

PNEUMOURETER / PNEUMONEPHROSIS

Muhammad Asghar

Gomal Medical College, Dera Ismail Khan

INTRODUCTION

Pneumonephrosis is extremely uncommon. Mostly it is due to a fistula between the high urinary tract and stomach, duodenum / urinary bladder and rectum accompanied by vesico ureteral reflux with ascent of air into the ureter and the kidney. One study of 92 cases having fistula between the urinary tract and bowel reveals 60% colonic, 23% duodenal, 7% gastric, 5% enteric, 2% appendiceal and 1% rectal [1,2]. In developed countries, renal fistulas are most commonly caused by iatrogenic trauma, as a complication of interventional radiographic procedures, percutaneous nephrostomy or nephrolithotomy tract replacement, extracorporeal shock wave lithotripsy and abdominal surgery. Chronic pyogenic infection and tuberculosis are now less common causes in the age of advanced antibiotics [3]. Patients with necrotic renal neoplasm are at increased risk [4]. Other causes include post dilatation of sigmoid colon stricture and congenital anomalies [5]. Urolithiasis in obstructive uropathy and uro sepsis are other common causes of ureterocolic fistula [6].

CASE REPORT

About 30 years old female patient, admitted in female Surgical Unit of DHQ. Teaching Hospital, Dera Ismail Khan, through the emergency department on February 21, 2007, for a severe left side abdominal pain of few days duration, associated with nausea / vomiting and absolute constipation.

She was at 4th postnatal day, given birth to a 7-month baby, who died after one day. There was a history of dysuria/pyuria for the last one month, with disturbed sleep and appetite. She was a known diabetic. Siblings and parents were also diabetic. Clinical examination revealed tender left lower

abdomen with moderate degree hyperpyrexia. Blood pressure was 120/60 mm Hg with pulse rate 84/minutes. The laboratory investigation showed blood urea - 40 mg/dl, Creatinine - 0.8 mg/dl, Serum Electrolyte - normal, however Fasting blood sugar was increased up to 370 mg/dl. Urine R/E - Pus cells, 25-30/HPF. Hemoglobin level was 7g/dl. Treatment profile started with Inj. Cephadrin (Velosef), 1 gm I/V BD, Inj Gentamycin (Gentacin) 80 mg BD, Inj Normal Saline 1000cc BD, Inj Cefatraxone (Oxidil) I/MBD, Inj Metoclopramide (Metomide), Inj. Drotaverine Hcl (No Spa) I/V TDS, Inj Insulin S/C 7 units TDS, Intake/Output chart, Nystatin (Nilstat) oral drops and passed N/G/Tube. Ultrasonography abdomen/pelvis performed on February 22, 2007, revealed slightly enlarged left kidney, 12 x 5 cm in size. Parenchymal thickness - slightly reduced with ill-defined echogenic areas in the medulla suspected as gas shadows, a differentiating point from Emphysematous Pyelonephritis, where air lucencies appears in subcapsular and cortical region of the kidney [7]. Normal postnatal changes observed in the pelvic viscera with no retained Products of conception. Plain X-Ray K.U.B exposed on February 23, 2007, outlined marked dilated loops of sigmoid and descending colon, loaded by hard faecal matter with intervening numerous gas bubbles. Left renal pelvi calyceal system/proximal 2/3rd of ureter outlined by a lucent gas shadow - Pneumonephrosis/Pneumoureter respectively (fig), considering the most probable diagnosis of uretero colic fistula with its sequel.

