



# Bilateral simultaneous “Santosh Post-graduate Institute tubularized flap pyelovesicostomy” in a case of bilateral pelvi-ureteric junction obstruction with bilateral giant hydronephrosis

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## Abstract

We present a case of bilateral giant hydronephrosis (HDN) secondary to bilateral pelvi-ureteric junction obstruction (PUJO) in a young girl, managed successfully by robot-assisted bilateral tubularized flap pyelo-vesicostomy. This case report highlights the feasibility, reproducibility and technicalities of this procedure.

**Keywords** Robot assisted · Giant hydronephrosis · Pyelotubular flap · Pelvi-ureteric junction · Obstruction

## Introduction

Giant hydronephrosis is an uncommon entity. Various treatment options have been described depending primarily upon three factors: functional status of both kidneys, pelvicalyceal anatomy of the affected kidney and patient’s presentation. Limited literature exists on laparoscopic and robot-assisted management of these cases. We report a case of bilateral giant hydronephrosis secondary to bilateral PUJO treated by robot-assisted tubularised flap pyelovesicostomy [1].

## Case report

A 15-year girl presented with complaints of bilateral dull aching, and intermittent flank pain associated with nausea and vomiting. On examination, the abdomen was distended. Her serum creatinine was 1.8 mg/dl and a non-contrast computed tomogram (CT) revealed bilateral giant hydronephrosis (HDN) (Fig. 1a). A DTPA scan demonstrated globally impaired renal function and slow obstructed drainage with

a differential function of 60 and 40% on the right and left side, respectively. The patient underwent bilateral percutaneous nephrostomy (PCN) following which creatinine fell to 1.0 mg/dl. Nephrostograms (Fig. 1b) exhibited bilateral giant HDN with significant contrast retention.

