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Brief Report

# Closed External End Double J Catheter as a Nephrostent in Pyeloplasty for Infants with Uretero-Pelvic Junction Obstruction

Seyed Mohammad Reza Rabani

## Abstract

Uretero-Pelvic Junction Obstruction (UPJO) is a common congenital anomaly that may need pyeloplasty to prevent renal function deterioration. The purpose of this study was to describe a modified use of jj stent catheter in pyeloplasty for infant with UPJO. A series of 12 children, between 3 and 10 months, underwent stenting open pyeloplasty. In each patient a 6 French Foley catheter was placed within the bladder. One ml sterile methylene blue was instilled into the catheter, which was clamped during the operation time. During a dismembered pyeloplasty, a small (3F) double j stent was placed through the flank into renal pelvis, passing the flank skin, muscles and entering via lower pole posteriorly to pass the anastomosis and entering the ureter and urinary bladder, confirmed by observing methylene blue within the wound. The external end of the jj catheter was doubled up and sutured to the flank skin and then removed 4 weeks later. No procedure related complication(s) such as extravasation, infection, and stent displacement was seen. The duration of follow up was 6 months to 3 years. This method of stenting pyeloplasty is easily tolerated and causes no need for endoscopic removal of the catheter. It is an invaluable technique of pyeloplasty with stenting in very small children, and needs no external appliance.

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**Keywords** ● Hydronephrosis ● newborn infant ● stents

## Introduction

Uretero-Pelvic Junction Obstruction (UPJO) is a common cause of hydronephrosis in infants. The most common cause of hydronephrosis in newborns is an anomalous uretero-pelvic junction, which is usually secondary to an intrinsic fibrotic narrowing between the ureter and renal pelvis. In 20% of cases there is an accessory renal artery supplying the lower pole of the kidney.[1] There are, however, controversies in medical literatures in regards to the management of such an anomaly. Some authors believe that a newborn's kidney has a tremendous capacity to improve renal function following decompression, and advise early diagnosis and operation.[1,2] However, others believe that unilateral newborn hydronephrosis appears to be relatively benign, and in most instances dilatation and renal function improve with time, and pyeloplasty may be indicated in only less than 25% of infants.[3]

Nowadays, laparoscopic pyeloplasty has been advised by some experts. However, open pyeloplasty with or without

Department of Urology,
Medical School,
Yasuj University of Medical Sciences,
Yasuj, Iran.

**Correspondence:**
Seyed Mohammad Reza Rabani MD,
Department of Urology and Renal Transplantation,
Beheshti Hospital,
Yasuj University of Medical Sciences
Yasuj, Iran.
**Tel/Fax:** +98 741 3337376
**Email:** smrrabani@yahoo.com
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stenting is an area of conflict. Some authors believe that ureteral stents are associated with irritative symptoms, hematuria, infections, and encrustation, and about 76% of patients using ureteral stents suffer at least from some types of morbidities related to the stent.[4] On the other hand, others believe that ureteral stents are invaluable urologic tools and their indications are evolving to improve patient care and comfort, and to reduce the length of hospitalization.[4,5] Nevertheless, at least, more experienced surgeons use ureteral stents for pyeloplasty.

The most used ureteral stents are double j catheters, which need to be removed by an endoscopic intervention. However, others have also used a nephrostent that needs an external appliance. The present study used a modified technique of stented pyeloplasty without the needs to perform an endoscopic intervention to remove the stent and to have an external appliance hanging from the patient.

## Materials and Methods

Twelve patients, (3 to 10 month old) underwent open (dismembered-stenting) pyeloplasty for advanced UPJO in a period of 4 years from 2002. All patients were examined by sonography during intrauterine period that is a routine part of prenatal care, and at least 3 days after birth. If the second songraphy confirmed UPJO, then the patients were followed by DTPA scanning and VCUG. The patients were included in the study, if there was advanced hydronephrosis, delayed excretion, and significant cortical loss in comparison to the contralateral kidney.

After general anesthesia a small Foley catheter was inserted within the bladder. One ml sterile methylene blue was instilled into it. The Foley catheter was clamped during the operation. After a proper flank incision a small size JJ stent was passed through the skin, and pushed through renal pelvis via the lower pole posteriorly. The external end of the catheter was doubled up and sutured to the flank skin. The internal end of the catheter was passed through the lower pole of the kidney entering the renal pelvis, anastomosis, the ureter and finally reaching the bladder. When the stent reached the bladder lumen the blue color of methylen blue confirmed that the internal end of the stent was within the bladder (figure 1).

After 4 weeks, the catheter was removed easily from the site of skin entrance in an outpatient follow up visit.

All patients had retroperitoneal drain for 5 to 7 days. Sonography was performed before removing the retroperitoneal drain, every month till three months, and then every three months during the period of study. Moreover, the patients were followed up using DTPA scanning every 3 months till one year, every 6 months for the second year, and by the 3rd post operative year. Renal function tests, urine analysis and urine culture tests were scheduled monthly during the period of study.

**Figure 1:** The relative position of external end of the stent to the flank incision, and the peritoneal drain on the 5th day after the operation.

## Results

During a period of 4 years beginning from 2002, 12 patients (9 males and 3 females), with a mean age of 6.5 months, ranging from 3 and 10 months, underwent open stenting pyeloplasty for advanced UPJO. Eight cases had left and 4 cases had right UPJO. The mean hospital stay was 3 days (2-5 days). No related complication was observed within 6 months to 3 years of follow up and no catheter displacement was observed. Moreover, no prolonged urinary extravasation, urinoma formation, or no documented urinary tract infection was noticed.