Intra-venous urography (IVU) performed on February 23, 2007 (with no preparation of bowel washout). Excretion of contrast only noted on the right side with normal pelvi calyceal system and ureter. Left kidney failed to concentrate/ excrete the contrast up to 60 minutes IVU. series films, with persistence of lucent gas shadow in the pelvi calyceal system/ureter, a differentiating point from

Correspondence: Dr. Muhammad Asghar, Associate Professor of Radiology, Gomal Medical College, Dera Ismail Khan

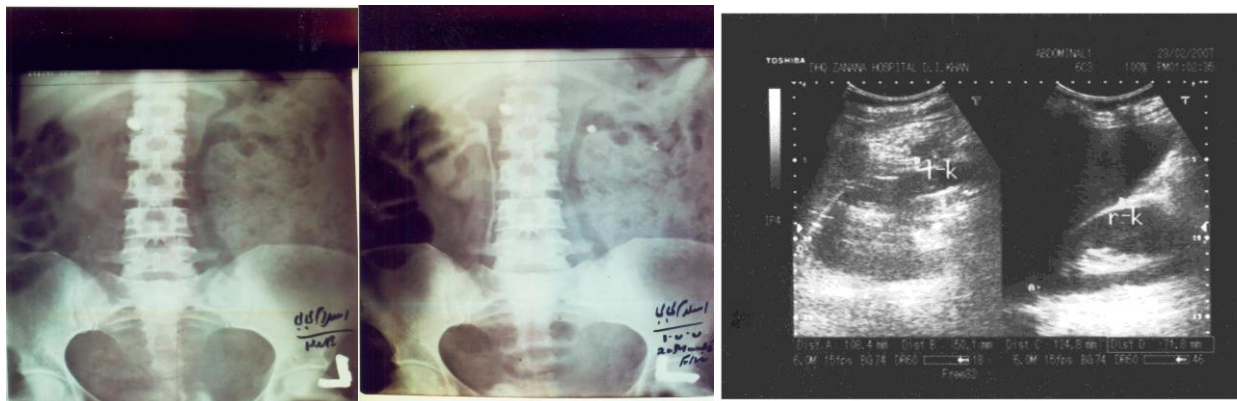
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emphysematous pyelonephritis, where kidneys mostly show normal excretory functions [8]. By the consultation of Surgeon, the procedure of IVU was stopped and no further investigation advised because of planned laparotomy. Three pints blood transfused to the patient after grouping and cross matching in pre-operative preparation along the proper Bowl wash out. Blood glucose level brought into normal range, pyuria and hyperpyrexia controlled by the proper use of medicines. Laparotomy performed on February 28, 2007 and after observing a perinephric abscess with infiltration to muscularis area and periureteral abscess with a fistula between the sigmoid colon and distal ureter, nephroureterectomy, fistulectomy, segmental colonic resection with re-anastomosis were done by the surgeon, however specimen was not send for histo-pathological study. Post operative treatment regime was Inj Benzyle Penicillin 10 lac OD, Inj Cefatraxon (Oxidil) I/V TDS, Inj Metronidazole (Flagyl) I/V/ TDS, Inj Ringolact 1000 cc B.D, Inj Tramadal (Ramal) SOS, Inj Zantac (Renitidine) I/V/ BD, Inj Insulin ® S/C 5 units TDS. Follow up study reveals improvement with gradual loss of dysuria, pyuria and GIT related symptoms. Diastolic blood pressure improved to 80 mmHg but moderate level hyper pyrexia remained at the level of 100-101° f with peak level up to 105° f on March 3, 2007 but came to normal level on March 4, 2007. Patient remained hospitalized till March 30, 2007 and discharged on satisfactory condition with advise to take regular oral anti diabetic treatment. Pain killers and anti pyretic drugs were advised on S.O.S. basis. After two weeks follow up visit at O.P.D., she was almost normal with controlled blood glucose level and no obvious post operative complication.

