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ORIGINAL ARTICLE

The efficacy and safety of endoscopic double J stent versus open ureteric re-implantation of primary obstructive megaureter in pre-school children 1-5 years

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ABSTRACT

Background: Primary obstructive megaureter (POM) is not uncommon in our population, and urologists treat it differently depending on their experience and personal preferences. In addition, there is conflicting information in the literature about the endoscopic placement of a double J stent in POM patients. This study will give us a local magnitude comparison of endoscopic implantation of JJ stents with open surgery in treating POM.

Methods: The Department of Urology at the Khyber Teaching Hospital Peshawar ran this comparative analytical study from July 2024 to July 2025. The study included 102 patients, 51 in each group, who were between the ages of 1 and 5 years and had primary obstructive mega ureter. We did not include patients with bladder stone, neurogenic bladder and who have received any treatment for POM in the past. While patients in group B underwent open ureteric re-implantation, patients in group A underwent endoscopic double J stent insertion. If the obstruction is removed and the ureteral diameter and hydronephrosis decrease, the procedure was deemed successful. If there were no complications during the eighth week of follow-up, the surgery was deemed safe.

Results: In my investigation, the efficacy of endoscopic double J stents and open ureteric surgery re-implantation was 64.71% and 92.16%, respectively, with a p-value of 0.0008. The safety of endoscopic double J stents and open ureteric surgery re-implantation was 80.39% and 96.08%, respectively, with a p-value of 0.014.

Conclusion: We came to the conclusion that open ureteric surgery is more effective and safer than endoscopic double J stents for re-implantation of primary obstructive megaureters in preschoolers aged 1 to 5.

Keywords: Double J Stents, Endoscopic Surgery, Primary Obstructive Megaureters, Re-implantation.

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Introduction

In 19231, Caulk used the term Primary Obstructive Megaureter (POM) to refer to a disorder that dilates the ureter and renal collecting system and hinders urine evacuation (1,2). Over time, the majority of

problems will be fixed. However, ureteral reimplantation is necessary for about 20% of patients with high-grade or progressive obstruction or uncontrolled urinary tract infections (UTI) (3). For the treatment of primary obstructive megaureters, open ureteral reimplantation has long been considered the gold standard. Over the past ten years, pediatric urologists have made substantial use of robotic-assisted, laparoscopic, and other minimally invasive procedures. With its 6° of articulation, tremor filtering, and stereoscopic vision, the Da Vinci robot-assisted laparoscopic surgery platform provides unique benefits for intracorporeal repair and suturing (4).

Ureteral anti-reflux re-implantation, typically in conjunction with ureteral remodeling or plication, is the current standard of care for primary obstructive megaureter is that presents with chronic or worsening symptoms. Endo ureterostomy, cutaneous ureterostomy, endoscopic balloon dilatation, double-J stenting, and refluxing ureteral reimplantation are short-term remedies. In 10–25% of instances, surgery is usually advised by the age of 7, particularly when renal function drops below 35–40% or when there is progressive uretero hydronephrosis, recurrent UTIs, bilateral illness, or a single kidney (5,6). Children with persistent or progressive non reflux megaureters have recently been treated with endoscopically placed JJ stents (7). It has been known for more than 20 years that an endoscopically placed JJ stent can facilitate internal ureter drainage (8). The effectiveness of double-J stent implantation as a secure and practical substitute for external drainage in children was subsequently reported in numerous publications (9). Double-J ureteric stents are easy to implant endoscopically in children, and issues are uncommon (8/38 insertions). In 66% of patients, primary non-refluxing megaureters can be resolved with double-J ureteric stenting alone (25/38 insertions) (10). In pediatric patients with primary obstructive megaureters, open ureteric re-implantation was 91.7% successful (11).

For the treatment of POM in children, the current study contrasts the safety and effectiveness of open ureteric surgical re-implantation with endoscopic placement of a double J stent. POM is not uncommon in our population, and urologists treat it differently depending on their experience and personal preferences. In addition, there is conflicting information in the literature about the endoscopic placement of a double J stent in POM patients. This study will give us a local magnitude comparison of endoscopic implantation of JJ stents with open surgery in treating POM, as statistics on its effectiveness are few in the local literature. The results of this study will guide future investigations and policy suggestions.

