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A COMPARATIVE STUDY ON OUTCOMES OF RIRS FOR RENAL CALCULI WITHOUT PREOPERATIVE DJ STENTING VERSUS WITH PREOPERATIVE DJ STENTING- OUR INSTITUTIONAL EXPERIENCE

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ABSTRACT **Introduction:** Improvement of the instruments as well as endoscopic technology has made RIRS as an increasingly popular treatment option for patients with renal stones < 2 cm. In many centres, prior DJ stenting is carried out before RIRS to passively dilate the ureter, which facilitates subsequent RIRS procedure. In our series, RIRS was attempted without preoperative stenting, without compromising the success of the procedure. **Materials And Methods:** It is a prospective study done in Deptt. of Urology, in a tertiary care hospital in Chennai between February 2022 and March 2023. A total of 103 patients with unilateral renal stones of size <2.5 cms who underwent RIRS were included in this study. The patients were divided into two groups based on whether or not a ureteral stent was inserted preoperatively. Baseline characteristics of patients, stone burden, operation time, stone-free rates, and complications were compared between both the groups. **Results:** Out of 103 patients, we were able to perform RIRS without preoperative stenting in 69 cases (66.99%) and rest 34 patients underwent RIRS after 2-3 weeks of stenting. The overall stone-free rate (SFR) was 79.71% for the non-stented group and 82.35% for the pre-stented group. There were no differences in operative times, perioperative complications and additional treatment rates between the two groups. **Conclusions:** RIRS without preoperative stenting had similar effects in terms of operative outcome and complications, when compared with RIRS with preoperative stenting. Out of 103 patients, RIRS was possible in majority of the cases without preoperative stenting. RIRS without prior DJ stenting is a feasible option in managing renal stones and whenever possible it should be performed without prior stenting to avoid undergoing the procedure twice.

KEYWORDS : RIRS, Preoperative ureteral stenting, Renal stone, DJ stent, stone free rate

INTRODUCTION

Retrograde intrarenal surgery (RIRS) is currently one of the standard treatments for patients with kidney stones <2 cm [1]. Improvement of the instruments as well as endoscopic technology has made RIRS as an increasingly popular treatment option for patients with renal stones < 2 cm [2]. According to European Association of Urology (EAU) guidelines, the routine placement of ureteral stents prior to RIRS for renal stones is not required. Even though in many centres around the world, prior DJ stenting is carried out before RIRS to passively dilate the ureter, which facilitates subsequent RIRS procedure. Several studies have also reported that preoperative ureteral stenting affected the outcome of ureteroscopic stone surgery [3–6]. However, a preoperative stenting inevitably leads extra cost and time, as well as complications such as flank pain, bothersome urinary symptoms and potential urinary tract infections. Therefore, we sought to investigate the outcomes of RIRS for treatment of renal calculi between preoperative ureteral stenting versus without preoperative stenting. In our series, RIRS was attempted without preoperative stenting, without compromising the success of success of the procedure.

MATERIAL AND METHODS

This study was approved by the ethical committee of kilpauk Medical College, Chennai, under The Tamilnadu Dr. M.G.R. Medical University. Study was conducted in Dept. of Urology at Kilpauk Medical College & Hospital, Chennai from February 2022 and March 2023. All patients with unilateral renal stones of size <2.5 cms who underwent RIRS in our institute were included in this study. The Patients with bilateral renal calculi, renal calculi associated with ureteric calculi, prestented patients due to other reason like persistent renal colic, fever and insufficient renal function were excluded. Those cases with solitary kidney status, coexisting ureteric disease (tumor or stricture) and CKD status were also excluded.