DISCUSSION

A fistulous tract can develop at any area affected by chronic inflammation, necrosis or ischemia. A large impacted ureteral stone with urosepsis can cause necrosis of adjacent ureteral wall. A peri ureteral abscess can perforate into adjacent bowel loop resulting in the formation of fistula, however majority of

patients with renal colic seek acute medical treatment and are thus unlikely to progress to the stage of developing a periureteral abscess [9]. Spontaneous ureteo colic fistula is a rare complication of urolithiasis [9, 10]. It's most common causes are diverticulitis and obstructing ureteral calculi [9, 11]. The ureter as it crosses the brim of lesser pelvis, a common site for ureteral calculus impaction, due to reduced ureteral distensability because of extrinsic effect of the adjacent iliac vessels. At this level, sigmoid colon lies immediately anterior to the left ureter so this close anatomical relationship between the two allows ureterocolic fistula to develop. Reflux of colonic contents through the fistula result in chronic or recurrent urinary tract infection. Pneumaturia and faecaluria are uncommon due to obstructing ureteral calculus distal to fistulous tract but pneumonephrosis is common [11]. Imaging is critical for establishing the diagnosis of reno alimentary tract fistulas. Plain radiograph may show gas in the collecting system of kidney ureter. Excretory urography may not be useful since the affected kidney is mostly non-functioning, as in the reported case. Direct antegrade or retrograde pyelogram/ ureterogram under fluoroscopy are most effective imaging modalities for the detection of fistulous tract as localized injection of contrast better outline the region of suspected fistula and its higher pressure is capable of demonstrating the small or partially occluded fistulous tracts & their characterization. IVU and renal tract ultrasound may provide corollary evidence of ureterocolic fistula, such as hydronephrosis or pneumonephrosis. Barium enema may delineate the fistula if the antegrade or retrograde ureterogram is negative despite a high index of clinical suspicion and double contrast barium enema is more valuable to demonstrate the fistulous tract compared with single contrast [12]. Diagnosis by the barium enema with advise to the patient to raise intra abdominal pressure or by having the patient hold, while attempting to pass flatus during a cystogram, demonstrates the gas bubble entering the bladder, are also the techniques to demonstrate the fistula between



Figs (A) Plain X-Ray KUB with left side pneumonephrosis/pneumoureter. (B) IVU-20 minutes film with normal excretion of contrast on the right side & no concentration/excretion on the left side with persistence of pneumonephrosis/pneumoureter. (C) Ultrasonographic scan shows slightly enlarged left kidney with ill-defined echogenic areas of gases in the medulla.

rectum and lower urinary tract [5]. Usefulness of 24 hours delayed/pre operative film of upper gastrointestinal series for the diagnosis of sigmoido vesical fistula remained valuable comparing to the barium enema, cystography, cystoscopy, colonic fibroscopy and computed tomography [13]. Emphysematous pyelonephritis is a life threatening infection of renal parenchyma & perirenal tissue in the diabetic patients, while pneumoureter/pneumonephrosis involve the ureter & pelvi calyceal system, as a result of uretero colic fistula. Emphysematous pyelonephritis is mostly bilateral with excretory kidneys while pneumonephrosis is mostly unilateral and not excretory to I/V contrast, may be non-functioning. Despite of the fact that advanced antibiotics can control the infection and further development of fistula but still it is a major cause of fistula formation between the urinary and alimentary tract in our country due to improper medical consultation. At laparotomy, it was observed that pneumoureter/pneumonephrosis was due to uretero colic fistula with perinephric abscesses - the sign of emphysematous pyelonephritis because of underlying chronic diabetes.

CONCLUSION

Chronic diabetic patients are more prone to develop infections emphysematous including pyelonephritis. Pneumoureter / Pneumonephrosis as a result of uretero colic fistula may have similar clinical findings as of emphysematous pyelonephritis but

radiologically they can be differentiated properly. Imaging plays a crucial role in delineating the anatomy and extent of the fistulas tract. In addition to direct endoscopic technique and traditional contrast studies under fluoroscopy, cross sectional modalities such as CT, MR imaging and sonography have gained increasing support in the diagnosis along with an expert Radiologists, who by the proper radiological findings, make the diagnosis accurate and in many cases, can guide for management planning.

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