

Comparison of Treatment Methods of Primary Obstructive Megaureter

Fatma Özcan Sıki^{1*}, Mehmet Sarıkaya¹, Metin Gündüz¹, Tamer Sekmenli¹, İlhan Çiftçi¹, İsa Yılmaz², Harun Peru²

¹Department of Pediatric Surgery, Faculty of Medicine, Selcuk University, Konya, Turkey

²Department of Pediatric Nephrology, Faculty of Medicine, Selcuk University, Konya, Turkey

Article History

Received 11 Sep 2023

Accepted 13 Oct 2023

Published Online 17 Oct 2023

*Corresponding Author

Fatma Özcan Sıki

Department of Pediatric Surgery

Faculty of Medicine

Selcuk University

Konya, Turkey

Phone: +90 5335714268

E-mail: doktorozcan@hotmail.com

Doi: 10.56766/ntms.1358523

Authors' ORCIDs

Fatma Özcan Sıki

<http://orcid.org/0000-0002-4461-3461>

Mehmet Sarıkaya

<http://orcid.org/0000-0003-2453-0893>

Metin Gündüz

<http://orcid.org/0000-0002-6070-0135>

Tamer Sekmenli

<http://orcid.org/0000-0001-8867-1383>

İlhan Çiftçi

<http://orcid.org/0000-0001-9080-4480>

İsa Yılmaz

<http://orcid.org/0000-0001-8654-9173>

Harun Peru

<http://orcid.org/0000-0001-6687-1229>



Content of this journal is licensed under a Creative Commons Attribution 4.0 International License.

Abstract: Primary megaureter (PM) is a common congenital uropathy. In this study, we compared the results of treatment options for primary megaureter with obstruction in UVJ. The files of all patients who underwent open surgery and had a double J (JJ) ureteral catheter for treatment of primary obstructive megaureter in our institution between 2010 and 2023 were evaluated retrospectively. The demographic information of the patients, the results of imaging tests before and after the surgery, early and late complications after the treatment, and the length of stay in the hospital were recorded. The results of both treatment methods were compared statistically. A total of 23 patients and 26 kidney units over 13 years were retrospectively analyzed. Eighteen patients were male (78%); 5 were girls (22%). Ureteral tapering and ureteroneocystostomy (UNC) were performed with open surgery in 8 patients, while JJ stent was placed in 12 patients primarily by cystoscopy. In the urinary system ultrasonography (USS) performed at an average of 3 months after the treatment, hydronephrosis grades were observed to regress in 25 units. All patients recovered after surgery and there was no significant difference between the two treatment methods ($p > 0.05$). In the treatment of primary obstructive megaureter (POM), endoscopic JJ stenting is as effective as ureteral reimplantation with open surgery. It may be considered more valuable due to the shorter hospital stay. ©2023 NTMS.

Keywords: Double J Stent; Primary Obstructive Megaureter; Pediatric Patient; Ureteroneocystostomy.

1. Introduction

Primary megaureter (PM) is a common disease among congenital uropathies. PM; The presence of an enlarged ureter with or without pelvicalyceal dilatation due to an anomaly at the vesicoureteral junction. Treatment of PMs varies depending on the cause. PMs; It is divided into 3 classes: due to reflux, due to obstruction at the ureterovesical junction (UVJ), and without obstruction and reflux ¹.

Treatment of PM due to reflux is mostly shaped by the degree and clinical presentation of vesicoureteral reflux (VUR). In non-reflux PM, symptoms secondary to impaired differential kidney function (DRF) and/or potential impaired urinary drainage are decisive for the treatment strategy ². Narrowing of the ureter and reimplantation to the bladder is a traditional treatment for POM that does not resolve or is associated with

obstruction or pyonephrosis. In recent years, endoscopically placed JJ stents have been used in the treatment of permanent or progressive nonreflux megaureters in children³. The use of the endoscopically placed JJ stent to provide internal drainage of the ureters was first described more than 20 years ago⁴. Subsequently, many authors reported the success of double-J stent placement as a safe and effective alternative treatment to external drainage in children⁵. In this study, we compared the results of our treatment methods in patients with primary obstructive megaureter.

2. Material and Methods

After obtaining ethical approval from our institution with the number 2021/252, the files of all patients who underwent open surgery and underwent therapeutic JJ ureteral stent between 2010 and 2023 due to primary obstructive megaureter were evaluated retrospectively. The demographic information of the patients, the results of imaging examinations before and after the treatment, early and late complications, and length of hospital stay were recorded.

