Translational Research in Urology

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Case report

Unusual Emphysematous Chest Wall with Progressive Loculated Empyema and Abscess Formation Post Emphysematous Pyelonephritis: A Caes Report

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HIGHLIGHTS

- The infection of emphysema around the kidneys and lungs can be confirmed by a urine sample test.
- Parenchymal infection can damage the kidney and destroyed and developed above the abscess diaphragm.
- Progressive Emphysematous (PELE) can be managed by a necessary diagnostic and therapeutic strategy like surgery thoracoabdominal incision with left nephrectomy.

ARTICLE INFO

Document type: Case report
Receive Date: 09 September 2019
Accept Date: 14 October 2019
Avaliable online: 15 November 2019
DOI: 10.22034/au.2020.232219.1023

ABSTRACT

Introduction
The abdominal emphysematous pyelonephritis and its association with lung involvement in diabetic patients can be life treating and should be the cure as soon as possible.

Case presentation
Our case is a 39-year-old female patient with diabetes mellitus with a history of left kidney stones. She underwent extracorporeal shock wave Lithotripsy (ESWL) and a week later referred to the emergency room because of glucose 389 mg/dL, fever, and renal abscess. The infection then developed as emphysema around the kidneys and lungs and subsequent studies of urine sample test confirmed the infection with *E-Coil*. Following this parenchymal infection, the left kidney was destroyed and developed above the abscess diaphragm, and the left lung collapsed causing progressive emphysematous (PELE). The patient underwent the necessary diagnostic and therapeutic measures, including glycemic control and surgery thoracoabdominal incision with left nephrectomy, abscess drainage, and decortications. Eventually, the patient was discharged in good general condition.

Conclusions
In our case, auto-nephrectomy caused by pyelonephritis occurred in the context of diabetes and with a history of renal stone, so it seems that diabetic patients should also consider auto-nephrectomy in severe chronic and acute pyelonephritis infection.

Keywords: Progressive Emphysematous Loculated Empyema; Emphysematous Pyelonephritis; Extracorporeal Shock Wave Lithotripsy

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Introduction

The co-occurrence of diabetes with various infections can cause severe infections in the vital organs like respiratory and urinary tracts and appears as pyelonephritis and empyema, causing sepsis with pre-renal abscess and adjacent lung abscess (1). Urinary tract infections are more common, more severe, and carry worse outcomes in patients with type 2 diabetes mellitus (2).

The most common reason for such infection is *E. coli* infection that can lead to causing rare complications of emphysematous pyelonephritis (3).

Emphysematous pyelitis is defined as the presence of gas localized to the renal collecting system. Emphysematous cystitis is defined as air in the urinary tract. More than half of these patients have diabetes (3). Emphysematous urinary tract infections are upper and lower urinary tract infections followed by gas formation followed by cystitis, pyelitis, or asymptomatic and symptomatic urinary tract infections (UTIs) such as renal and perinephric abscess and candidiasis. In this study, we are presenting a strange case of the emphysematous chest wall with progressive loculated empyema and abscess formation post emphysematous pyelonephritis.

Case presentation

A case of a diabetic single woman weighing 86 kg, 165 cm tall with poor glycemic control referred to our department at Sina hospital. The informed consent was completed by the patient to report the case, and the case was reported based on CARE guidelines.

She was under extracorporeal shock wave lithotripsy (ESWL) treatment with renal stones but due to fever, abdominal pain, nausea, vomiting symptoms of lethargy and general malaise, one week later on 2017.06.09 referred again to the emergency department of Sina hospital with an initial diagnosis of sepsis. On kidney, ureter, and bladder (KUB) X-ray imaging, the air was evident in the chest wall and the left kidney, based on the diagnosis of emphysematous infection. After an emergency computerized tomography (CT) scan, abdominal left retroperitoneal abscess, localized empyema, closed left periphery, and fluid-air surface at the base of the left lung (abscess) was identified and the patient was diagnosed with pleuritis and pyelonephritis. The result of the laboratory test of the patient was presented in Table 1. After cardiac, pulmonary, internal medicine, and forensic consultation, the patient underwent surgery on 21st June 2018, using double-lumen right. The patient was placed in an artery-line and then underwent thoracoabdominal incision, first a left lower thoracotomy followed by left lung decortication and abscess drainage. After cleft development to the left paramedical of the abdomen without entering the abdominal cavity in the left retroperitoneum, she underwent left abscess and nephrectomy, which was performed in the left umbilical artery with both clot and nonfunctional auto-nephrectomy. The chest wall was closed by inserting the renal log drainage, chest tube, and catheter into the pleural effusion. The patient was discharged on 25th June 2018 with oral ciprofloxacin treatment.