## Discussion

There are a number of options to treat a patient with UPJO. The options depends on the age of the patient, the severity of the obstruction, the cause of the obstruction, the availability of instruments, the preference of the surgeon and the patient's desire. Nonsurgical treatment with close follow up, especially during the first 2 years in selected cases, has been recommended.[3]

Management of UPJO has been significantly influenced by various minimally invasive techniques, such as antegrade and retrograde endopyelotomy, balloon dilatation and laparoscopic pyeloplasty.[6] The cases of the present study were all younger than one year. It was preferred to choose an open stented pyeloplasty with a modified use of jj catheter. The technique of the operation was the same as a classic Dismembered pyeloplasty, but a modification was made in the use of double j catheter. In general, the formula of "age plus 10" has been suggested for choosing a suitable size jj stent,[7] but very small 3f jj stents was used in the patients of the present study. In all patients through a small flank incision with minimal dissection of the pelvis and the ureter to save the vascularity of the area of anastomosis, the stent was inserted into the bladder. Patients were followed up using DTPA scanning every 3 months for one year, and then every 6 months for the following year. The last DTPA scanning was performed 3 years after the operation.

Traditionally, the use of a nephrostomy tube was accompanied by a nephrostent. This has been abandoned after routine use of jj stent. However, a number of investigators used a nephrostent crossing the site of anastomosis, but did not enter the bladder. [8] Woo, in his studies on Dismembered pyeloplasty in infants under the age of 12 months, concluded that the use of internal ureteral stents had led to a dramatic reduction in operative morbidity.[9]

Nowadays, in spite of some controversies, most urologists prefer to use ureteral stents in pyeloplasty and other similar urologic conditions.[10-12] However, the present study employed a unique modification in the application of ureteral stent, because all previous methods included indwelling double j stents and all patients had retroperitoneal drain for 5 to 7 days. Sonography was performed before removing the retroperitoneal drain, every month for three months, and then every three months during the period of study. Moreover, the patients were followed up using DTPA scanning every 3 months till one year, every 6 months for the second year, and by the 3rd post operative year. Renal function tests, urine analysis and urine culture were scheduled monthly during the period of study. All patients had retroperitoneal drain for 5 to 7 days. The previous methods have the disadvantages of either need to perform a second intervention to remove the stent, or the necessity to have an external appliance. Both of these conditions are unfavorable in infants. We suggest that a new stent, namely a single j catheter, which its external end is closed and is without fenestration, may be suitable for pyeloplasty in very small infants using the formula of "age +10" to determine the appropriate size of the stent.

## Conclusion

The findings of the present study show that the use of modified stenting pyeloplasty was associated with favorable outcome in the patients recruited at our center, and precluded a second surgical intervention to remove the stent and/or the use of an external appliance. However, further studies using a control group are needed to confirm these findings.

**Conflict of Interest:** None declared

## References

1 Kouranloo J, Ghorobi J, Rouzrokh M, et al. Uretero pelvic junction obstruction in the newborn. *Acta Medica Iranica* 2006; 44: 140-4.
2 Salem YH, Majd M, Rushton HG, Belman AB. Outcom Analysis of Pediatric Pyeloplasty as a Function of Patient Age, Presentation and Differential Renal Function. *J Urol* 1995; 154: 1889-93.
3 Ulman I, Jayanthi VR, Koff SA. the long-term followup of newborns with severe unilateral hydronephrosis initially treated nonoperatively. *J Urol* 2000; 164: 1101-5.
4 Chew BH, Knudsen BE, Denstedt JD. The Use of Stents in Contemporary Urology. *Curr Opin Urol* 2004; 14: 111-5.
5 McMullin N, Khor T, King P. Internal Ureteric Stenting Pyloplasty Reduces Length of Hospitalization. *Br J Urol* 1993 ;72: 370-2.
6 Osman M, Abdel-monem AE, Kurkar A, et al. Retrograde Holmium: YAG Laser Endopyelotomy. *Arab J Urol* 2008; 6: 23-6.
7 Palmer JS, Palmer LS. Determining The Proper Stent Length to Use in Children: Age Plus 10. *J Urol* 2007; 178: 1566-9.
8 Reed MJ, Williams MP. Open Pyeloplasty in Children:Experience With an Improved Stenting Technique. *Urol Int* 2003; 71: 201-3.
9 Woo HH, Farnsworth RH.. Dismembered Pyeloplasty in Infants Under The Age of 12 Months. *Br J Urol* 1996; 77: 449-51.
10 Nayyar R, Sarda AK, Kaza RCM, Anand VJ. The obstructed kidney. *Indian J Surg* 2005; 67: 21-8.

11 Tavakoli A, Surange RS, Pearson RC, et al. Impact of Stents on Urological Complications and Health Care Expenditure in Renal Transplant Recipients: Results of a Prospective, Randomized Clinical Trial. *J Urol* 2007; 177: 2260-4.
12 Yucel S, Samuelson ML, Nguyen MT, Baker LA. Usefulness of short- term Retrivable Ureteral stent in Pediatric Laparoscopic Pyeloplasty. *J Uro*l 2007; 177: 720-5.