The treatment criteria of the patients were as follows;

1. Increasing hydronephrosis with a retrovesical ureter greater than 10 mm with an obstructive drainage pattern on dynamic radionuclide renography or
2. Dynamic radionuclide renography pattern with evidence of dysfunction with less than 40% differential kidney function with an obstructive excretion, or
3. Presence of pyonephrosis / recurrent urinary tract infection.

Patients with a ureteral diameter of 15 mm or more and atrophic kidney underwent an open surgical procedure; an Endoscopic JJ stent placement procedure was applied to patients with ureteral diameter of less than 15 mm.

Ureteral stents used; Plasti-Med was a brand of 3 fr 16 cm with one end closed and 4 fr 18 cm with one end closed. A Karl Storz-Germany 9.5-5 Fr and 8-4 Fr cystoscope were used to place JJ stents transurethrally. In patients who underwent open surgery, the ureter was narrowed and a Glenn ureteroneocystostomy was performed. Antibiotic prophylaxis was administered to patients treated with both methods. While the JJ stents of the patients treated with open surgery were removed after an average of 4-6 weeks; JJ stents inserted through endoscopic or antegrade nephrostomy were removed after 6-8 weeks. The stents were removed endoscopically with an outpatient procedure. Patients were re-evaluated with routine renal system ultrasonography (USS) 3 months after removal of the JJ catheter. If there was increasing hydronephrosis, it was re-evaluated with mandatory dynamic radionuclide renography. Data were evaluated using descriptive statistics showing median values and range. Patients who started the first treatment in another center and then applied to our

clinic and patients who discontinued the treatment were excluded from the study.

3. Results

A total of 23 patients and 26 kidney units over 13 years were retrospectively analyzed. Of the patients, 18 (78%) were male; 5 of them were girls (22%). The mean age was 37.7 ± 35.2 months (0-161 months). In girls, the mean age was 69.4 ± 67.4 months (2-161 months); the mean age in men was 28.9 ± 28.8 months (0-132 months).

4 of 26 kidney units are right; 16 of them are left; 3 were bilateral. Eighteen patients had recurrent urinary tract infections. 5 patients had antenatal hydronephrosis.

In the urinary system, ultrasonography was performed before the treatment; There was grade 1 hydronephrosis in 1 unit, grade 2 hydronephrosis in 13 units, grade 3 hydronephrosis in 12 units, and ureter diameters were larger than normal and the mean was 14.5 ± 7.5 mm (7-25 mm). Vcug was normal in all patients.

In static kidney scintigraphy ((Dimercaptosuccinic Acid (DMSA)) parenchymal function was normal in 8 units, the function was 20% or less in 2 units, and scar appearance was present in 4 units. In 12 units, renal function was 40% and above with mild dysplasia. There was an obstructive pattern in the dynamic radionuclide renography of the patients. Antibiotic prophylaxis was started in all patients during the investigation phase. All patients were treated after an average of 2.9 months (2-15) after admission. Emergency intervention was performed on the patient, and JJ stent was requested by cystoscopy, but when the JJ stent could not be inserted endoscopically, an antegrade JJ stent was inserted together with nephrostomy. 8 patients underwent ureteral tapering and UNC with open surgery, while 12 patients received a JJ stent primarily by cystoscopy.

In the USS performed at an average of 3 months after the treatment, it was observed that the hydronephrosis grades regressed in 25 units. One patient with multiple urinary anomalies also had an increase in hydronephrosis.

Renal hydronephrosis and ureter diameters were compared in preoperative and postoperative ultrasonographic imaging of patients with endoscopic JJ stent implantation and patients who underwent open surgery for ureteral reimplantation. It was observed that all patients recovered after surgery and there was no significant difference between the two treatment methods ($p > 0.05$).

While the average hospital stay was 36 ± 8 hours in endoscopic treatment; In the open surgery technique, the mean time was 72 ± 8 hours ($p < 0.05$).

Of the 26 units operated for POM; Preoperative and postoperative urinary system ultrasound findings are given in Table 1.

Table 1: 26 units operated for POM; Pre- and postoperative urinary system ultrasound findings.