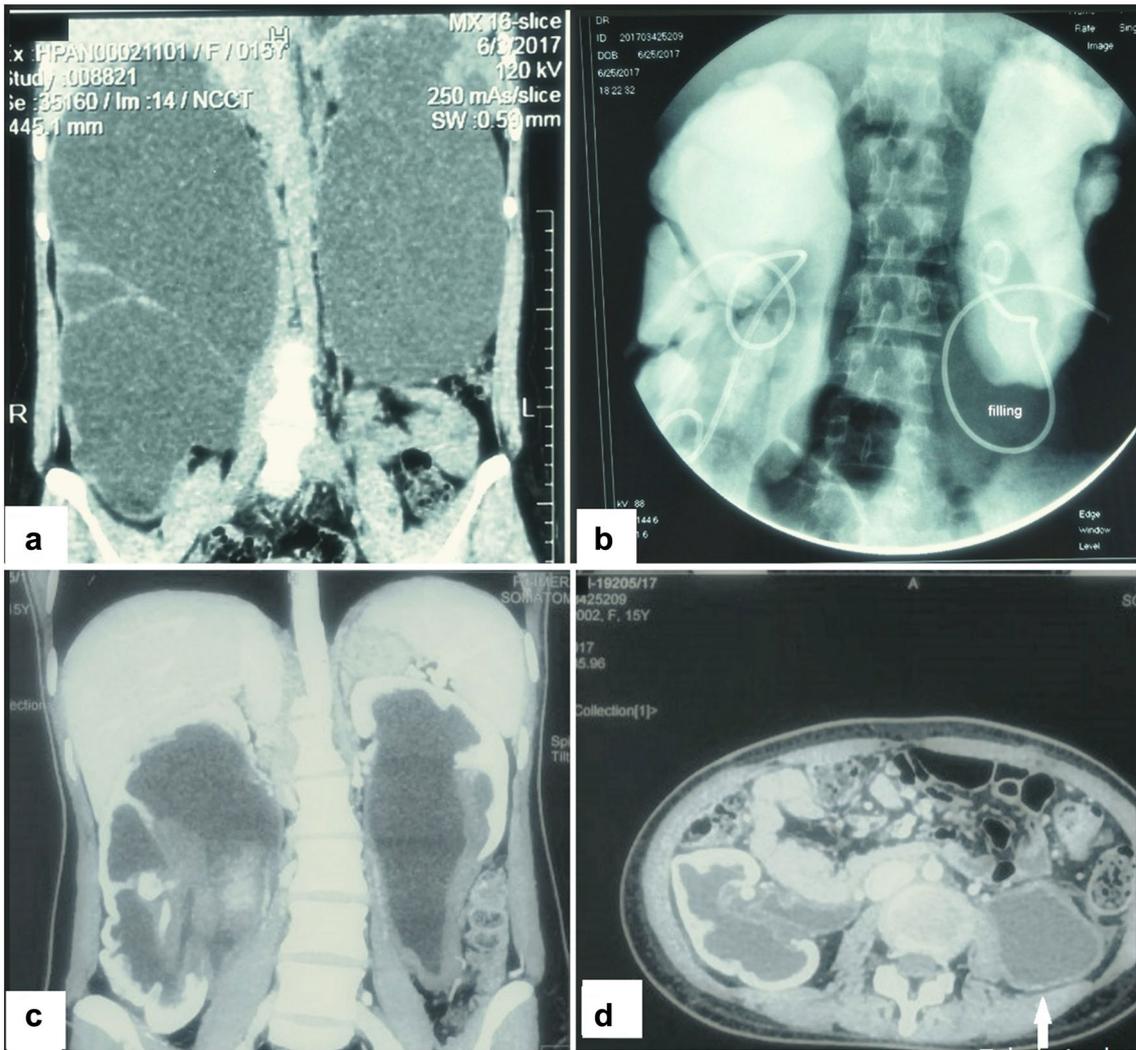
She underwent bilateral simultaneous robot-assisted Santosh Post-graduate Institute tubularized flap pyelovesicostomy using the da Vinci Si system. The operative room was setup as shown in Fig. 2. The patient was placed in left lateral position. Mobilization of the colon revealed a baggy pelvis (Fig. 3a). An anterior rectangular flap was created on the most dependent part of the pelvis (Fig. 3b, c). A psoas hitch (Fig. 3d) was performed on the ipsilateral side using polyglactin 1/0 and a 3-cm cystotomy (Fig. 3f) created on the anterolateral wall of the bladder. The posterior anastomosis of the pyelovesicostomy was performed in a continuous fashion using polyglactin 3/0. The 16 F Foleys inserted suprapubically was drawn into the peritoneal cavity via the cystotomy (Fig. 3g). Using the Foleys as a splint, the flap was tubularized over it (Fig. 3h, i) using polyglactin 3/0 sutures. The position was changed to right lateral and the procedure was repeated on the left side. The operative time was 180 min with a blood loss of 100 ml.

The post-operative period was uneventful with bilateral PCN clamped on post-operative day (POD) 3 and removed on POD 5. The drains were subsequently removed on POD 6. The splints were removed at 3 weeks on an outpatient basis. 3 months post-operatively, the patient is doing well with imaging demonstrating well-enhancing parenchyma and dependent drainage (Fig. 1c, d).

