renal infection, involving the renal parenchyma, collecting system, or perinephric tissue. Mortality rates may be as high as 40–50%.[5,6] Old age, uncontrolled Diabetes mellitus and urinary tract obstruction are deemed to be the major risk factors, with female predominance seen more in these rare cases.

In some very out of the ordinary situations EPN may also be complicated with EC which is a very rare manifestation of EPN.[7] EC habitually occurs in subjects having a history of diabetes mellitus (DM), those with neurogenic bladder, in the presence of obstructive uropathy. Some authors have insisted on the possible role of immunosuppression as well.[6,7] Similar to the emphysematous pyelonephritis cases here too the predisposition of female gender and background uncontrolled DM has been narrated in few cases in literature. It is suggested that in uncontrolled diabetes mellitus, high concentrations of glucose in tissues impart the microbes with a more complimentary habitat thereby resulting in fermentation of glucose inside the tissues and a resultant production of gas.[7,8] The clinical features in patients suffering from EC may be variable. In some cases, it may be asymptomatic while on other occasions it can present itself as abdominal pain. Pneumaturia (air bubbles that may pass in urine) might be seen in few cases while gross haematuria or grave sepsis can also be present in few of the cases. Urinary tract obstruction has also been observed on rare occasions.[6–8]

As mentioned, emphysematous pyelonephritis is a rare manifestation however coexistence of emphysematous cystitis with it has been a rare phenomenon and till date very few cases have been narrated in literature regarding this specific ailment. Usually, elder patients of age around 55–60 years are affected more from such a coexisting phenomenon. Mortality rate according to one review analysis was around fifteen percent which is too high and as such reiterates the fact to timely manage such critical cases. *E. coli* can be seen in more than half of the affected cases followed by *Enterobacter cloacae* and *Enterococcus*.[7,8] Diagnosis of such condition is dependent on finding gas patterns on CT scans. It allows physician to estimate the location and extent of spread of the emphysematous process and as such can be a helpful tool in guiding case management.[8–10]

Initial aggressive empirical antibiotics along with other interventions increases the chances of patient recovery and halting the process to full blown critical condition. We did urgent percutaneous nephrostomy of the patient followed by passage of Double J stent. Patient improved initially and sepsis was treated. However due to recurrent urinary tract infections that followed later on, delayed elective nephrectomy was performed. Delayed nephrectomy may be required as a salvage procedure in non-resolving infection with poor kidney function or when it becomes threat to patient's health and life.

CONCLUSION

Emphysematous pyelonephritis and coexisting Emphysematous cystitis is a rare condition. Physicians in emergency or outpatient clinic need to correctly diagnose it on Computed tomography images followed by immediate antibiotic treatment. If the additional procedures such as Double J stent and percutaneous nephrostomy doesn't alleviate the infection then nephrectomy may be imperative to get ultimate control of this infection.

REFERENCES

1. Dutta P, Bhansali A, Singh SK, Gupta KL, Baht MH, Masoodi SR, *et al*. Presentation and outcome of emphysematous renal tract disease in patients with diabetes mellitus. Urol Int 2007;78(1):13–22.
2. Boakes E, Batura D. Deriving a management algorithm for emphysematous pyelonephritis: Can we rely on minimally invasive strategies or should we be opting for earlier nephrectomy? Int Urol Nephrol 2017;49(12):2127–36.
3. Momin UZ, Ahmed Z, Nabir S, Ahmed MN, Al Hili S, Khanna M. Emphysematous prostatitis associated with emphysematous pyelonephritis and cystitis: A case report. J Clin Urol 2017;10(3):286–9.
4. Tsu JH, Chan CK, Chu RW, Law IC, Kong CK, Liu PL, *et al*. Emphysematous pyelonephritis: an 8-year retrospective review across four acute hospitals. Asian J Surg 2013;36(3):121–5.
5. Hu SY, Lee BJ, Tsai CA, Hsieh MS. Concurrent emphysematous pyelonephritis, cystitis, and iliopsoas abscess from discitis in a diabetic woman. Int J Infect Dis 2016;51:105–6.
6. Iqbal N, Shah ARM, Saif UB, Hasan A, Iqbal MW, Ali M. Emphysematous Cystitis in a Non-Diabetic Male. J Coll Physicians Surg Pak 2018;28:496–7.
7. Thomas AA, Lane BR, Thomas AZ, Remer EM, Campbell SC, Shoskes DA. Emphysematous cystitis: a review of 135 cases. BJU Int 2007;100(1):17–20.
8. Liao PH, Hsieh MS, Chen YC. Emphysematous cystitis. CMAJ 2020;192(12):E313.
9. Hassan MH, Iqbal N, Shahzad M, Khalid U I, Hassan A, Khalid M, *et al*. Emphysematous Pyelonephritis in a Male Diabetic Patient: A Case Report. EC Clin Med Case Rep 2020;3(4):52–5.
10. Schicho A, Stroszczynski C, Wiggermann P. Emphysematous cystitis: mortality, risk factors, and pathogens of a rare disease. Clin Pract 2017;7(2):930.

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