

Primary Ureterocalycostomy for complicated upper urinary tract obstruction in solitary kidney: challenging but effective.

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ABSTRACT

Objective: To report our contemporary experience in operative management of complex upper urinary tract obstruction in solitary kidney patients. **Material and method:** From January 2014 to December 2018 , we have performed 9 cases of ureterocalycostomy in which 6 cases were of primary PUJ(Pelviureteric junction) obstruction with complete intrarenal pelvis with minimal hydronephrosis, 2 cases were post PCNL(Percutaneous Nephrolithomy) and one case of post RIRS(Retrograde Intrarenal surgery) proximal upper ureter stricture All patients subjected to ureterocalycostomy after control of sepsis .

Open Flank approach was performed. Due to hypertrophy of kidney and intra renal pelvis, Guillotine lower pole partial nephrectomy was performed in all the cases. Ureterocalycostomy was done with the most dependent calyx over 6/26 DJS (Double J stent) followed by omental wrapping. Standard postoperative monitoring done. The recorded data included demographic profiling. **Results:** All the patients presented with pain, raised creatinine levels and sepsis. Patients mean age of presentation was 20.1 years, 6 were male and 3were female. Mean operative time was 129.5 minutes, mean blood loss was 100ml, mean cold ischemia time 30 minutes and mean hospital duration was 9.1 days. Out of two patients one patients had grade 1(clavein –dindo) and second had grade 3 (clavein –dindo) complications. All patients were asymptomatic for next 1 year follow up. **Conclusions:** Primary ureterocalycostomy with Guillotine lower pole partial nephrectomy, has resulted in satisfactory outcomes in patients with complex upper urinary tract obstruction and having solitary functioning kidney ,who are not candidates for other procedures, such as pyeloplasty.

Key words: Solitary Kidney–Ureter–Ureteral Obstruction

1 INTRODUCTION

Ureterocalycostomy(UC) is one of the uncommon procedures in urology practice in which lower pole calyx is anastomosed to upper part of ureter, which provides reasonable option for urinary drainage with long term satisfactory outcome in patients of primary and secondary complex PUJ

obstruction. It was first discovered by Neuwirt in 1947[1]. Since then it has been used for failed pyeloplasty, long upper ureteric stricture, horseshoe kidney with PUJ obstruction and complex upper urinary tract obstruction with intra renal pelvis[2,3,4,5] .It becomes more challenging in case of solitary kidney as there is presence of compensatory hypertrophy of kidney where the preservation of renal function is of paramount importance.

2 AIM

To report our contemporary experience in operative management of complex upper urinary tract obstruction in solitary kidney patients.

3 MATERIALS AND METHODS

We have performed 9 ureterocalycostomy (UC) in solitary kidney patients from January 2014 to December 2018 in which 6 cases were of primary PUJ obstruction with complete intrarenal pelvis with minimal hydronephrosis, 2 cases were post PCNL(Percutaneous Nephrolithomy) and one case of post RIRS (Retrograde Intrarenal surgery) proximal upper ureter stricture. All patients presented to us with urosepsis and rising levels of creatinine. Percutaneous drainage was done in all patients to salvage renal function. After control of sepsis CT Urography was performed to know preoperative anatomical and functional assessment.

Intraoperative assessment of the defect was done by antegrade and retrograde pyelogram. Open Flank approach was performed. Dissection of ureter with good amount of adventitial tissue was done followed by resection of ureteric tissue until normal vascular tissue is identified with wide lateral spatulation. Vascular control over the hilum was taken with help of bulldog clamp after cooling the kidney with the help of ice slush. Only renal artery was clamped and not the renal vein. Guillotine lower pole partial nephrectomy was performed in all the cases. Ureterocalycostomy was done with the most dependent calyx over 6/26DJS followed by omental wrapping. Postoperative monitoring done and preplaced nephrostomy removed on day 3, foleys catheter removed on day 10, DJ stent kept for 30 days and followed up till date. The recorded data included age, gender, clinical presentation, duration of symptoms, operative time, cold ischemia time, hospital stay, complications, clinical and functional outcomes.