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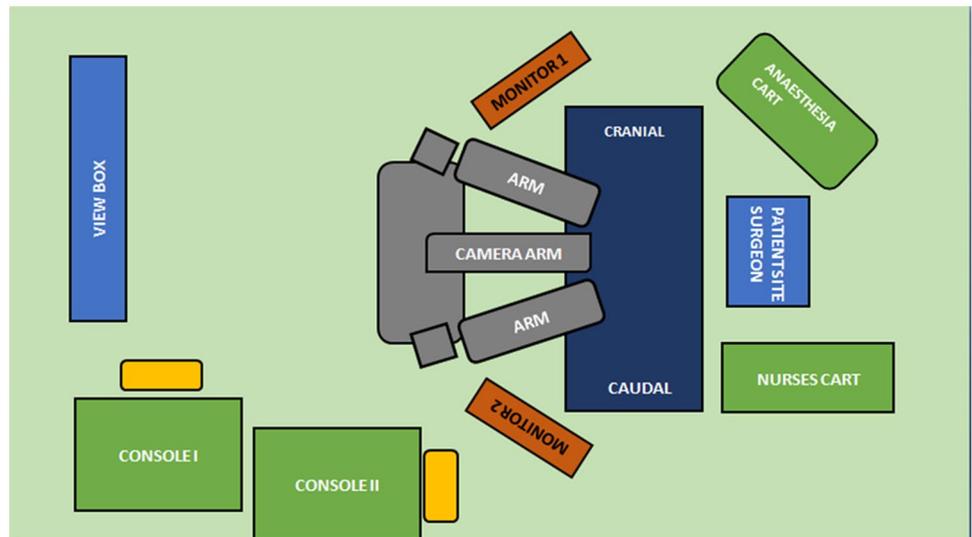
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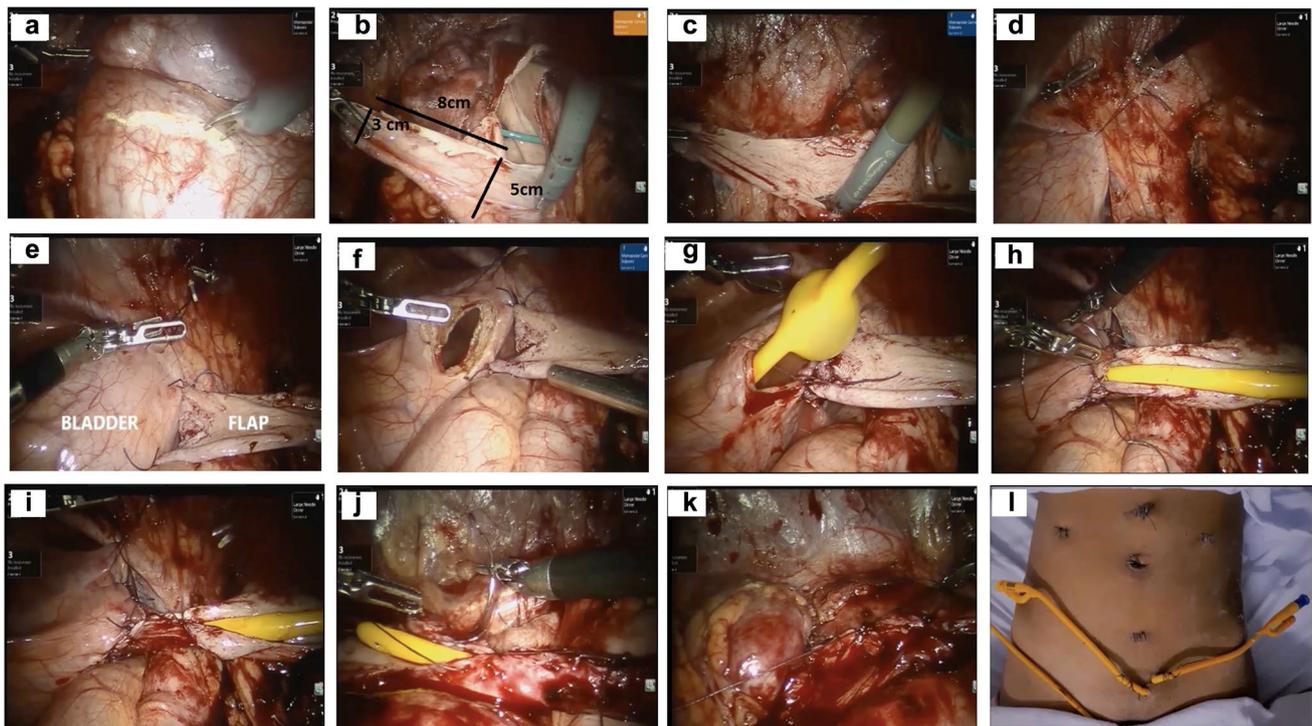
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**Fig. 1** Coronal CT image (a) and nephrostogram image (b) showing bilateral giant hydronephrosis. Post-operative (3 months) contrast-enhanced CT images (c, d) showing increase in parenchymal thickness with wide dependent drainage

**Fig. 2** Arrangement of the operative suite





**Fig. 3** Template showing steps of robot-assisted bilateral tubularised flap pyelovesicostomy in a case of bilateral pelvi-ureteric junction obstruction. **a** Giant hydronephrotic right kidney; **b, c** anterior trapezoid-shaped renal pelvic flap (length 8 cm, width 5 cm at base and 3 cm at apex) from the most dependant portion of the renal pelvis; **d** psos hitch; **e** configuration of the flap with the urinary bladder;