All procedures were performed by experienced urologists in our department according to standard operative protocols. UTI was controlled before all operations. All patients were attempted to perform RIRS without preoperative DJ stenting. First, calibre of the ureter was checked by introducing 8/9.8 semirigid URS and those cases not negotiable with URS were stented with a 5fr DJ stent and RIRS was performed at 2-3 weeks. All patients underwent RIRS after placement of 10/12 ureteric access sheath. In some cases, ureteric access sheath placement was not possible even though they were allowing 8/9.8 semirigid URS and those cases were also stented with a 5fr DJ stent and RIRS was performed at 2-3 weeks. All other cases who are allowing ureteric access sheath placement, RIRS were performed. Thus, patients were classified into two groups depending on whether they received a preoperative stent. All procedure was performed with a flexible ureteroscope Olympus URF-P7R (7.9Fr) and Sphinx 30 W Holmium YAG Laser device. All patients received ureteral stent at the end of operations. Then all patients underwent X-ray KUB and USG-KUB at about four weeks after treatment, and absence of any stone or residual stone fragment less than 4 mm was considered as stone-free. Statistical analysis was performed by Statistical Package for the Social science version 22. Continuous variables were performed with Student's t-test or Fisher's exact test and Categorical variables were performed with chi-squared test. A P value <0.05 was considered as statistically significant. Figure 1 shows patient cohort and clinical outcome of all patients.

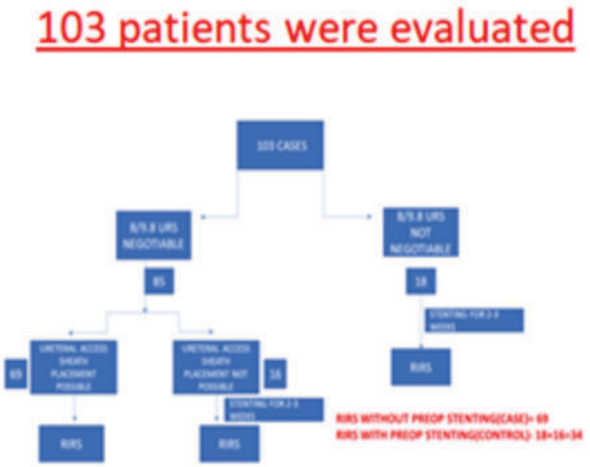

Figure 1: Flow diagram and patient cohort. URS, Ureteroscopy; RIRS, Retrograde intrarenal surgery

RESULTS

A total of 103 patients were included in the study. Out of 103 patients, RIRS was possible in majority of the cases without preoperative stenting(66.99%). In the remaining 34 cases RIRS was performed at 2-3 weeks after DJ stenting. Mean age in the non-stented group was 43.87 ± 12.14 years and mean age in the stented group was 41.21 ± 12.59 years. No significant differences were seen between the two groups in age, body mass index (BMI), gender, prevalence of diabetes mellitus, hypertension etc and preoperative creatinine and haemoglobin levels. No significant differences in most stone characteristics, including number, size, and laterality and presence of hydronephrosis between the two groups. Mean operative time was 79.70 ± 15.58 mins in nonstented group and 82.00 ± 17.03 mins in stented group. Mean hospital stay was 2.36 ± 0.66 days in nonstented group and 2.53 ± 1.08 days in stented group. Out of 69 non stented cases, stone was completely cleared in 55 cases (79.71%). Similarly, stone was completely cleared in 28 cases (82.35%) in the stented group. Procedures for solitary stone accounted for 54.37% (56 of 103). For single stone, stone-free rate was highest for stone in renal pelvis, and lowest in lower pole.

Complication rates were low in both the groups. There were 4 (5.80%) intraoperative bleeding cases in the nonstented group and 2 (5.88%) cases in the

Table-1: Patient Characteristics And Perioperative Outcomes In Non-prestenting And Prestenting Group.

	Without prestenting	With prestenting	P value
procedure	69	34	
Age (year)	43.87 ± 12.14	41.21 ± 12.59	0.311
Gender (male/female)	44/25	20/14	0.626
BMI (kg/m2)	23.87 ± 2.30	23.47 ± 2.18	0.394
Side (right/left)	39/30	22/12	0.426
Stone size	1.59 ± 0.44	1.44 ± 0.44	0.110
Solitary/multiple stone	40/29	16/18	0.385
Solitary stone location			0.737
Upper pole	6	3	
Middle pole	8	4	
Lower pole	7	4	
Renal pelvis	19	5	
Hydronephrosis (+/-)	26/43	16/18	0.362
Operating time (min)	79.70 ± 15.58	82.00 ± 17.03	0.509
Hospital stay (days)	2.36 ± 0.66	2.53 ± 1.08	0.412
Stone free rate	79.71(55/69)	82.35(28/34)	0.749

