ORIGINAL ARTICLE

Comparison of Hospital Stay in Stented Versus Non-Stented Pyeloplasty in Children with Pelviureteric Junction Obstruction

Mahwish Khan[1], Muddassar Fiaz Gondal[1], Asrar Ahmad[2], Muhammad Omer Fraz[1], Naveed Ahmed[2*], Amaar Talib[3]

ABSTRACT

Objective: To compare the average hospital, stay between stented vs non-stented pyeloplasty in children with hydronephrosis due to pelviureteric junction obstruction at our setup.

Study Design: Cross-sectional Study.

Place and Duration of Study: The study was carried out at the Department of Paediatric Surgery, Holy Family Hospital Rawalpindi, Pakistan from 07th September 2016 to 30th June 2017.

Methods: The study was conducted after the ethical clearance was taken from the institutional ethics committee, and patients were enrolled after taking informed consent from parents. In Group-A, patients underwent stented pyeloplasty, whereas those in Group B underwent non-stented pyeloplasty. All of the pyeloplasty were performed by the consultants. The duration of hospital stay after pyeloplasty was compared between study groups. Data was entered and analyzed through SPSS version 20.

Results: The mean age was 6.1 (SD: ± 3.29) years in stented and 6.3(SD: ± 3.15) years in the non-stented pyeloplasty group. The majority of cases were males in both groups, 24 (80%) in stented and 23 (76.7%) in non-stented. Most of the children, 27 (90%), had intrinsic type obstruction in the stented and 26 (86.7%) in the non-stented pyeloplasty group. The mean duration of hospital stay was significantly shorter in the non-stented group (5.27 ± 1.72 days) compared to the stented group 11.43 ± 1.52 days). (*p*-value <0.001).

Conclusion: Hospital stay after pyeloplasty in pelviureteric junction obstruction patients is significantly shorter in a non-stented group compared to the stented group, irrespective of age, gender, and pelviureteric junction obstruction type.

Keywords: *Hydronephrosis, Obstruction, Pyeloplasty.*

How to cite this: *Khan M, Gondal MF, Ahmad A, Fraz MO, Ahmed N, Talib A.Comparison of Hospital Stay in Stented Vs Non-Stented Pyeloplasty in Children with Pelviureteric Junction Obstruction. Life and Science. 2023; 4(4): 387-392. doi: http://doi.org/10.37185/LnS.1.1.352*

Introduction

Hydronephrosis is an abnormal dilatation of the kidney and is frequently encountered in children. One of the commonest causes of hydronephrosis in children is pelviuretericjunction (PUJ) obstruction.[1] It is often detected by antenatal ultrasound.[2] Renal pelvis becomes detectable from the beginning of the second trimester, and the kidneys generally lose their previous hyperechogenic appearance. Hydronephrosis is detected in the sections of the fetal abdominal transverse planes by measuring the anteroposterior diameter of the renal pelvis. There could be multiple causes for antenatal hydronephrosis, ranging from mild transient hydronephrosis to more serious vesicoureteral reflux and pelviuretericjunction obstruction.[3] Antenatal and neonatal upper urinary tract dilatations have a tendency to resolve spontaneously, thus making the

[1]*Department of Paediatric Surgery*
Rawalpindi Medical University, Rawalpindi, Pakistan
[2]*Department of Paediatric Surgery*
Pak Emirates Military Hospital (PEMH), Rawalpindi, Pakistan
[3]*Department of Orthopaedic*
Punjab Rangers Teaching Hospital, Lahore, Pakistan

Correspondence:
Dr. Naveed Ahmed
Department of Paediatric Surgery
Rawalpindi Medical University, Rawalpindi, Pakistan
E-mail: amcolian22@gmail.com

Funding Source: NIL; Conflict of Interest: NIL
Received: Feb 07, 2023; Revised: May 10, 2023
Accepted: Jun 11, 2023

decision of surgical intervention more difficult.[4]

