DOI: 10.7860/JCDR/2024/72566.19657

Case Series

Surgery Section

Presentation and Management of Giant Hydronephrosis in Adults: A Case Series

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ABSTRACT

Giant Hydronephrosis (GH) is rare due to improved diagnostic modalities and the ready availability of abdominal imaging. Pelviureteric junction obstruction is the most common aetiology of GH, with abdominal mass or distension being the most common presentation. If GH is not detected early, it can lead to various complications. Authors report three cases of GH in adults who presented to the emergency department with complications. One patient had abdominal distension, while the other two presented with painful abdominal swelling and fever. Two of them were admitted with sepsis, and one had haematuria. Percutaneous Nephrostomy (PCN) catheters were placed in all three cases to decompress the calyceal system, and subsequently, nephrectomy was performed on all of them as the kidneys were not salvageable.

Keywords: Haematuria, Nephrectomy, Percutaneous nephrostomy

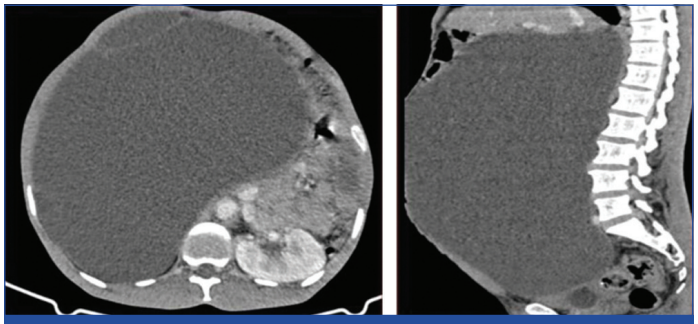
INTRODUCTION

The GH has been described in the literature as a kidney containing more than one litre of fluid in a collecting system [1]. Radiologically, it is defined as a hydronephrotic renal pelvis that meets or crosses the midline, occupies the hemi-abdomen, and extends for a length of five vertebrae or more [2]. Though it is more common in children, many cases have been found in adults. If left untreated, GH can have various complications such as rupture of the kidneys, pyonephrosis, hypertension, renal failure, and malignant changes [3,4]. Functional assessment of both the hydronephrotic and contralateral kidney should be done before performing any definitive procedure.

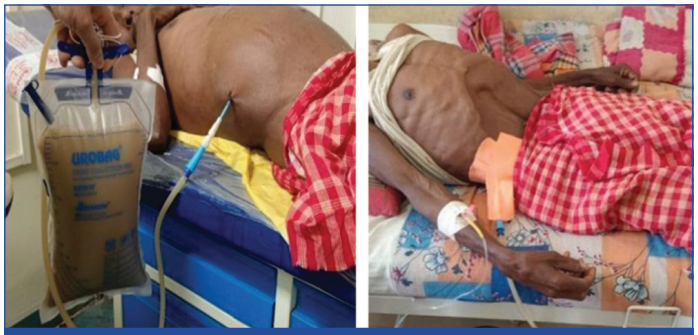
CASE SERIES

Case 1

A 45-year-old male presented with swelling in the right-side of his abdomen since childhood, which has been gradually increasing in size for the last two years. He had pain over the swelling, along with intermittent fever for the last one month. He also experienced difficulty in breathing and had constipation, but without any urinary symptoms. On admission, he was febrile and had tachycardia and tachypnoea. Other vital parameters were normal. Blood parameters showed leukocytosis (16×10^9/L), hypoalbuminaemia (3.0 g/dL), and anaemia (10.2 g/dL). Renal function test was normal. Ultrasonography (USG) and Contrast-Enhanced Computed Tomography scan (CECT) of the abdomen revealed a grossly enlarged right kidney (33×23×20 cm) with dilatation of the pelvicalyceal system, loss of medulla, and thinning of cortical parenchyma displacing surrounding organs, suggestive of pelviureteric junction obstruction with GH without any contrast uptake or excretion [Table/Fig-1]. The patient was started on intravenous fluids and broad-spectrum antibiotics. A USG-guided PCN catheter was placed, and around seven litres of purulent fluid was drained out. The abdomen became scaphoid, soft, and non tender [Table/Fig-2]. Blood parameters gradually improved. The culture of drained fluid showed growth of *Escherichia coli*, and an appropriate antibiotic was started. Functional assessment of the hydronephrotic kidney was done by measuring 24-hour creatinine clearance (Urine creatinine in mg/dL x urine volume of 24 hours through PCN in ml) / (Plasma creatinine in mg/dL x 1440) after two weeks of PCN catheter placement and was found to be 10 mL/min. A radionuclide scan was not available at the centre. Hence, an



[Table/Fig-1]: Axial and sagittal views of CECT kidney of nephrogenic phase.