4 RESULTS

All the patients presented with flank pain, fever, drop in urine output and other signs of sepsis .Patients mean(range)age of presentation was 20.1 years, 6were male and 3were female. A total of 6 cases were of primary complicated PUJO(Pelviureteric obstruction) with complete intrarenal pelvis, 2 cases were post PCNL pelvic disruption and one was post RIRS(Retrograde intra renal surgery).Mean (range) operative time was 129.5(90-180) minutes, mean(range)blood loss was 100ml(50-200), mean (range) cold ischemia time 30(25-40) minutes, mean(range) hospital duration was 9.1(6-37) days. Out of two, one patient had grade 1(clavein –dindo) and second with grade 3(clavein – dindo) complications. All patients were asymptomatic for next 1 year follow up.

Table 1. Demographic profile

Pa-tient No	Age(yr)/sex	Primary Procedure/primary PUJ obstruction	Oppo-site kidney Nephrec-tomy/ Non-func-tioning kidney	Prior at-tempt of endouro-logical proce-dure	Sign and symp-toms of ure-mia	Sign and symp-toms of sep-sis
1	30/F	Primary PUJO	Nephrec-tomy	—	+	+
2	42/M	Primary PUJO	Nephrec-tomy	—	+	+
3	31/F	Primary PUJO	Non-func-tioning kidney	—	+	+
4	14/M	Post PCNL	Nephrec-tomy	+	+	+
5	18/M	Primary PUJO	Non-func-tioning kidney	—	+	+
6	28/M	Primary PUJO	Non-func-tioning kidney	—	+	+
7	17/M	Post PCNL	Nephrec-tomy	+	+	+
8	36/F	Primary PUJO	Non-func-tioning kidney	—	+	+
9	28/M	Post RIRS	Nephrec-tomy	+	+	

Table 2. Results

Number of patients	9
Median age	27.11(14-42)
Gender m/f	2:1
Operative time (mins)	129.5(90-180)
Intra-op blood loss(ml)	100(50-200)
Cold ischemia time(mins)	30(25-40)
Hospitaliza-tion (days)	9.1(6-37)
Complica-tions (Clavein-Dindo)	One patient:Grade 1(increased drain output in one patients) One patient: Grade 3(Incisional hernia)

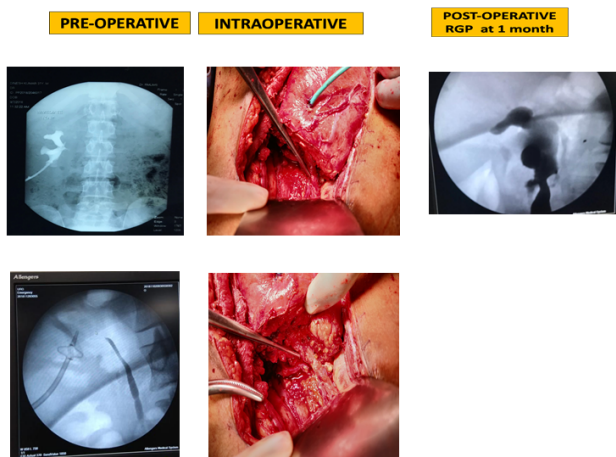


Figure 1.

5 DISCUSSION

In 1947 K. Neuwirt described Ureterocalycostomy for the first time. Historically described by K. Neuwirt in 1947 [1] and the surgical technique most commonly used today was delineated by Hawthorne et al. [6] in 1976. This procedure is rarely performed because of its unique indications and therefore the operator has limited experience. Basically it is used for pyeloureteric union in which conventional pyeloplasty cannot be performed, Whether as first treatment or because of scarring due to previous surgery, or due to long upper ureteric strictures [7]. Mesrobian and Kelalis [8] in the later years popularized the key technical facets of achieving a successful outcome: extensive excision of lower pole tissue to expose the calyceal lumen, performing a stented anastomosis, and ensuring mucosal continuity between the ureter and the exposed lower pole calyx.