	JJ stent placed with endoscopic treatment (n=16)	Treated with open surgery (n=10)	Test Results
Preoperative degree of renal hydronephrosis			
Grade 1	-	1 (10.0)	p>0.05 X ² =3.610
Grade 2	12 (75.0)	2 (20.0)	
Grade 3	4 (25.0)	6 (60.0)	
Grade 4	-	1 (10.0)	
Preoperative ureteral diameter			
Normal	1 (6.3)	2 (20.0)	p>0.05 X ² =3.055
4-10 mm	2 (12.5)	3 (30.0)	
11-20 mm	12 (75.0)	5 (50.0)	
21 ve üzeri	1 (6.3)	-	
Postoperative degree of renal hydronephrosis			
Normal	7 (43.8)	4 (40.0)	p>0.05 X ² =0.114
Grade 1	6 (37.5)	3 (30.0)	
Grade 2	2 (12.5)	3 (30.0)	
Grade 3	-	-	
Grade 4	1 (6.3)	-	
Postoperative ureteral diameter			
Normal	11 (68.8)	5 (50.0)	p>0.05 X ² =0.576
4-10 mm	2 (12.5)	3 (30.0)	
11-20 mm	3 (18.8)	2 (20.0)	
21 ve üzeri	-	-	
Hospital stay time	36±8 hours	72±8 hours	p<0.05

4. Discussion

The traditional treatment of POM is UNC with ureteral constriction. Minimally invasive treatment methods have been used in the last 20 years and have been found to be as effective as UNC. These are endoscopic balloon dilation to the UVJ, which is thought to be narrow, or endoscopic placement of the JJ stent, which is passed through the UVJ and extends to the kidney pelvis. Research has shown that; Balloon dilation performed with endoscopy is a safe and effective method. It can be definitive treatment⁶⁻⁹. It was observed that endoscopic balloon dilatation was not used in our series because the equipment was not available. Endoscopic insertion of the JJ stent, which is one of the non-invasive treatment methods, was applied. Patients who developed VUR after endoscopic balloon dilatation procedure have been reported¹⁰. In our series, no patient developed VUR after the endoscopic procedure.

The only treatment for POM is a cystoscopically placed JJ catheter with limited success. However, in infants, catheter placement has been reported to be a reasonable interim solution until the baby is old enough for a definitive procedure¹¹. It has been stated that reimplantation will be more difficult in a small bladder in infants, and it has been observed that endoscopic JJ stenting is recommended for POM in patients in infants¹². In our study, it was seen that JJ stent was placed in 8 infant patients and UNC was performed in 2 infant

patients. In another study, it was stated that ureteral reimplantation with an open method is safe and feasible, although there is an anatomical limitation in infants¹³. In our study, we observed that the endoscopic JJ stent was placed primarily in infant patients. Although it has been stated that cutaneous ureterostomy is safe and usable for the treatment of POM infants¹⁴. It is not a method used in recent years and it was not a preferred treatment method in our study.

Another study stated that complications caused by JJ stents should also be taken into consideration and should be used only for selected patients¹⁵. There were no JJ stent-related complications (perforation or increased urinary tract infection) in our series.

It has been stated that endoscopic methods can be primarily evaluated in the treatment of POM, but a larger database is needed to clarify whether they are as effective as open surgery¹. In this study, we found that there was no significant difference between the two techniques when we compared the ureter diameter and the degree of hydronephrosis in the kidney before and after the endoscopic JJ catheter insertion with the open surgical method (p>0.05). We think that endoscopic JJ insertion may be more valuable due to the shorter hospital stay.

5. Conclusions

In the treatment of POM, endoscopic JJ catheter insertion is as effective as open surgical ureteral reimplantation. It may be considered more valuable due to the shorter hospital stay. Prospective studies with larger numbers of patients are needed to be considered a definitive and only treatment.

Limitations of the Study

This study is retrospective. The number of patients is small and balloon ureteral catheter dilation was not used among the treatment options.

Acknowledgement

None.

Conflict of Interests

The authors declare that there is no conflict of interest.

Financial Support

This work has not received external funding. None of the authors have financial statements to declare.

Author Contributions

FÖS: Conceptualization and study design; literature search and selection, recruitment, data refinement and extraction, formal analysis; investigation; methodology; project management; resources; verification; visualization; writing – original draft; writing – reviewing and editing. Mehmet Sarıkaya- İÇ: Conceptualization and study design; literature search and selection, data refinement and extraction, formal analysis; investigation; methodology; project management; resources; verification; visualization; writing – original draft; writing – reviewing and editing. MG-TS- İY-HP: Laboratory determinations, original draft, writing – reviewing and editing. FÖS: data improvement and extraction. FÖS-İÇ: writing – reviewing and editing.