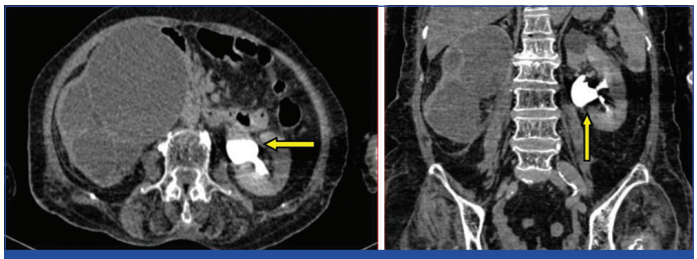
[Table/Fig-2]: Before and after percutaneous nephrostomy.

open right nephrectomy was performed after three weeks of PCN placement through a flank approach after proper preoperative work-up. Intraoperatively, the kidney was very baggy with thin parenchyma and with dense perinephric adhesion. Meticulous adhesiolysis was done by separating the kidney from the psoas muscle, diaphragm, duodenum, colon, and inferior vena cava. One unit of packed Red Blood Cells (RBC) was transfused during the operation, and the nephrectomy was completed without any complications. The postoperative stay was uneventful, and the patient was discharged on the 7th postoperative day.

Case 2

A 50-year-old male presented with abdominal distension, which was more pronounced on the right-side for three years. He had intermittent haematuria and pain on the right-side of the abdomen for the last month. He did not have any bowel or respiratory symptoms. On evaluation (USG/CECT scan of the abdomen), he was found to

have an enlarged gross hydronephrotic right kidney with thinning of parenchyma with no uptake or excretion of contrast suggestive of a poorly functioning kidney with pelviureteric junction obstruction [Table/Fig-3]. His renal function and other blood parameters were within normal limits except for low haemoglobin (9.8 gm/dL). Around four litres of blood-stained urine were drained out after the placement of a PCN [Table/Fig-4]. The culture of the drained urine did not reveal any microbial growth. Creatinine clearance of the right kidney after three weeks of PCN catheter placement was 12 mL/min. After a proper work-up, open right nephrectomy was performed through a flank incision four weeks after PCN placement. No intraoperative complications were encountered. He had an uneventful recovery and was discharged on the 10th postoperative day. Histopathology of the specimen revealed chronic pyelonephritis.

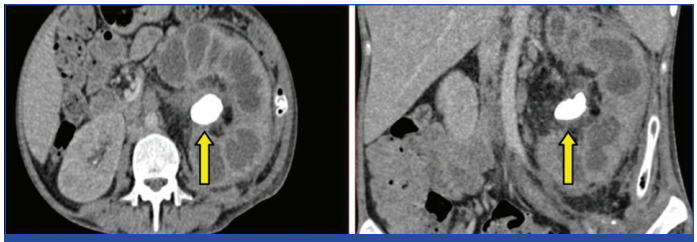


[Table/Fig-3]: Axial and coronal views of CECT kidney of delayed phase showing right non excreting hydronephrotic kidney with an arrow showing contrast in the pelvis of left kidney.

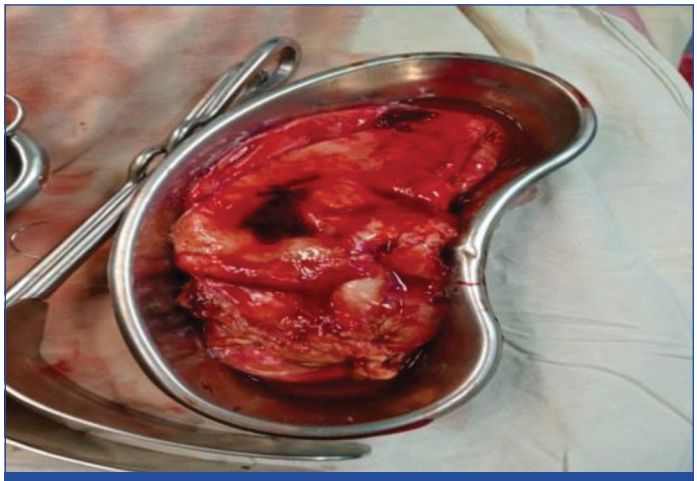
[Table/Fig-4]: USG-guided percutaneous nephrostomy