Surgery should be considered in patients who have a deteriorating renal function or on serial ultrasound scans; anteroposterior diameter of the renal pelvis has a rising tendency.[5] For correction of PUJ obstruction, many surgical procedures are in practice nowadays. These surgical techniques are categorized into dismembered and flap pyeloplasties. Dismembered Pyeloplasty (Anderson Hynes) can be either stented or non-stented.[6] The stent being used is either a double-J or a straight stent, which is kept ensuring the patency of the ureter. The double-J stent has one end in the renal pelvis and the other in the urinary bladder. This type of stent has a few advantages as well as disadvantages. Its main advantage is that it does not require a separate nephrostomy tube, as the urine gets drained through the DJ stents into the bladder by passing the anastomosis.[7] On the other hand, it carries a disadvantage as such a type of stent requires removal after six to eight weeks through cystoscopy under general anesthesia.[8] Straight ureteric stent or external ureteric stent is another type of stent used during pyeloplasty. This stent does not drain urine from the renal pelvis into the bladder; instead, it is brought out as a nephrostomy tube for drainage of urine. After five to seven days, this stent is removed after carrying out a contrast study through this stent to confirm the patency of anastomosis.[9] It is believed that the stent keeps the anastomosis patent and in a way, it is also helpful in reducing the leak from the anastomosis site. However, like double-J stent, it is also not free from complications as it can get blocked, dislodged, and rarely can break during removal. Moreover, the stent is a source of pain to the child as well.Sometimes, leaving a nephrostomy tube may be counterproductive as it will keep the anastomosis dry and, hence, the tendency to stenosis or stricture formation.[10] In the case of non-stented pyeloplasty, no trans-anastomotic stent or nephrostomy tube isused.

If we look at the literature, there are different views regarding the use of stentsin pyeloplasty. Few studies are against the use of stents,whereas others favor it. The main determinant in the decision making whether to use the stent or not is the length of hospital stay. The matter is still disputed, so this study was carried out on patients with pelviureteric junction obstruction who underwent pyeloplasty in order to compare the hospital stay of stented repair versusnon-stented repair so that better treatment optionscan be adopted. We hypothesized that non-stentedpyeloplasty is better than the stented one in terms of hospital stay, keeping in mind the extreme workload on a resource-constrained medical facility where the duration of hospital stay is significant for rapid patient turnover.

Methods

A cross-sectional study was conducted at the Paediatric Surgery Department, Holy Family Hospital Rawalpindi, Pakistan from 07th September 2016 to 30th June 2017 after taking approval by the institutional ethics committee held on August 03, 2016 vide letter number RMU-RRF-SUR-001-23. The sample size was calculated using the WHO Sample Size Calculator, keeping the level of significance at 5% and the power of the test at 90%. The sample size was 30 patients in each study group, which was selected by simple random sampling technique. Children were randomized into two groups by lottery methods of pre-written cards. Children in group A underwent stented pyeloplasty, whereas those in group B underwent non-stented pyeloplasty. All of the pyeloplasties were performed by the consultants. In Group A patients, a feeding tube was used as an external stent placed trans-anastomotic and brought out through the lumbar region. A contraststudy was done after ten days through this stent to confirm the patency of the anastomosis followed by the removal of the stent.

All types of PUJ obstructions in the pediatric age group (1 to 12 years) that were significant and required correction were diagnosed by ultrasound with dilatation and cupping of renal calyces, paper-thin renal cortex, and pelviectasis within the cut-off value of the anteroposterior diameter of the renal pelvis up to 3cm wasincluded in the study. Patients with pyonephrosis and those undergoing re-do pyeloplasty were excluded from the study. Informed consent was taken from parents after a detailed description. Patients were operated under general anesthesia as elective proceduresafter detailed pre-operative workup and assessment by the anesthetist. Workup included detailed history,

including a review of antenatal scans, serial ultrasound scans, and renal scans. After being discharged, the patients were followed up after 1 week, then after 2 weeks, then on monthly, three monthly, and 6 monthly basis with follow-upultrasoundsand renal scansto look for outcomes. The demographic data was entered on a specified proforma. As per the study aim after pyeloplasty, the overall duration of hospital stay was recorded on the study proforma.

Data was entered and analyzed through SPSS version 20. The numerical variables, i.e., age and duration of hospital stay, were measured as mean ± SD. Independent sample t-test was applied to compare the mean duration of hospital stay between the two groups. A $p \leq 0.05$ was taken as significant. The categorical variables, i.e., gender and type of PUJ obstruction,weremeasured as frequency and percentage. The duration of hospital stay was also stratified according to age, gender, and type of PUJ obstruction to address affect modifiers. Post-stratification independent sample t-test was applied, keeping $p \leq 0.05$ as significant.