Methods

The Department of Urology at the Khyber Teaching Hospital Peshawar did this comparative analytical study from July 2024 to July 2025. Before the study began, it got the go-ahead from the ethical review committee reference number: 941/DME/KMC dated 28.1.2024. The study included 102 patients, 51 in each group, who were between the ages of 1 and 5 years and had primary obstructive mega ureter (based on the intravenous urethrogram and ultrasound with ureter size of more than 7mm). Sample size is calculated on WHO sample size calculator by keeping 66% (10) efficacy of double J stenting and 91.7% (11) in open ureteric re-implantation, 95% confidence level and 90% power of the test. Sample size will be 102 (51 in each group). We did not include patients with bladder

stone, neurogenic bladder and who have received any treatment for POM in the past.

Every patient was brought to the ward for additional assessment. Every patient had a complete medical history taken, a comprehensive physical examination, and ongoing investigations. The ureter size and baseline grade of renal hydronephrosis were recorded. The block technique was used to randomly assign each patient to one of two groups. While patients in group B underwent open ureteric re-implantation, patients in group A underwent endoscopic double J stent insertion. One skilled urologist performed all of the operations. In the eighth week, patients in group A were contacted once more, and the stents were taken out. To determine the follow-up grade of hydronephrosis and ureteral diameter, patients in both groups underwent a new evaluation on US. If the obstruction is removed and the ureteral diameter and hydronephrosis decrease, the procedure was deemed successful. If there were no complications during the eighth week of follow-up, the surgery was deemed safe. A pre-made proforma was used to record all of the data. To account for cofounders and bias in the study's findings, strict exclusion criteria were applied.

SPSS version 20 was used to analyze the data. The mean + standard deviation or median IQR was calculated for numerical variables including age, baseline ureter diameter, and follow-up ureteral diameter after the Shapiro Wilk Test was used to check for normality. Frequencies and percentages for categorical covariates, including gender, residence, history of preterm birth, and hydronephrosis grade, were calculated at baseline and during follow-up. The effectiveness and safety of the two groups were assessed using the chi square test, with a P value < 0.05 being deemed significant. To observe the effect modifications, efficacy and safety were stratified using effect modifiers such as age, gender, domicile, and history of premature birth. The Fisher's exact test or post-stratification chi-square test was used, with a P-value of less than 0.05 deemed significant.

Results

The average age of the participants in the study was 3.13 ± 1.78 years, and they ranged in age from 1 to 5. Group A patients were 3.86 ± 1.04 years old on average, whereas group B patients were 3.05 ± 1.86 years old on average. Of the 102 patients, 62 were boys and 40 were girls, resulting in a male-to-female ratio of 1.5:1. The baseline size of the ureter in groups A and B was 12.80 ± 1.98 mm and 12.84 ± 2.32 mm, respectively. The baseline hydronephrosis was 3.25 ± 0.87 for group A and 3.73 ± 0.98 for group B. Table I displays the distribution of the various variables in both groups.

On follow up, the size of the ureter in groups A and B was 10.43 ± 2.27 mm and 9.13 ± 1.32 mm, respectively. The follow up hydronephrosis grade was 2.41 ± 1.18 for group A and 1.49 ± 1.21 for group B. In this study, the efficacy of endoscopic double J stents and open ureteric surgery re-implantation was 64.71% and 92.16%, respectively, with a p-value of 0.0008. The safety of endoscopic double J stents and open ureteric surgery re-implantation was 80.39% and 96.08%, respectively, with a p-value of 0.014. The results are summarized in table 2.

Table 1: Distribution of different variables (n=102).

Variables		Group A (n=51)	Group B (n=51)
		N(%)	N(%)
Age (years)	**1-3**	24 (47.06%)	22 (43.14%)
	4-5	27 (52.94%)	29 (56.86%)
Gender	**Male**	32 (62.75%)	30 (58.82%)
	Female	19 (37.25%)	21 (41.18%)
Residence	**Rural**	21 (41.18%)	24 (47.06%)
	Urban	30 (58.82%)	27 (52.94%)
H/o premature delivery	**Yes**	12 (23.53%)	11 (21.57%)
	No	39 (76.47%)	40 (78.43%)

Table 2: Comparison of efficacy and safety (n=102).

