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General Surgery

PERCUTANEOUS NEPHROSTOMY VERSUS DJ URETERIC STENT AS THE INITIAL DRAINAGE METHOD IN KIDNEY STONE PATIENTS WITH INFECTIVE AETIOLOGY OF KIDNEY: A COMPARATIVE STUDY

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ABSTRACT **Background:** Percutaneous nephrostomy facilitates subsequent percutaneous nephrolithotomy, especially when carried out by a urologist, and it has a higher insertion success rate, a shorter operative time and a lesser incidence of postoperative urinary tract infection than a JJ stent. In advent of same the present study was conducted to compare between initial urinary drainage procedures in kidney stone patients with infective aetiology.**Method:** This study has been carried out on 20 renal stone patients with infective aetiology admitted in surgical ward and ICU of Index Medical College Hospital & Research Centre, Indore (M.P) from a August 2021 to February 2022. Prior admission, proper screening including detailed clinical evaluation with detailed history, a record of general & systemic examination, routine blood and urine investigation including Renal Function Test was done with treatment and post procedure follow-up. **Result:** The percutaneous nephrostomy group had shorter operative time. There was no significant difference in the recovery period for normalization of serum creatinine between both groups. Procedural failure, ureteric mucosal injury and perforations increased in the case of male sex, stone size >1.5 cm and upper ureteric stones in the JJ stent group. Procedural failure, pelvic perforations and intraoperative bleeding increased in case of male sex, mild hydronephrosis and stone size >2.5 cm in the percutaneous nephrostomy group. Suprapubic pain, urethral pain and lower urinary tract symptoms were significant in the JJ stent group. **Conclusion:** Percutaneous nephrostomy has a higher insertion success rate, a shorter operative time and a lesser incidence of postoperative urinary tract infection than a JJ stent.

KEYWORDS : Pyonephrosis, Percutaneous nephrostomy, JJ Stent

INTRODUCTION

Pyonephrosis (PN) refers to infected hydronephrosis with associated suppurative destruction of the kidney parenchyma, with partial or total loss of renal function, and it is defined as an accumulation of purulent debris and sediment in the renal pelvis and urinary collecting system. PN is associated with factors that compromise host defense, including immunosuppression, renal failure, renal transplantation [1,2], and it is associated with local factors that compromise the urinary tract, such as congenital uropathy, neurogenic bladder, pregnancy, presence of foreign bodies such as calculi, indwelling catheters or other drainage devices, or endoscopic maneuvers, and it is frequently associated with the obstruction of the collecting system (renal calculus disease, RCD).[2-6]

It is a condition where pus collects in the kidney as result of an infection with a urinary tract obstruction. A kidney infection, known as pyelonephritis, is mainly bacterial in origin. The bacteria may reach the kidney through the bloodstream (hemtogenous spread) or from an infection that originates lower down the tract (ascending infection). Naturally pus in the kidney will drain out with the urine (pyruria) unless it is walled off in an abscess. In pyonephrosis, the situation is not just about an abscess in the kidney instead the passage of urine is blocked due to some obstruction in the urinary tract, like a urinary stone, and therefore the urine and pus collects in the kidney.

Pyonephrosis is uncommon in adults, rare in children and extremely rare in neonates; however, it has been reported in several neonates and adults, making it clear that the condition may develop in any age group. The clinical spectrum of PN is extremely variable, from asymptomatic bacteriuria to sepsis, making diagnosis and treatment more challenging.[7]

The main approach to treating pyonephritis is the administration of intravenous (IV) antibiotics like gentamicin, ampicillin and sometimes clindamycin as well. Surgical intervention is often necessary and is aimed at draining the urine and pus from the kidney.

This can be accomplished by one of two ways:

- Placement of a ureteral stent to widen the ureter thereby allowing the urine and pus to exit the kidney through the urinary tract. This is known as retrograde decompression.
- Placement of a tube through the skin into the renal pelvis to allow the urine and pus to drain out directly into the exterior through a nephrostomy tube. This is known as antegrade decompression.

The decision which drainage method, when indicated, should be used in a patient presenting with an obstructing ureteral stone is significantly influenced by the clinician's and patient's perception of the risks, complexity and quality of life (QoL) issues related to the different drainage methods. We often observed that an expected long period time for definitive treatment biased the treating urologist to prefer a ureteral stent over a nephrostomy tube, assuming the patient would be less bothered by the stent during the waiting period. There are few studies comparing the efficacy of ureteral double J stent (DJS) vs a percutaneous nephrostomy tube (PCN) in the setting of obstructive ureteral stones. [8-10]

In advent of same the present study was planned with an aim to compare between initial urinary drainage procedures in kidney stone patients with infective aetiology. Also, the study had following

OBJECTIVES:

- To compare outcome after initial urinary drainage procedures in kidney stone patients with infective aetiology.
- To compare and evaluate intra & post procedure complications.