Results

A total of 60 patients were included in the study, with 30 patients in each group. Out of 60 patients, 32 had left-sided, 22 had right-sided and 6 patients had bilateral PUJ obstruction. The age of the patients ranged from 1 year to 12 years, with anoverall mean of 6.20 ± 3.19 years. Overall, there were 47 (78.3%) male and 13 (21.7%) female patients. There were 14 (46.7%) children between 1 and5 years in stented pyeloplasty group compared to 15 (50.0%) in non-stented pyeloplasty group, whereas 16 (53.3%) children in stented and 15 (50.0%) in non-stented pyeloplasty were between 6 to 12 years. The mean age was 6.1 years in stented and 6.3 years in the non-stented pyeloplasty group. In the stented group, 24 (80.0%) patients were males, whereas in the non-stented group, 23 (76.7%) patients were male. Intrinsic type of obstruction was observed in 27 (90.0%) children in the stented group and 26 (86.7%) in the non-stented pyeloplasty group. There was no significant difference between the two groups in terms of age, gender, and type of PUJ obstruction. (Table 1).

Table 1: Demographic characteristics of patients in the two groups (n=30)

	Stented Pyeloplasty	Non-Stented Pyeloplasty	*P*-value
Age (years)			
1-5 years	14 (46.7%)	15 (50.0%)	0.79
6-12 years	16 (53.3%)	15 (50.0%)	
Mean ± SD	6.10 ± 3.29	6.30 ± 3.15	0.81
Gender			
Male	24 (80.0%)	23 (76.7%)	0.75
Female	6 (20.0%)	7 (23.3%)	
Type of PUJ Obstruction			
Intrinsic	27 (90.0%)	26 (86.7%)	0.68
Extrinsic	3 (10.0%)	4 (13.3%)	

The mean duration of hospital stay was significantly shorter in the non-stented group (5.27 ± 1.72 days) as compared to the stented group (11.43 ± 1.52 days), and this difference was significant (*p*-value, <0.001). When the duration of hospital stay was stratified according to age, gender, and type of PUJ obstruction, no variations were witnessed. However, when hospital stay was compared according to the two interventions in terms of age, gender, and type of PUJ obstruction, the significant difference observed in the overall stay between the two groups continued according to these demographic and clinical parameters. (Table 2).

Discussion

Pelviureteric junction obstruction is one of the most common causes of antenatally diagnosed hydronephrosis in children. It is easily diagnosed with an ultrasound of the kidneys and urinary

Table 2: Comparison of Mean Duration of Hospital Stay between Study Groups according to age, gender and type of PUJ obstruction (n=30)

	Stented Pyeloplasty	Non-Stented Pyeloplasty	
Age (years)			
1-5	11.21±1.67	5.47±1.64	<0.001*
6-12	11.63±1.41	5.07±1.83	<0.001*
Gender			
Male	11.50±1.56	5.22±1.81	<0.001*
Female	11.17±1.47	5.43±1.51	<0.001*
Type of PUJ obstruction			
Intrinsic	11.41±1.50	5.23±1.66	<0.001*
Extrinsic	11.67±2.08	5.50±2.38	0.016*

*Independent sample t-test, * observed difference was statistically significant*

bladder. Most of the timeit will resolve spontaneously however, when progressive, it needs surgery. The most common procedure performed is open or laparoscopic dismembered pyeloplasty. During pyeloplasty,anastomosis can be stented either with an externally placed tube through the kidney across the anastomosis or a Double-J stent, or it may be performed without any stent. As the stent has its inherent morbiditieslike lower urinary tract symptoms, hematuria, and wound infection, so there is the inclination of the surgeons to switch to stent-less surgery to avoid such complications that will ultimately lead to shorter hospital stays. In the present study, the mean duration of hospital stay was significantly shorter in the non-stented group as compared to the stented group. The hypothesis established at the start of the study is thus well proved, and non-stented pyeloplasty is superior to stented pyeloplasty in terms of shorter hospital stays. The duration of hospitalization has become an increasingly important issue in hospitals that have limited resources and a large patient load. As mentioned earlier, different views prevail in the literature regarding the use of stents.

A study conducted by Hussain compared the duration of hospital stay in stented and non-stented pyeloplasty patients and favored that stent is associated with longer hospital stay with a duration of 12.1 days in stented and 5.4 days in non-stented pyeloplasty (p<0.05).[5] The findings of this study are comparable to ours.