On extensive search of literature we found only case reports and small case series on UC done either through open, laparoscopic or robotic approach. Experience of UC in solitary kidneys is even more limited. In 2005 Matlaga et al. performed and shared a series of 11 patients with open calycostomy [9]. Indications for the procedure were primary PUJO in patients with an intrarenal pelvis, failed endopyelotomy, long proximal ureteric stricture and fibrosed renal pelvis and PUJ after PCNL. All 11 procedures were performed with minimal complications with a mean operative time of 292 minutes, mean blood loss of 373 mL, and an average hospital stay of 5.1 days. The investigators documented relief of obstruction in all patients by IVU or nuclear renal scan. The perioperative variables in our present patients compare favorably with those in that open series.

Couvelaire et al in 1964 reported ureterocalycostomy for long upper ureteral tuberculous strictures with good results. Tejanshu P Shah et al in 2004, reviewed their 25 cases of complexed primary and secondary PUJO (19), horse shoe kidney (3), intrarenal pelvis (4), endopyelotomy (2), pyelolithotomy (9), 5 had tubercular long proximal ureteric stricture, 5 patients had single kidney. Ureterocalycostomy was performed with DJ stenting performed in

all cases, out of them 22 patients were doing well, 2 patients did not show improvements and one patient developed pyonephrosis and subsequently nephrectomy was done [10].

In our 9 cases the complexity of the procedures increased because of the risk of excessive bleeding due to bulky renal parenchyma as a result of compensatory renal hypertrophy and complete intrarenal pelvis or long upper ureteric stricture. These patients present early with features of urosepsis and/or only minimal hydronephrosis. In addition there was utmost need to preserve renal function and also to minimize ischemic injury to the renal parenchyma. Meticulous preoperative patient evaluation is the key to success for the procedure. It is imperative to locate and quantify the extent of the disease segment assessed with preoperative imaging that includes retrograde/antegrade pyelography/IVP, nuclear renography and/or CT Urography to assess the renal function. It is also important to note that we did Guillotine amputation of lower pole in all our cases due to presence of thick parenchyma. Guillotine amputation is better than simple wedge resection or incision technique to avoid the anastomotic stricture. As there were increased chances of bleeding we routinely clamped the hilar vessels and cooled the kidney with ice slush to prevent ischemic injury.

Sticking to correct technical details leads to better results. No patient had major complication except one in whom there was prolonged drain output. After conservative management for about two weeks finally the drain output decreased and PCN was removed after performing a nephrostogram which was not suggestive of any leak. Stent removal was done after 6 weeks. One patient developed incisional hernia after 5 months of surgery. He has been advised surgery in future.

Postoperative results were assessed by periodic serum creatinine measurements, retrograde pyelography at the time of stent removal, USG at 6 weeks and isotope renal scan after 3 months and yearly thereafter. All cases had resolving hydronephrosis with non-obstructive drainage with minimum follow-up of 6 months and maximum of 5 years. Srivastava et al analyzed their data of 72 patients and suggested that patients with a low preoperative glomerular filtration rate (less than 20 ml/minute/1.73 m²) and a thinned out cortex (less than 5 mm) showed a poor outcome after ureterocalycostomy [11]. In our series patients presented early with features of urosepsis albeit with minimal hydronephrosis due to presence of intrarenal pelvis. Also the presence of existing compensatory hypertrophy in these solitary kidneys was in a way advantageous although at a cost of greater technical difficulty.

6 CONCLUSION

In our study, Primary ureterocalycostomy has resulted in satisfactory outcomes.

We therefore conclude, primary ureterocalycostomy as a safe and effective treatment option in patients with complex upper urinary tract obstruction and having solitary functioning kidney who are not candidates for other procedures, such as pyeloplasty. Although difficult, lower pole

partial nephrectomy (guillotine) rather than wedge resection was chosen as procedure to prevent recurrence.

Conflict of interest: None.

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