

Long Standing Emphysematous Cystitis Ends with Chronic Renal Failure and High Intravesical Pressure (*Short Communication*)

التهاب المثانة الهوائي لفترة طويلة قد ينتهي بفشل كلوي مزمن مع ارتفاع في ضغط المثانة

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Abstract

A 61-year old male patient with end stage renal failure and severe bilateral hydronephrosis was admitted to our hospital. The patient had pneumaturia since many years with history of several surgeries due to urethral strictures. Computed tomography showed air fluid level in the bladder and bilateral hydronephrosis with air bubbles in the kidneys. Urodynamic study revealed normal bladder volume with increased intravesical pressure during the filling phase. Urine culture was positive for klebsiella pneumonia. Prompt reduction in the serum creatinine level was observed after appropriate medical therapy and catheterization of the bladder. Emphysematous cystitis although it can be managed easily, it may lead to impairment of renal function if no appropriate management was given.

Keywords: Bladder, Cystitis, Emphysematous Cystitis.

ملخص

مريض ذكر بعمر 61 سنة حضر الى مستشفىنا بفشل كلوي مع وجود انتفاخ حاد في حوض الكليتين. يعاني المريض من وجود هواء في البول منذ عدة سنوات واجري له العديد من العمليات بسبب تضيق في مجرى البول (الاحليل). اتضح بالصورة الطبقيّة وجود مستوى هواء

و سائل في المثانة مع وجود انتفاخ وفقاعات هواء في كلا الكليتين. اجري له تخطيط مثانة وتبين أن حجم المثانة طبيعي مع زيادة في ضغط المثانة خلال فترة التعبئة. بعد زراعة البول تبين أن البول يحتوي على klebsiella pneumonia. كان هناك تحسن ملحوظ بوظائف الكلية بعد اعطاء العلاج المناسب ووضع قسطرة للمثانة. بالرغم من أن التهاب المثانة الهوائي يعالج بسهولة إلا أنه قد يؤدي الى خلل حاد في وظائف الكلية اذا لم يتم اعطاء العلاج المناسب له.

Introduction

Emphysematous cystitis (EC) is a rare condition where an air is seen in the urinary tract system especially the bladder lumen and wall. Total of 237 cases of EC have been reported till 2013, with 93 cases from Japan (Amano M. *et al.*, 2014). EC has low mortality rate in comparison to that of emphysematous peylonephritis, 3-12% versus 14-20% respectively (Bjurlin MA. *et al.*, 2012, Huang JJ. *et al.*, 2000). Diabetes Miletus and voiding dysfunction are among the most predisposing factors for EC. Here in we present a case with long standing untreated EC and end stage renal disease (ESRD), but without history of voiding dysfunction; literature was reviewed, management and urodynamic findings were discussed.

Case report

In May 2014, **61** year-old male patient was admitted to our hospital because of high creatinine level with bilateral severe hydroureteronephrosis. The patient underwent multiple surgeries due to urethral stricture and many endoscopic managements including Double J stent and nephrostomy placement to resolve hydroureteronephrosis in outside centers. The patient suffered from persistent air coming from urethra at the end of urination with no further lower urinary tract symptoms. No history of any abdominal surgery or disease. There was no compliant of nausea, vomiting, fever, chills or flank pain. The patient is diabetic since 10 years. Physical examination showed distended lower abdomen with mild suprapubic tenderness and tympanic percussion sound. Urine culture was positive for growth of klebsiella pneumonia, white blood cells **were** normal in the blood account and the serum creatinine was 6.8 ml/dl. Abdominal ultrasound showed severe bilateral hydroureteronephrosis. Plain radiography and computed tomography

were done and gas accumulation with air fluid level were seen in the distended bladder (figure 1). Urodynamic study showed stable bladder with volume of 400 cc and high intravesical pressure (40 cm H₂O), no uninhibited contraction or sign of neurogenic bladder (figure 2). Under spinal anesthesia cystoscopy was done, penil urethral stricture was passed easily. On cystogram the bladder was intact and no vesicoureteral reflux was observed (figure 3). Retrograde peylography (RGP) showed no evidence of fistula between upper urinary tract and gastrointestinal system. (GI). Fourteen f Foley catheter was placed and the patient was discharged after three days of admission on oral antibiotic (Quinolone, levovox 500mg).

