



ORIGINAL ARTICLE

Double J Ureteral stent removal in children non cystoscopically: A preferred innovation.

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ABSTRACT... Objective: To determine the feasibility of non cystoscopic removal of double J ureteral (DJ) stent using a foley catheter with suture in children in terms of success rate, number of attempts required and complications. **Study Design:** Cross Sectional study. **Setting:** Department of Pediatric Surgery, Services Hospital, Lahore. **Period:** August 2022 to August 2023. **Methods:** All the children who underwent DJ stent placement for any urological procedure were included if DJ stent was seen in the bladder postoperatively. After informed consent, under sedation and aseptic measures, the foley catheter with suture already passed through its eye, was introduced per urethral after adequate lubrication. The foley was given five to six rotations in clockwise direction for right sided and anti-clockwise for left sided stents respectively and pulled out keeping traction on the suture. In case of three failed attempts, a cystoscope was introduced under general anesthesia and the stent was removed. Successful removal, number of attempts needed, time taken, and post removal complications were noted to determine feasibility of the procedure. **Results:** Out of twenty patients, 17 patients (85%) underwent successful removal of DJ stent. The failure rate was 15% as three patients required cystoscope assisted removal. In 13 patients (76.5%) DJ stent was removed in first attempt, whereas in 4(23.5%) patients it required two attempts. Mean time taken was 8.83 ± 7.33 minutes. Complications were noted in 2 patients (10%). **Conclusion:** Removal of DJ stent in children without cystoscope, using a foley catheter with suture is a safe and feasible procedure with a high success rate and should be attempted in selected cases.

Key words: Children, Double J Ureteral Stent, Non-cystoscope Removal.

INTRODUCTION

Double J ureteral (DJ) stent is commonly used in children in procedures like pyeloplasty, ureteric re-implantation and after stone extractions or ureteric repairs. It is a preferred stent as its curved ends help in avoiding migration upwards or downwards.^{1,2} Normally it is removed by cystoscope under general anesthesia, which is unfeasible in our resource limited setup. Also, it can negatively affect the quality of life in patients.³

Various techniques have been described to remove DJ stent non cystoscopically to avoid hospital admission or longer stay and extra cost and need for anesthesia. These techniques involve DJ stent removal via Vellore catheter snare technique, introduction of magnetic DJ stents and removal through a magnetic tip catheter.^{1,3,4}

A recent retrospective study from China involving more than 600 pediatric patients suggested that using a foley catheter with polyglactin 5/0 suture passed through its eye helps in removal of DJ stent without cystoscope assistance and with minimal complications.⁵ Other studies also suggest that non cystoscopic removal is safe and possible with mild sedation in children.^{6,7}

Despite the international available literature, no local studies are available, and removal of DJ stent is still practiced using cystoscope and under general anesthesia. The rationale of this study was to help local community by avoiding unnecessary exposure of children to general anesthesia, saving precious resources, and avoiding unnecessary burden on hospital and attendants. The objective was to determine the

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feasibility in terms of success rate, number of attempts required and complications of DJ stent removal using a foley catheter with suture in children and without cystoscope.

METHODS

This cross-sectional study was carried out from August 2022 to August 2023 in pediatric surgery Services Hospital, using census sampling. Ethical permission (IRB/2023/1216/SIMS) was taken. All patients who had undergone DJ stent placement for any urological procedure were included. Patients with displaced DJ stent seen on Xray KUB and/or ultrasound were excluded from study and underwent removal as per ward protocol. All patients underwent removal of DJ stent under ketamine/ midazolam infusion in theatre after informed consent. Under aseptic measure, urethra was lubricated using lidocaine 2% gel and a silicone foley catheter (size 6 Fr or 8 Fr) with polyglactin 5/0 suture passed through its eye and under slight traction, was introduced per urethra (Figure-1). The foley was given five to six rotations in clockwise direction for right sided and anti-clockwise for left sided stents respectively and pulled out keeping traction on the suture (Figure-2). Another two attempts were carried out, if in first attempt DJ stent couldn't be removed. In case of three failed attempts, a cystoscope was introduced under general anesthesia and the DJ stent was removed.