**f** cystotomy on the anterolateral aspect of the bladder; **g** delivering the suprapubically placed 16F via cystotomy site into the peritoneal cavity; **h, i** tubularisation of flap over Foleys catheter; **j** tubularisation process on the contralateral side; **k** completed pyelotomy closure; **l** post-operative picture with bilateral suprapubic catheters and per-urethral catheter in situ

## Discussion

Stirling defined giant HDN as the presence of > 1000 ml fluid in the pelvicalyceal system. Other authors have described it as a kidney weighing more than 1.6% body weight [2] and a hydronephrotic sac volume equalling the average daily urine output for age [3]. Radiologically, a giant hydronephrotic kidney is one which meets or crosses the midline or spans at least five vertebral bodies in length [4]. PUJO has been cited as the most common cause; others being calculi and obstructed megaureter [2, 5, 6].

Most cases present with asymptomatic abdominal distention or as an incidentally diagnosed mass whereas symptomatic cases present with flank pain, fever, recurrent urinary tract infections and/or hematuria [2, 3].

Both static and functional imaging modalities such as CT, nephrostograms, MRI and renograms are frequently used to diagnose these conditions, ascertain their aetiology, plan treatment and rule out other pathologies [5, 7].

Percutaneous drainage of the giant hydronephrotic kidneys is often employed in cases presenting with infected hydronephrosis, pyonephrosis, impaired renal function or severe compressive symptoms [6]. It can also help ascertain

the functional status of the kidneys and delineation of the anatomy via nephrostograms, aiding in planning the treatment. As was the case in our patient, drainage also allows adequate space for placement of trocars, permitting surgery with ease without puncture into the hydronephrotic kidney.

Management of these complex cases are dictated by a number of factors including the functional status of the affected and contralateral kidney, anatomical configuration of the affected kidney and patient presentation [6, 8]. A kidney with  $\geq 15$ –20% differential function mandates preservation with surgical intervention aiming at providing unimpeded, gravity-dependent drainage thereby, delaying renal function deterioration. Salvage reconstructive procedures are also performed in solitary [9] or bilaterally affected kidneys [6].

Drainage of urine in these systems is mainly by virtue of gravity. Various reconstructive procedures, such as calyco-ureterostomy [10], calicocystostomy [11], Boari flap calicovesicostomy [9], nephropexy and nephropliation [12], have been described for such systems. However, each of these is fraught with varied complications.

Pyelovesicostomy as a form urinary reconstruction was initially described for renal transplantation cases where the

diseased ureters were unavailable for standard reconstructive procedures [13]. It is not associated with any deleterious effects on bladder contractility, voiding pressures or renal function [13–15]. The long tube fashioned from the baggy redundant renal pelvis in our case further reduces the impact of reflux on the renal function by dampening the transmission of high voiding pressures to the upper urinary tract. Splinting the tubularised flap with a Foleys catheter ensures a wide calibre tube which can be removed easily without the need for secondary endoscopic procedures as are required for cases where double-J stents are used. The extent of dissection is also limited as the native ureter and bladder are not disturbed.

Laparoscopic management of complex PUJO obstructions has been described [16]. Laparoscopic suturing is a major hurdle which explains its lack of popularity amongst urologists performing reconstructive procedures. Our technique involves considerable suturing which can be articulately performed using a robot-assisted approach. This is the first case of bilateral giant HDN managed by simultaneously performed robot-assisted Santosh Post-graduate tubularised flap pyelovesicostomy.

## Conclusions

Robot-assisted Santosh Post-graduate Institute tubularised flap pyelovesicostomy is a safe, feasible and easily reproducible procedure suitable and effective in salvaging unilateral or bilateral giant hydronephrotic kidneys with baggy redundant extrarenal pelvis.

## Compliance with ethical standards

**Conflict of interest** The authors Kumar Santosh, Khanna Ashish, Chandna Abhishek, Mandal Subhjit and Manoharan Vignesh do not have any conflict of interests.

**Informed consent** Written informed consent was obtained from the patient for publication of this Case Report/any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

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