Case 3

A 30-year-old female, known to be diabetic, was admitted to the urology ward with complaints of pain and swelling on the left-side of the abdomen for nine months and intermittent high-grade fever for two weeks. She had recurrent urinary tract infections for the last year, for which she had received multiple courses of oral antibiotics. A CECT scan of the abdomen showed a grossly dilated left renal pelvicalyceal system with thinning of the parenchyma and a large staghorn calculus (3.9×2.5 cm) in the renal pelvis with perinephric fat stranding [Table/Fig-5]. There was no uptake or excretion of contrast in the left kidney. She had leukocytosis (18×10^9/L) along with low haemoglobin (9 gm/dL) and hypoalbuminaemia (2.8 gm/dL). Her renal function test was normal. Under antibiotic coverage, a PCN was performed in the left kidney, and around three litres of turbid urine was drained out. Urine culture showed growth of *Escherichia coli*, and the appropriate antibiotic was initiated. The patient was stabilised, leukocyte count improved with antibiotics. Hypoalbuminaemia and anaemia were corrected with human albumin 20% infusion and blood transfusion, respectively. The creatinine clearance of the left kidney was measured three weeks after PCN catheter insertion and was found to be 10 mL/min. Left open nephrectomy was performed after four weeks of PCN placement through flank incision [Table/Fig-6]. Intraoperatively, dense perinephric adhesions were released from surrounding structures without causing any injury to them. One unit of packed cells was transfused during the procedure. She developed a postoperative wound infection, which was resolved with regular dressing changes and antibiotic coverage. She was discharged on the 12th postoperative day.



[Table/Fig-5]: Axial and coronal views of CECT abdomen of nephrogenic phase with an arrow showing a calculus in the left renal pelvis.



[Table/Fig-6]: Left nephrectomy specimen.

DISCUSSION

The GH, although a rare urological entity, can often be encountered in developing and underdeveloped countries. The most common aetiology is pelviureteric junction obstruction, which occurs in 80% of cases. Other causes include obstructive megaureter, ureteric atresia, impacted renal pelvic or ureteric calculus, and retroperitoneal fibrosis [3,5,6]. They can present as a slowly progressive, painless abdominal mass, flank pain, abdominal distension, haematuria, recurrent UTI, and uraemia in bilateral disease [7,8]. Differential diagnosis including large mesenteric cyst, pseudomyxoma peritonei, ovarian cyst, ascites, and hepatobiliary cyst should be considered [9]. In the literature, the largest hydronephrotic sac containing 115 litres of fluid was described by Glass in 1746 in a 22-year-old female, and the second-largest sac containing 80 litres of fluid was reported by Vilares RN et al., in 2020 [10,11]. Although the classical teaching suggests PCN placement in patients presenting with fever or raised creatinine, PCN was performed as a primary procedure in all three patients to decompress the pelvicalyceal system, reduce pain, and assess kidney function by calculating the 24-hour creatinine clearance of the affected kidney [3]. Similar procedures were described in the literature by by Kaura KS et al., in 35 patients and Shah SA et al., in 10 patients [3,7]. Detailed anatomical and functional assessments are performed 2 to 6 weeks after PCN placement using intravenous urogram/CECT of kidney/24-hour creatinine clearance/diuretic renogram [3]. The authors performed 24-hour creatinine clearance tests after two to three weeks of PCN placement and found it to be in the range of 10 to 12 mL/min. The treatment of GH depends on a aetiology, anatomical, and functional assessment of the kidney. Shah SA et al., described 10 cases of GH that were managed by nephrectomy in four patients and reconstructive procedures in six patients [7]. Hoffman HA preferred nephrectomy in patients with GH if there is no improvement in renal function after PCN placement and increased susceptibility to trauma due to a retained hugely hydronephrotic sac [12]. The rate of nephrectomy varies from 30-70% in GH cases in the literature [8]. Hemal AK et al., described laparoscopic nephrectomy in 18 cases of GH (transperitoneal approach in six cases and retroperitoneal in 12 cases) [13]. Although laparoscopic nephrectomy was successful for poorly functioning kidneys in GH, conversion to an open procedure

was also reported due to severe perinephric adhesions [14]. The authors performed open nephrectomy for all cases without any complications. A laparoscopic approach could be an alternative if expertise is available but could be challenging due to dense adhesions. If the kidney is found to be salvageable, a reconstructive procedure should be planned based on its anatomical configuration [3]. The higher rate of nephrectomy in GH patients compared to simple hydronephrosis emphasises the need for early diagnosis and management of GH kidney [15].

CONCLUSION(S)

Each patient with GH should be individually managed based on their anatomical and functional status. High clinical suspicion of GH should be kept in mind in patients presenting with a large abdominal lump. Nephrectomy can be avoided if the diagnosis is made early and intervention is initiated as soon as possible.

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PLAGIARISM CHECKING METHODS: [Jain H et al.]
- Plagiarism X-checker: May 01, 2024
- Manual Googling: May 20, 2024
- iThenticate Software: Jun 08, 2024 (13%)

ETYMOLOGY: Author Origin

EMENDATIONS: 10

AUTHOR DECLARATION:
- Financial or Other Competing Interests: None
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. Yes

Date of Submission: **May 01, 2024**
Date of Peer Review: **May 17, 2024**
Date of Acceptance: **Jun 10, 2024**
Date of Publishing: **Jul 01, 2024**