The feasibility of the procedure was determined by the success rate of the procedure removing DJ non cystoscopically. Number of attempts needed, total time taken for removal and time to regain urination was noted. Complications if any such as hematuria, dysuria, hesitancy and need for catheterization, and in males, foreskin damage, hydro-phallus were recorded.

RESULTS

A total of 20 patients were included in the study. The age ranged from 3 months to 12 years, and 18 (90%) were male and 2 (10%) were female. Sixteen (80%) patients had DJ on their right side and 4 patients (20%) had DJ on left side. Seventeen patients (85%) underwent successful removal of DJ stent (Fig-3).



Figure-1. Introduction of foleys catheter per urethrum, along with polyglactin 5/0 suture threaded through its eye.



Figure-2. Clockwise rotation of foleys catheter for right sided DJ Stent, keeping suture on opposite side.



Figure-3. Successful removal of DJ Stent.

The failure rate was 15% as three patients required cystoscope assisted removal. In 13 patients (76.5%) DJ stent was removed in first attempt, whereas in 4 (23.5%) patients it required two attempts. Mean time taken was 8.83 ± 7.33 minutes (minimum 4 min and maximum 30 min). Mean time to regain micturition was 6.66 ± 16.05 hours (min 0 hour and max 48 hour). Complications were noted in 2 patients (10%). One patient (5%) had hematuria and dysuria,

needing catheterization, and regained voluntarily micturition after 48 hours. Another patient had hydro-phallus with foreskin damage and settled conservatively.

DISCUSSION

Since the first description of DJ stent by Finney², it is a commonly used stent in many urological procedures. The placement and removal of DJ stent using cystoscope is a standard procedure requiring additional anesthesia and hospital admission, causing a burden on hospital limited resources, and increasing overall cost. Many innovative techniques are used to avoid these drawbacks including internal and external placement of stents, stents with string passed per urethra, stents with magnetic ends for easier removal, percutaneous removal of DJ stent.^{3-6,8,9} Another innovative method for removal is using a feeding tube and a monofilament suture 'a vellore catheter snare technique'.¹ In this study we used a Foley catheter with suture passed through its eye which can ensnare the DJ stent. Using polyglactin suture instead of a monofilament, we believed that it would avoid urethral trauma, while still removing DJ stent non-cystoscopically. Similarly, urethra was lubricated well, and sedation was used to avoid any traumatic removal. We used ketamine/ midazolam infusion for sedation and carried out removal in theatre, and in case of failure removed DJ stent through cystoscope under general anesthesia. Other use inhalational anesthesia or no sedation for removing stent non-cystoscopically.^{4,8} Still, this technique is likely to fail in a very large capacity bladder and in presence of bladder stones and when DJ stent is displaced upwards, limiting it in selected cases. In this study, one patient passed DJ stent spontaneously under sedation and was excluded from study.

DJ was successfully removed in 85% of our patients, while DJ was successfully removed non-cystoscopically by similar technique in 99.1% patients in similar study conducted in China⁵ and in 86.67% of patients non-cystoscopically in vellore snare technique.¹ Though the rate of removal of bit lower (86.67%) compared to removal by cystoscope (100%) in this study, yet

it was statistically insignificant, and the cost of removal difference was nearly one third lower than cystoscopy removal (INR 5636.5 vs INR 14579). The higher cost in cystoscopy was due to admission, theatre, and equipment sterilization cost.¹ In one of the failed cases, knotting of distal end was noted after removal by cystoscope. This complication is reported in literature but more in proximal end of DJ stent. The other technique for removal in case of knotting is use of Holmium laser.^{10,11}

In this study, DJ stent was removed in first attempt in 76.5% cases. Similar study reported removal of DJ stent in first attempt in 76% cases, 20.1% in second attempt, and 3% needing several attempts.⁵ Another study reported 93.8% success in first attempt, the results higher due to magnetic tip of DJ stent.⁴ Huanyi and co-authors used five attempts to remove DJ stent successfully, using monofilament on feeding tube as a loop.⁶ We suggest not to increase attempts as this may lead to urethral injury or hematuria later.

The time for removal in this study was 8.83 ± 7.33 minutes. In similar studies, it was 2.55 ± 0.6 min⁵ and 7.4 ± 3.75 min⁶, less than our reported time. The increased time in our cases was probably due to our unfamiliarity with this technique initially.