Discussion

Ec is relatively rare condition, with 237 cases were reported till 2013. Gas in the urinary tract was described in 1961 and defined by Baily in 1971 as EC (Bos D. *et al.*, 2014). Ec is potentially fatal, as it **results in** a necrotizing infection that **begins** in the bladder and ascends to the renal parenchyma. It has been postulated that in diabetic patients with glucose concentration in the urine act as a substrate for bacteria to produce carbon dioxide and hydrogen. About 60% of the cases of EC have diabetes as the basic disorder complicated by lower urinary tract obstruction or other condition as neurogenic bladder (Yoshida K. *et al.*, 2010). The risk factors for EC include; **advanced** age, diabetes, neurogenic bladder, urethral catheter, vesicourethral fistula, ESRD and bladder outlet obstruction (Yoshida K. *et al.*, 2010). In our case **the risk factors were diabetes**, age, outlet obstruction **and ESRD. ESRD, although may predispose to EC, long standing untreated EC may lead to impairment of renal function and ESRD.** In our case the patient had creatinine of 3 mg/ dl before 5-6 months and the prompt increase in creatinine value to 6.8 mg/dl is difficult be justified only by multiple urethral stricture surgeries which have been done before 15 years. Although uroflowmetry parameters **were** below normal value, there was no significant post voiding residue in the bladder. Urodynamic study revealed normal bladder volume with high intravesical pressure (40 cmH₂O). Therefore our patient did not suffer from voiding dysfunction

and the high intravesical pressure can be attributed to high volume of gazes in the bladder and this fact **justifies** the balloon shape of the bladder. This finding is parallel to that in the literature as many patients are asymptomatic or had a minor voiding difficulty or abdominal pain which is the most common symptom (Grupper M., Kravtsov, & Potasman I., 2007). The only valid justification for bilateral hydronephrosis and ESRD is the high intravesical pressure and the ascending urinary tract infection. This is a very rare complication of EC, up to our knowledge no report on the urodynamic findings in EC was seen in the literature therefore decompression of the bladder by Foley catheter **represents** an important issue in the treatment of EC as it **helps** in reduction of the bladder pressure and **facilitates** the passage of urine especially in patient with significant post voiding residue.

The most accurate diagnostic tool is abdominal computed tomography (CT), therefore any patient complaint of vague abdominal pain, penumaturia, or tympanic bladder percussion, CT should be indicated. Similarly as in our case ultrasound and kidney ureter bladder (KUB) couldn't diagnose the patient however CT showed air fluid level in the bladder (figure 1). Cystoscopy although it is not diagnostic (Thomas AA , Long RM, Creagh TA *et al.*, 2006) but it is necessary to rule out bladder outlet obstruction as in our patient we also perform cystogam to rule out reflux and RGP to rule out ureter obstruction or fistula with GI system (**figure 3**). Klebsiella pneumonia was identified in urine culture which is the second most common organism after Escherichia coli for EC, (21%) and (58%) respectively (Thomas, AA. *et al.*, 2007).

Management of EC consist of wide spectrum antibiotics, bladder drainage and, glycemic control. The duration of therapy should be 3 to 6 weeks while other found a median length of 10 days is effective (Yoshida K. *et al.*, 2010); (Grupper, M. *et al.*, 2007). In our study we continue giving antibiotics for three weeks till the urine culture became negative and penumaturia disappeared. In rare cases conservative approaches may **fail** and surgical debridement may be needed (Young, SJ. *et al.*, 2005). The overall mortality rate is 7% (Thomas, AA. *et al.*, 2007).

In conclusion; although EC is relatively uncommon disease with low mortality rate, long standing untreated EC may lead to fatal irreversible consequences like ESRD. Therefore early detection with appropriate therapy is essential in reduction morbidity and mortality of this rare disease. Imaging including CT is the most accurate diagnostic tool in EC, however urodynamic study shouldn't be ignored.

Conflict of interest

We have no conflict of interest to declare

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