MATERIAL AND METHODS

After approval from the institutional ethical committee the present study was conducted on 20 renal stone patients with infective aetiology and admitted in surgical ward and ICU of Index Medical College Hospital & Research Centre, Indore (M.P) from August 2021 to February 2022. Patients qualifying the inclusion criteria were enrolled for the study after taking a pre informed written consent.

Inclusion Criteria:

Patient with Renal stone with infective etiology of kidney under age group 20-80 years and willing to undergo this study by self-consent were included in this study.

Exclusion Criteria:

Candidates for acute dialysis, pregnant females and with uncontrolled coagulopathy were excluded.

METHOD

Prior to admission, proper screening along with detailed clinical evaluation with detailed history of each patient was done. A record of general & systemic examination, routine blood and urine investigation including Renal Function Test was done with treatment and post procedure follow-up.

The patients were divided into two groups; Group I & Group II. Each group consisted of 10 patients. Procedure was organized in the same way as other elective patients admitted in general surgical ward.

Patients were fully explained about the procedure and preoperative counselling regarding the nature of the disease, treatment plan, complications & follow up was done and written informed consent in patient's own language was taken.

Statistical Analysis

All data were recorded on a structured proforma and tabulated. Statistical analysis of the demographic data was performed using SPSS Software Version 20.0. The differences in the variables between the were analyzed by Student t test and chi square test. $P < .05$ was considered to be statistically significant.

RESULT

The percutaneous nephrostomy group had shorter operative time. There was no significant difference in the recovery period for normalization of serum creatinine between both groups.

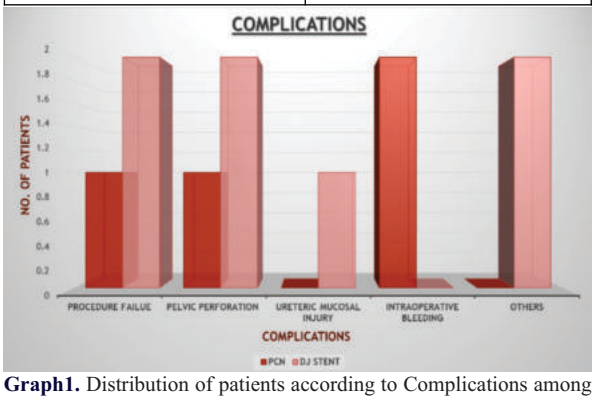
Procedural failure, ureteric mucosal injury and perforations increased in the case of male sex, stone size >1.5 cm and upper ureteric stones in the JJ stent group.

Procedural failure, pelvic perforations and intraoperative bleeding increased in case of male sex, mild hydronephrosis and stone size >2.5 cm in the percutaneous nephrostomy group.

Suprapubic pain, urethral pain and lower urinary tract symptoms were significant in the JJ stent group.

Table 1. Comparison of time of resolution between the two study procedures

PROCEDURE	DURATION
PCN	14 weeks
DJ STENTING	16 weeks

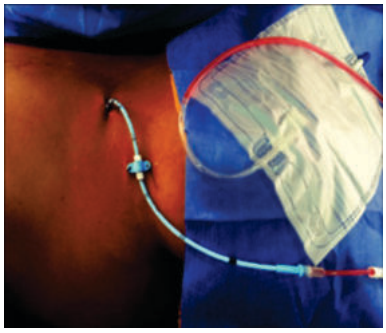


Graph1. Distribution of patients according to Complications among the two study groups

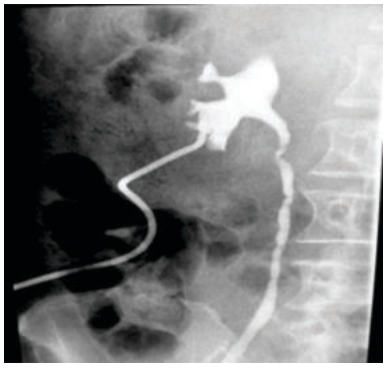
a. DJ Stent in situ

b. Misplaced DJ stent in situ

Figure 1. Complications of DJ Stent



a. Percutaneous nephrostomy



b. Pyelography Post- Nephrostomy

Figure 2. Complications of Percutaneous nephrostomy

DISCUSSION

- The percutaneous nephrostomy group had shorter operative time. There was no significant difference in the recovery period for normalization of serum creatinine between both groups.
- Procedural failure, ureteric mucosal injury and perforations increased in the case of stone size >1.5 cm and upper ureteric stones in the JJ stent group with p- value of <0.001 (significant).
- Procedural failure, pelvic perforations and intraoperative bleeding increased in case of mild hydronephrosis and stone size >2.5 cm in the percutaneous nephrostomy group.
- Suprapubic pain, urethral pain and lower urinary tract symptoms were significant in the JJ stent group.
- This study was in corroboration with El Sheemy MS et al [11], Geraghty RM etal.[12], Sammon JD et al. [13]studies.