Table 1. The result of the laboratory test of the patient over six months

Laboratory test	2017.06.09	2017.06.10	2017.06.11	2017.06.12	2017.06.17	2017.09.08
FBS (mg/dl)		385		146	100	102
BUN (meq/L)	66	37			8	7
Creatinine (meq/L)	1.3	1			0.6	0.8
Sodium (meq/L)	125	131			139	125
Pottassium (meq/L)	4	3.8			3.5	3.9
WBC (10^3/mm^3)	15.41		12.2	6.85	6.87	10.04
RBC	2.9					4.58
Hemoglobin (gr/dl)	8.1		6.9	10.8*	11.1	11.5
Platelet (10^3/mm^3)	407		375	349	332	356
BS (mg/dl)	398			141	199	
Hb A1C	14.9					
TSH	3.66					
T4	4.01					
Neut %	88		83			76.5
Lymp %	4.6					14.0
Blood Culture	Neg		E-Coli			

FBS: Fasting Blood Sugar; BUN: Blood Urine Nitrogen; WBC: White Blood Cell; RBC: Red Blood Cell; BS: Blood Sugar; TSH: thyrotropin

Discussion

The abdominal emphysematous pyelonephritis and its association with lung involvement in diabetic patients are very dangerous and require concurrent treatment in both organs after ICU hospital admission and emergency blood and urine culture tests, abdominal ultrasound, CT scan with and without injecting and performing a kidney scan with T99 and monitoring of blood sugar levels are essential. The occurrence of pyelonephritis associated with diabetes requires urgent hospitalization and prompt treatment. Emergency cystoscopy and necessary measures to remove the obstruction may be required if there are obstructive symptoms due to stenosis or urinary stricture. Symptoms of sepsis in pyelonephritis patients with concomitant sickness and fever require special hospitalization, diagnostic and therapeutic measures. The onset of respiratory symptoms following clinical symptoms indicates the spread of infection from the sub-diaphragmatic to the supra-diaphragmatic. A CT-scan of the abdomen, pelvis, and chest with an injection is necessary to examine the retroperitoneal and thoracic space. Although auto-nephrectomy has been reported in chronic kidney disease, especially tuberculosis or trauma, it has been observed in diabetes mellitus and *E-coli* infection.

Patients with chronic renal tuberculosis develop necrosis and progressive cavitation (4). Diagnosis of auto-nephrectomy has been gradually forgotten over time by physicians in Europe, with a sharp decline in tuberculosis cases, but it should always be taken into the account (5). Some cases of auto-nephrectomy due to trauma have also been reported that have been chronic for many years (6-8).

Conclusions

In our case, auto-nephrectomy caused by pyelonephritis occurred in the context of diabetes and with a history of renal stone, so it seems that diabetic patients should also consider auto-nephrectomy in severe chronic and acute pyelonephritis infection.

Authors' contributions

All authors contributed equally.

Acknowledgments

Special thanks to the Urology Research Center (URC), Tehran University of Medical Sciences (TUMS).

Conflict of interest

All authors claim that there is not any conflict of interest.

Funding

There is no funding.

Ethical statement

All authors ensured our manuscript reporting adheres to CARE guidelines for reporting of case reports.

Data availability

Data will be provided by the corresponding author on request.

Abbreviation

CT	Computerized tomography
EPN	Emphysematous pyelonephritis
ESWL	Extracorporeal shock wave lithotripsy
KUB	Kidney, ureter, and bladder x-ray
PELE	Progressive emphysematous
UTI	Urinary tract infections

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How to cite this article
Marzban Rad S, Alizadeh R, Marzban Rad Z, Sattari P, Kazemi AS, Aghsaeefard Z. Unusual Emphysematous Chest Wall with Progressive Loculated Empyema and Abscess Formation Post Emphysematous Pyelonephritis: A Caes Report. Translational Research in Urology. 2019 Oct;1(2):54-57.
DOI: 10.22034/au.2020.232219.1023
URL: http://www.transresurology.com/article_108113.html