On the other hand, according to another study, the hospital stay of the non-stented group was longer as compared to the stented group, with findings of 6.81+1.34 days and 2.3+1.21 days, respectively. (p=0.031).[6] The researchers attributed these results to better post-operative care and wound management policy of the hospital. Whereas in our study, the results favored the non-stented pyeloplasty.

A study conducted by Siddique et al. concluded that a stent is not necessary for pyeloplasty as it does not affect the outcome.[11] Similarly, another study favored stent-lesspyeloplasty as it is associated with less morbidity like lower urinary tract symptoms, hematuria, comparable outcome, and shorter hospital stay.[12]

Our results are similar to those observed by Garg et al., who noted a significant reduction in the mean duration of hospital stay with non-stented pyeloplasty (5.15 ± 4.749 days vs 11.95 ± 1.395 days; p=0.001) as compared to stented pyeloplasty.[13] Similarly, Smith et al. also witnessed a significantly shorter mean duration of hospital stay in the non-stented group compared to the stented group, with findings of 5 days and 12 days, respectively, but without any difference in the outcome.[14] Keeping in view these comparable findings, the present study advocates the use of non-stented pyeloplasty in future practice to reduce hospital stayswith associated costsand economic consequences.

The average age of patients in the current study was comparable to other studies mentioned in the literature. In this study, the mean age was 6.20 ± 3.19

years, with a male preponderance showing a male-to-female ratio of 3.6: 1. When the duration of hospital stay was stratified according to age and gender between the two study groups, it was found significant. The overall demographic features of the current study were found to be consistent with many previous studies. Elbatarny et al. reported a similar age of 5.7 ± 2.6 years with a female ratio of 3:1.[6] Another study by Kim et al. reported a mean age of 4.95 years with a male-to-female ratio of 3.3:1.[6,15] However, a study by Garg et al. reported a much lower average age of 2.7 ± 3.47 years in such patients.[13]

Due to increased rates of complications and duration of hospital stay, the use of stents in pyeloplasty has become questionable. Scientific evidence suggests that, more recently, there seems to be a return toward non-stented repairs. Stents have been described as unnecessary and cause additional complications, specifically more urinary tract infections, as well as longer hospital stays.[16-18]

The advantages of the current study are multi-fold, as in this study, we enrolled 60 patients in stented versus non-stented pyeloplasty. Secondly, the shorter hospital stay is particularly important in an era in which outcome analysis and particularly the costs of care are evaluated carefully. Thirdly, Pakistan, being alower middle-income country, has fewer healthcare facilities and limited staffing and resources so the short hospitalization would decrease the burden on individuals and healthcare facilities. A limitation of the present study was that the various other outcome measures among the two groups, such as the need for revision surgery, leak, infection, and other complications of surgeries, could not be compared. There is a need for such a study for further help and in the selection of better treatment optionsin future practice.

Conclusion

The mean duration of hospital stay was found to be significantly shorter in patients who underwent non-stented pyeloplasty as compared to those who underwent stented pyeloplasty regardless of patients, age, gender, and type of PUJ obstruction. Further large-scale studies on this topic with rigorous methodologies and detailed short and long-term outcomes are required.

Acknowledgment

We acknowledge the support and help of the parents of our patients. The support of paediatric surgery departmental staff and the Head of the Department is also highly acknowledged during this study.

Authors Contribution

MK: Data collection
MFG: Idea conception
AA: Manuscript writing and proof reading
MOF: Idea conception
NA: Study designing
AT: Data analysis, results and interpretation