CONCLUSION

- Percutaneous nephrostomy has a higher insertion success rate, a shorter operative time and a lesser incidence of postoperative urinary tract infection than a DJ stent.
- DJ stent usually comes in smaller sizes, which provides less effective drainage. It needs to be performed in the operating room under general anesthesia. Furthermore, there is the risk of perforating the ureter during manipulation. In addition, bacteremia and septicemia may flare up under the pressure of the irrigation fluid.
- PCN can be performed under local anesthesia. Evacuation of pus

and necrotic material reduces bacterial burden. In addition, decompressing the collecting system improves renal perfusion and function and hence, the entry of antibiotics into the renal parenchyma.

- A distinct advantage of PCN is that nephrostomy cultures provide microbiological information that is not available in bladder urine cultures which is sufficient to control of sepsis and return of renal function, so nephrectomy can be avoided. Percutaneous nephrostomy further facilitates subsequent percutaneous nephrolithotomy.

REFERENCES

1. Flores-Mireles A.L., Walker J.N., Caparon M.G., Hultgren S.J. Urinary tract infections: Epidemiology, mechanisms of infection and treatment options. Nat. Rev. Microbiol. 2015;13:269–284.
2. Wagenlehner F.M.E., Johansen T.E.B., Cai T., Koves B., Kranz J., Pilatz A., Tandogdu Z. Epidemiology, definition and treatment of complicated urinary tract infections. Nat. Rev. Urol. 2020;17:586–600.
3. 3. Wagenlehner F.M.E., Pilatz A., Weidner W., Naber K.G. Urosepsis: Overview of the Diagnostic and Treatment Challenges. Microbiol. Spectr. 2015;3
4. 4. Wang X., Tang K., Xia D., Peng E., Li R., Liu H., Chen Z. A novel comprehensive predictive model for obstructive pyonephrosis patients with upper urinary tract stones. Int. J. Clin. Exp. Pathol. 2020;13:2758–2766.
5. 5. Patodia M., Goel A., Singh V., Singh B.P., Sinha R.J., Kumar M., Dalela D., Sankhwar S.N. Are there any predictors of pyonephrosis in patients with renal calculus disease? Urolithiasis. 2017;45:415–420.
6. 6. Nicola R., Menias C.O. Urinary Obstruction, Stone Disease, and Infection. In: Hodler J., Kubik-Huch R.A., von Schulthess G.K., editors. Diseases of the Abdomen and Pelvis 2018–2021: Diagnostic Imaging-IDKD Book. Springer International Publishing; Cham, Switzerland: 2018. pp. 223–228.
7. Tamburrini S, Lugarà M, Iannuzzi M, Cesaro E, De Simone F, Del Biondo D, Toto R, Iulia D, Marrone V, Faella P, Liguori C, Marano I. Pyonephrosis Ultrasound and Computed Tomography Features: A Pictorial Review. Diagnostics (Basel). 2021 Feb 17;11(2):331.
8. Joshi HB, Adams S, Obadeyi OO, Rao PN. Nephrostomy tube or 'JJ' ureteric stent in ureteric obstruction. Assessment of patient perspectives using quality-of-life survey and utility analysis. Eur Urol. 2001;39:695
9. Mokhmalji H, Braun PM, Martinez Portillo FJ, Siegsmund M, Alken P, Köhrmann KU. Percutaneous nephrostomy versus ureteral stents for diversion of hydronephrosis caused by stones: a prospective, randomized clinical trial. J Urol. 2001;165:1088.
10. de Sousa Morais N, Pereira JP, Mota P, Carvalho-Dias E, Torres JN, Lima E. Percutaneous nephrostomy vs ureteral stent for hydronephrosis secondary to ureteric calculi: impact on spontaneous stone passage and health-related quality of life-a prospective study. Urolithiasis. 2018.
11. El Sheemy MS, Shouman AM, Shoukry AI, El Shenoufy A, Aboulela W, Daw K, Hussein AA, Morsi HA, Badawy H.BJU Int. 2015 Mar;115(3):473-9.
12. Geraghty RM, Rai BP, Jones P et al. Bilateral simultaneous ureteroscopic (BS-URS) approach in the management of bilateral urolithiasis is a safe and effective strategy in the contemporary era-evidence from a systematic review. Curr. Urol. Rep. 2017; 18: 11
13. Sammon JD, Ghani KR, Karakiewicz PI et al. Temporal trends, practice patterns, and treatment outcomes for infected upper urinary tract stones in the United States. Eur. Urol. 2013; 64: 85-92.