Ethical Approval

Ethics committee approval was obtained from the Selcuk University Faculty of Medicine Local Ethics Committee for this study (2021/252).

Data sharing statement

All data pertaining to this study are available in correspondence upon reasoned request through the author.

Consent to participate and Informed Statement

Since this study is a retrospective study, patient consent is not required.

References

1. Buder K, Opherk K, Mazzi S, Rohner K, Weitz M. Non-surgical management in children with non-refluxing primary megaureter: a systematic review and meta-analysis. *Pediatr Nephrol.* 2023; 38(11):3549-58.
2. Keating MA, Escala J, Snyder HM 3rd, Heyman S, Duckett JW. Changing concepts in management of primary obstructive megaureter. *J Urol.* 1989; 142(2 Pt 2):636-68.
3. Carroll D, Chandran H, Joshi A, McCarthy LS, Parashar K. Endoscopic placement of double-J ureteric stents in children as a treatment for primary obstructive megaureter. *Urol Ann.* 2010; 2(3):114-18.
4. Andriole GL, Bettmann MA, Garnick MB, Richie JP. Indwelling double-J ureteral stents for temporary and permanent urinary drainage: experience with 87 patients. *J Urol.* 1984; 131(2):239-41.
5. Barbancho DC, Fraile AG, Sánchez RT, et al. Es útil el manejo inicial del megauréter primario con catéteres doble J? [Is effective the initial management of primary nonrefluxing megaureter with double-J stent?]. *Cir Pediatr.* 2008; 21(1):32-36.
6. Casal Beloy I, Somoza Argibay I, García González M, García Novoa MA, Míguez Fortes LM, Dargallo Carbonell T. Endoscopic balloon dilatation in primary obstructive megaureter: Long-term results. *J Pediatr Urol.* 2018; 14(2):167.e1-167.e5.
7. Kassite I, Renaux Petel M, Chaussy Y, et al. High Pressure Balloon Dilatation of Primary Obstructive Megaureter in Children: A Multicenter Study. *Front Pediatr.* 2018; 6:329.
8. García-Aparicio L, Blázquez-Gómez E, Martín O, et al. Use of high-pressure balloon dilatation of the ureterovesical junction instead of ureteral reimplantation to treat primary obstructive megaureter: is it justified?. *J Pediatr Urol.* 2013; 9(6 Pt B):1229-33.
9. Romero RM. Management of Primary Obstructive Megaureter by Endoscopic High-Pressure Balloon Dilatation. IDEAL Framework Model as a New Tool for Systematic Review. *Front Surg.* 2019; 6:20.
10. Ortiz R, Parente A, Perez-Egido L, Burgos L, Angulo JM. Long-Term Outcomes in Primary Obstructive Megaureter Treated by Endoscopic Balloon Dilatation. Experience After 100 Cases. *Front Pediatr.* 2018; 6:275.
11. Awad K, Woodward MN, Shalaby MS. Long-term outcome of JJ stent insertion for primary obstructive megaureter in children. *J Pediatr Urol.* 2019; 15(1):66.e1-66.e5.
12. Shenoy MU, Rance CH. Is there a place for the insertion of a JJ stent as a temporizing procedure for symptomatic partial congenital vesico-ureteric junction obstruction in infancy?. *BJU Int.* 1999; 84(4):524-25.
13. Jude E, Deshpande A, Barker A, Khosa J, Samnakay N. Intravesical ureteric reimplantation for primary obstructed megaureter in infants under 1 year of age. *J Pediatr Urol.* 2017; 13(1):47.e1-47.e7.
14. Shrestha AL, Bal HS, Kisku SMC, Sen S. Outcome of end cutaneous ureterostomy (ECU) as a non conservative option in the management of primary obstructive megaureters (POM). *J Pediatr Urol.* 2018; 14(6):541.e1-541.e5.
15. Castagnetti M, Cimador M, Sergio M, De Grazia E. Double-J stent insertion across vesicoureteral

junction--is it a valuable initial approach in neonates and infants with severe primary nonrefluxing megaureter?. *Urology*. 2006; 68(4):870-76.

NTMS New Trends in
Medicine Sciences
<https://dergipark.org.tr/pub/ntms>