	Group A (n=51)		Group B (n=51)		P-value
	Yes	No	Yes	No	
EFFICACY	33 (64.71 %)	18 (35.29 %)	47 (92.16 %)	04 (7.84 %)	**0.0008**
SAFETY	41 (80.39 %)	10 (19.61 %)	49 (96.08 %)	02 (3.92 %)	**0.014**

Discussion

The intramural ureter narrows congenitally, resulting in primary obstructive megaureter (POM). Ureteral reimplantation, with or without ureteral tapering, is the traditional course of treatment. However, it can be difficult to reimplant a dilated ureter into an infant's bladder using ureteral reimplantation in children younger than one year. Concerns about bladder dysfunction following newborn reimplants have also been discussed. Additional tactics for the infant patient include endoscopic procedures, refluxing end-to-side, mini-tapering, or temporary diversion with cutaneous ureterostomy followed by delayed reimplant. Temporary ureteral stent placement is complicated by encrustation, migration, and UTIs and necessitates repeated stent exchanges (12,13).

As was already said, ureteral reimplantation may be difficult for POM newborns; therefore, ureteral stent insertion is a viable substitute to accomplish internal urine drainage. Until the VUJ matures on its own, the stent can stretch the stenotic VUJ, permit the dilated system to decompress, and guarantee unhindered urine passage across the VUJ (14). In POM babies, double-J stents were first placed in an open manner (15). After then, there were reports of endoscopic double-J stent insertion as well, however they were associated with low success rates (26% to 66%). Complications (stent migration, stent encrustation, UTI, stone formation, and recurrent hematuria) were more likely to occur, necessitating ureteral reimplantation later on (16,17).

According to studies conducted primarily in the 2000s, ureteral stents for POM were deemed to be relatively effective, since almost half of patients did not require further surgery after three to six months of stenting. The drawbacks, however, were that many POMS ureteral stents for infants needed to be placed openly or had issues with migration, stone formation, or UTI (18). More recently, a bigger trial with a longer follow-up (6 years) that included 29 patients and 35 ureters revealed that 25% of patients did not need further surgery and that 40% of patients experienced problems throughout the stenting period, such as hematuria, stones, UTI, and stent migration (19).

Aiello et al (20). presented a comprehensive analysis that included 13 retrospective studies with 324 individuals, whose median age ranged from 4 months to 7 years. Varying trials had varying treatment indications, but the majority of them included patients with symptoms, obstructive patterns on MAG-3 scans, increased dilatation, or decreasing renal function. Endoscopic therapy involved UVJ dilatation or incision, commonly followed by the temporary implantation of a JJ-stent. The median follow-up period ranged from 21 months to 10.3 years overall. The stated overall success percentage varied between 69 and 100 percent. The rate of complications varied between 0% and 50%. Several of the included studies reported de novo VUR, with an incidence ranging from 5% to 27%.

The gold standard for treating symptomatic obstructive megaureter disease is still open ureteral reimplantation (OUR), which has demonstrated an outstanding success rate of around 90%(21,22).The goal of ureteral reimplantation is to remove the narrow ureteral segment, either with or without tapering or plication to make the ureter the right size, and then anastomose the distal ureter to the bladder using a ureteral nipple or an anti-reflux submucosal tunnel(23).Both intravesical and extra venous methods can be used. On the other hand, the open technique is linked to lengthy recovery, unpleasant invasiveness, and postoperative problems. Laparoscopic ureteral reimplantation and robotic-assisted laparoscopic ureteral reimplantation are two minimally invasive ureteral reimplantation (MIUR) procedures that more urologists are performing for POM. MIUR has typically been used to treat POM in adults and children older than one year.

Agarwal et al. placed the ureter on traction in three young adult patients using a vascular loop, and they did not unhook it from the hiatus until the tailoring was complete. This led to the ureter's anatomical alignment and strong platform, which greatly aided intracorporeal suturing and excisional tailoring (24). For eight individuals, Khan et al. tapered the ureter intracorporeally over a ureteral dilator that was already in place. In order to locate the ureter, determine its tapering ureteral diameter, and preserve its anatomy without interfering with the blood flow, the dilator was used (25). For three patients, ages five to thirty, Ansari et al. recommended extracorporeal tailoring in addition to intracorporeal tailoring, which included delivering the ureter through the trocar (26). For both adults and children with symptomatic POM, extracorporeal ureteral tailoring followed by ureteroneocystostomy has had positive results (27,28).

Conclusion

We came to the conclusion that open ureteric surgery is more effective (obstruction is relieved and reduction in hydronephrosis and ureteral diameter) and safer than endoscopic double J stents for re-implantation of primary obstructive megaureters in preschoolers aged 1 to 5. Therefore, in order to improve outcomes, we advise that the main therapeutic option for primary obstructive megaureter should be open ureteric surgical re-implantation.

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All the authors agree to take responsibility for every facet of the work, making sure that any concerns about its integrity or veracity are thoroughly examined and addressed.	