REFERENCES

1. Alshoabi SA, Alhamodi DS, Alhammadi MA, Alshamrani AF. Etiology of Hydronephrosis in adults and children: Ultrasonographic Assessment in 233 patients. Pakistan Journal of Medical Sciences. 2021; 37: 1326-30. doi: 10.12669/pjms.37.5.3951.
2. Safdar O, Safhi MA, Saggaf O, Algethami HR, Alhalabi M, Alnajrani EM, et al. Assessment of the Etiologies and Outcomes of Antenatal Hydronephrosis in Patients at King Abdulaziz University Hospital. Cureus. 2020; 12: e7615 doi: 10.7759/cureus.7615
3. Yalçınkaya F, Özçakar ZB. Management of antenatal hydronephrosis. Pediatric Nephrology. 2020; 35: 2231-9. doi: 10.1007/s00467-019-04420-6
4. Cherian AG, Jacob TJ, Sebastian T, Vijayaselvi R, David LS, Kumar M, et al. Postnatal outcomes of babies diagnosed with hydronephrosis in utero in a tertiary care centre in India over half a decade. Case Reports in Perinatal Medicine. 2019; 8: 20180036. doi: 10.1515/crpm-2018-0036
5. Hussain S, Frank JD. Complications and length of hospital stay following stented and unstented paediatric pyeloplasties. British journal of urology. 1994; 73: 87-9. doi: 10.1111/j.1464-410x.1994.tb07462.x
6. Elbatarny AM, Elafifi MA, Hashish AA, Elsharaby AM. Stented versus nonstented open pyeloplasty for primary ureteropelvic junction obstruction in children. Tanta Medical Journal. 2014; 42: 92-9. doi: 10.4103/1110-1415.143555
7. Abdelwahab M, Abdelaziz A, Aboulela W, Shouman AM, Ghoneima W, Shoukry A, et al. One week stenting after pediatric laparoscopic pyeloplasty; is it enough?. Journal of Pediatric Urology. 2020; 16: 98. e1-e6. doi: 10.1016/j.jpurol.2019.10.016

8. Yellinek S, Krizzuk D, Nogueras JJ, Wexner SD. Ureteral injury during colorectal surgery: two case reports and a literature review. Journal of the anus, rectum and colon. 2018; 2: 71-6. doi: 10.23922/jarc.2017-052
9. Liu X, Huang C, Guo Y, Yue Y, Hong J. Comparison of DJ stented, external stented and stent-less procedures for pediatric pyeloplasty: A network meta-analysis. International Journal of Surgery. 2019; 68: 126-33. doi: 10.1016/j.ijsu.2019.07.001
10. Mukherjee R, Mullick M, Samanta S. A study to evaluate the outcome following Anderson Hynes pyeloplasty in hydronephrosis patients with cummings stent and DJ stent.International Journal of Research in Medical Sciences. 2019; 7: 214. doi: 10.18203/2320-6012.ijrms20185383
11. Siddique M, Pansota MS, Saleem MS. Outcome of pyeloplasty in children. Journal of Ayub Medical College Abbottabad. 2014; 26: 71-5.
12. Khawaja AR, Dar TI, Bashir F, Sharma A, Tyagi V, Bazaz MS. Stentless laparoscopic pyeloplasty: A single center experience. Urology Annals. 2014; 6: 202-7. doi: 10.4103/0974-7796.134258
13. Garg RK, Menon P, Rao KL, Arora S, Batra YK. Pyeloplasty for hydronephrosis: Issues of double J stent versus nephrostomy tube as drainage technique. Journal of Indian Association of Pediatric Surgeons. 2015; 20: 32-6. doi: 10.4103/0971-9261.145444
14. Smith KE, Holmes N, Lieb JI, Mandell J, Baskin LS, Kogan BA. Stented versus nonstented pediatric pyeloplasty: A modern series and review of the literature. The Journal of urology. 2002; 168: 1127-30. doi: 10.1016/S0022-5347(05)64607-1
15. Kim EH, Tanagho YS, Traxel EJ, Austin PF, Figenshau RS, Coplen DE. Endopyelotomy for pediatric ureteropelvic junction obstruction: A review of our 25-year experience. The Journal of urology. 2012; 188: 1628-33. doi: 10.1016/j.juro.2012.02.016
16. Brunhara JA, Moscardi PR, Mello MF, Andrade HS, Carvalho PA, Cezarino BN, et al. Transperitoneal laparoscopic pyeloplasty in children: Does upper urinary tract anomalies affect surgical outcomes?.International Brazilian Journal of Urology. 2018; 44: 370-7. doi: 10.1590/S1677-5538.IBJU.2017.0224
17. Ramachandra M, Mosayyebi A, Carugo D, Somani BK. Strategies to improve patient outcomes and QOL: current complications of the design and placements of ureteric stents. Research and reports in urology. 2020; 12: 303-14. doi: 10.2147/RRU.S233981
18. Chu DI, Shrivastava D, Van Batavia JP, Bowen DK, Tong CC, Long CJ, et al. Outcomes of externalized pyeloureteral versus internal ureteral stent in pediatric robotic-assisted laparoscopic pyeloplasty. Journal of pediatric urology. 2018; 14: 450-e1-e6. doi: 10.1016/j.jpurol.2018.04.012