

# Pneumorrhachis in emphysematous pyelonephritis: A rare finding in an uncontrolled diabetic patient

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## ABSTRACT

Emphysematous pyelonephritis (EPN) is a life-threatening infection of kidney with the presence of gas in the renal parenchyma, collecting system, and the surrounding retroperitoneum. We present a case of EPN in a diabetic patient with extension of gas into the spinal epidural space of the lumbar vertebral canal. He was managed conservatively with minimally invasive intervention along with supportive medical management and recovered well.

## INTRODUCTION

Emphysematous pyelonephritis (EPN) is an often fatal urological emergency; presence of gas in EPN is commonly limited to the renal parenchyma, collecting system, and surrounding retroperitoneum.<sup>[1]</sup> Herein, we present a case of EPN with extension of gas into the spinal epidural space of the lumbar vertebral canal.

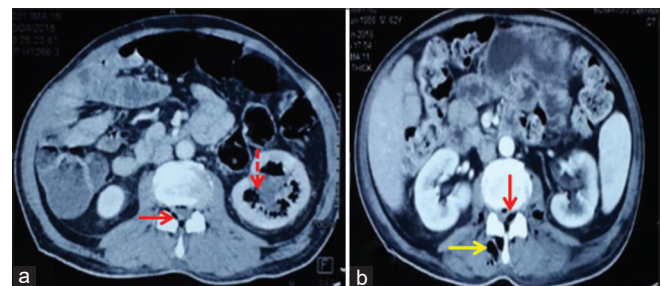
## CASE REPORT

A 65-year-old diabetic male presented with left flank pain, fever with hypotension, tachycardia, and uncontrolled blood sugar (random blood sugar of 340 mg/dL and glycated hemoglobin of 7.4). After initial resuscitation, computed tomography (CT) revealed left kidney enlargement with presence of gas in the collecting system, paranephric space suggestive of Huang Class III EPN, mild hydronephrosis, and gas extending to the intraspinal, likely epidural space, of the lumbar region [Figure 1]. A left double-J (DJ) stent was placed under local anesthesia, and blood sugars were controlled. Urine culture grew *Escherichia coli*, sensitive to piperacillin-tazobactam. The patient was discharged on the 7<sup>th</sup> day, the DJ stent was removed after 4 weeks, and, on the last follow-up at 3 months, the patient was doing well.

## DISCUSSION

EPN is a severe form of pyelonephritis occurring mostly in diabetic and renal stone disease patients, most caused by *E. coli*. Production of gas in EPN is a result of bacterial fermentation of sugar and lactate, causing formation of carbon dioxide and hydrogen.<sup>[2]</sup>

Wan *et al.* divided EPN into Type I which had extensive renal parenchymal necrosis with absence of fluid or streaky or mottled gas and Type II included bubbly or loculated gas



**Figure 1:** (a) Abdominal computed tomography axial scan showing gas in the spinal epidural space (bold red arrow) and left emphysematous pyelonephritis with gas in the pelvicalyceal system (dotted red arrow). (b) Axial computed tomography film showing the presence of gas in the intermuscular plane (bold yellow arrow) and in the epidural space around the spinal cord (bold red arrow)

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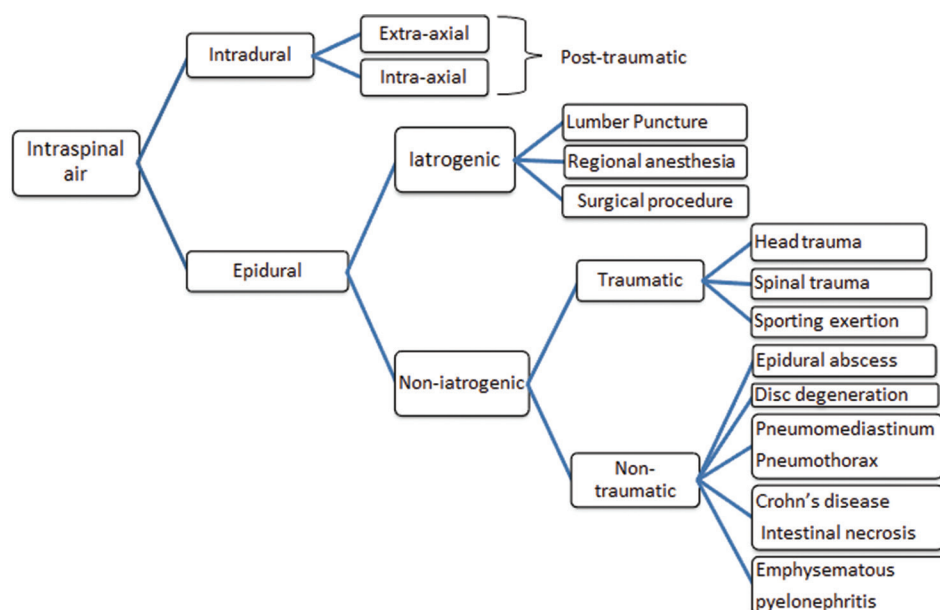


Figure 2: Different etiologies of intraspinal air<sup>[5]</sup>

with renal or perirenal fluid collections or presence of gas in the collecting system. Type I patients were having higher mortality of 69% and needed more aggressive treatment, in comparison to 18% in Type II patients.<sup>[3]</sup>

Contrast-enhanced CT is the preferred investigation for diagnosis as it can guide for treatment selection. Gas in the intraspinal space is called pneumorrhachis, extracranial epidural emphysema, epidural pneumatosis, or intraspinal pneumocele.<sup>[4]</sup> Various pathways of access to epidural space include neuroforamina after extension through intermuscular planes, intervertebral discs via vacuum phenomena, iatrogenic via regional anesthesia and surgical procedures, vertebral fracture, venous lumbar plexus, and hematogenous spread of gas-producing bacteria [Figure 2].<sup>[4]</sup>

To the best of our knowledge, only one such case is reported in literature, who expired within 6 hours.<sup>[5]</sup> Significance of epidural gas is not well established and it may be absorbed spontaneously without any detrimental effect, as in the present case where no neurological symptoms were seen. Occasionally, it may cause neurological symptoms and back pain. Inhalational nitrous oxide should be avoided in patients who need general anesthesia. Epidural gas should be considered a marker of some other disease process and treatment should be directed to the underlying secondary pathology.<sup>[4]</sup>

Older literature is in favor of open surgical drainage or emergency nephrectomy for EPN. Recent advancement in minimally invasive interventional urology favors initial management with DJ stenting or percutaneous drainage tube and more aggressive surgical treatment if there is no response to initial therapy.<sup>[1]</sup>

This case was managed successfully with DJ stenting and supportive medical therapy. EPN with severely deranged blood sugar needs early diagnosis and prompt resuscitation along with timely minimally invasive intervention for better outcomes.

### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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