Our complication rate was 10%. Only one of our patients developed hematuria and dysuria. The patient needed catheterization and regained voluntary micturition after 48 hours. The rest of the patients didn't need catheterization. In a similar study, gross hematuria was noted in 22.5%, dysuria in 3.6% and foreskin injury in 1.7%.⁵ In adults, non-cystoscopic removal using string is associated with slightly increased discomfort though statistically non-significant.⁸

The main limitations of this study are cross-sectional study design with no control group for comparison and having a small sample size. Additionally, shorter follow up makes it difficult to evaluate the likelihood of developing urethral stricture.

CONCLUSION

Removal of DJ stent in children without cystoscope, using a Foley catheter with suture is a safe and feasible procedure with a high success rate and should be attempted in selected cases, to avoid burdening the limited healthcare resources.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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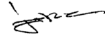

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REFERENCES

- Sundaramurthy S, Thomas RJ, Herle K, Jeyaseelan, Mathai J, Kurian JJ. **Double J stent removal in paediatric patients by Vellore Catheter Snare technique: A randomized control trial.** J Pediatr Urol. 2019; 15(6):661.e1-61.e8. doi:10.1016/j.jpuro.2019.08.009
- Finney RP. **Experience with new double J ureteral catheter stent.** J Urol. 1978; 120 (6): 678-81. DOI: 10.1016/s0022-5347(17)57326-7.
- Rassweiler MC, Michel MS, Ritter M, Honeck P. **Magnetic ureteral stent removal without cystoscopy: A randomized controlled trial.** J Endourol. 2017; 31(8):762-66. doi: 10.1089/end.2017.0051.
- Arce WB, Vuille-dit-Bille RN, Holland-Cunz SG, Frech-Doerfler M. **Magnetic double-j stent removal without general anaesthesia in children.** Urology. 2021; 156(1):251- 55. Doi 10.1016/j.urology.2021.01.028
- Bao Q, Lao W, Shi T, Ouyang K, Ma S, Zhang W, et al. **Feasibility and safety of a simple non-cystoscopic double-j tube removal technique in children.** Front Pediatr. 2021; 9(1):761903. doi:10.3389/fped.2021.761903.
- Shao H, Liu P, Zhang H, Chen C, Lin X. **Noncystoscopic removal of retained ureteral stents in children: A retrospective study from a single center.** Medicine (Baltimore). 2018; 97(1):e9540. doi: 10.1097/MD.0000000000009540.
- Lin H, Xu M, Jiang D, Xu G, Fang X, Jia J, et al. **Non-cystoscopic removal of retained ureteral stents with mild sedation in children.** Urology. 2016; 94:255-58. doi: 10.1016/j.urology.2016.03.026.
- Kim DJ, Son JH, Jang SH, Lee JW, Cho DS, Lim CH. **Rethinking of ureteral stent removal using an extraction string; what patients feel and what is patients' preference? a randomized controlled study.** BMC Urol. 2015; 15:121. DOI:10.1186/s12894-015-0114-6
- Jayasimha S, Nagasubramanian S, Jayanth E ST, Pandian RM, Chandrasingh J, Kumar S. **Management of proximal migration of double-J stents after Anderson-Hynes pyeloplasty in children.** J Pediatr Urol. 2021; 17(3): 399.e1-399.e7. DOI: 10.1016/j.jpuro.2021.02.002.
- Kolu AC, Akan S. **Spontaneous knot formation complication of double J: Two case reports.** J Med Case Reports. 2024; 18:103. DOI:10.1186/s13256-024-04395-5
- Jendouzi O, Lamghari A, Jamali M, Harchaoui A, Alami M, Ameer A. **Knotted double J ureteral stent: A case report and literature review.** Pan Afr Med J. 2022; 43:5. DOI: 10.11604/pamj.2022.43.5.34538.

AUTHORSHIP AND CONTRIBUTION DECLARATION

No.	Author(s) Full Name	Contribution to the paper	Author(s) Signature
1	Fatima Naumeri	Conception, Review, accountability, Final approval agreement.	
2	Zohra Khanum	Data analysis, Critical review, accountability, Final approval agreement.	
3	Hafiz Mahmood Ahmad	Drafting, Data collection accountability, Final approval agreement.	
4	Laeq Ahmad	Data collection, Follow-up, accountability, Final approval agreement.	