presented group. For the intrarenal bleeding cases, intraoperative and postoperative transfusion was performed. However, no additional procedures such as embolization were required. Up to 20.59% of patients with preoperative stent experienced fever postoperatively as compared to 13.04% of patients in nonprestented group, but it was not significant (p value 0.320). Postoperative UTI occurred in 4 (5.80%) cases in the nonstented group and in 3cases (8.82%) in the presented group (p value 0.566). As all seven cases of postoperative UTI showed abnormal urine test and more than 38 degrees of fever, they were treated with antibiotics. Acute pyelonephritis occurred in one case from each group (p value 0.621), which revisited after discharge and were treated with antibiotics after confirmation with a positive urine test. Sepsis occurred in 2 (2.90%) cases in the nonstented group and in one cases (2.94%) in the presented group (p value 0.990) and all 3 cases required intensive care unit treatment. No cases of perforations of renal pelvis or ureter and ureter avulsion occurred in both groups.

Table-2: Comparisons Of Postoperative Complications Between Both Groups According To The Clavien Dindo Classification

Complications	Without prestenting	With prestenting	P value
Intraoperative bleeding	4 (5.80%)	2 (5.88%)	0.986
Fever	9 (13.04%)	7 (20.59%)	0.320
UTI	4 (5.80%)	3 (8.82%)	0.566
Acute pyelonephritis	1 (1.45%)	1 (2.94%)	0.621
Sepsis	2 (2.90%)	1 (2.94%)	0.990

DISCUSSION

Flexible RIRS procedure was first introduced by Bagley et al. in 1987 [7]. Since then, due to the development of optical technology and the advancement of surgical instruments, the role of RIRS have increased in the primary treatment for kidney stones with a diameter less than 2 cm [1,6,8,9]. Fuchs and Fuchs reported the first large series of renal calculi treated by ureteroscopy using a flexible deflectable ureteroscope after a 1 to 2-week period of ureteral stent placement [10]. In many centers around the world, prior stenting is carried out before RIRS to passively dilate the ureter to facilitate the passage of the access sheath and flexible ureteroscope. [11,12]. However, a preoperative stenting inevitably leads extra cost and time, as well as complications such as flank pain, bothersome urinary symptoms and potential urinary tract infections. Several studies have also reported that preoperative ureteral stenting affected the outcome of ureteroscopic stone surgery [3–6]. Ronald, et al. retrospectively randomized 90 patients to no pre-operative stenting and pre-stenting groups. In their study, they concluded that pre-stenting is associated with a significantly higher stone-free rate and few complications [11]. Purlmutter et al. reported that preoperative stents dilated the ureter, passively affecting the outcomes of RIRS [13], while Rubenstein et al. reported that there was a significant effect of the stent and SFR [14]. However, Fabrizio et al. reported that preoperative ureteral stenting affected the expansion of the ureter but there was no significant correlation with stone clearance [15]. Hyeong Dong Yuk et al. also reported that preoperative ureteral stenting did not affect operative outcomes, but it increases the success rate of access sheath placement [16]. In view of these mixed results we soughted to investigate the outcomes of RIRS for treatment of renal calculi between preoperative ureteral stenting versus without preoperative stenting.

In our study, out of 103 patients, RIRS was possible in 66.99% of cases without preoperative stenting. In the remaining 34 cases RIRS was performed at 2-3 weeks after DJ stenting. In a study done by P Chhettri et al stated that, majority of ureters (67.92%) are distensible and does not requiring pre-stenting before retrograde intrarenal surgery [17]. In our study, the SFR was 79.71% in the non-stented group and 82.35% in the preoperatively stented group (p = 0.749). These results indicate that preoperative ureteral stenting was not significantly associated with stone clearance. In our study, patients in the preoperatively stented group had slightly more complications than the non stented group, although the difference between the two groups was not statistically significant. Similar to our results, Rubenstein et al. have also shown no significant difference in the rate of complications between the two groups [18]. Lee et al. have compared a short preoperative stenting group, a long preop-group, and a no-stenting group and found no significant difference in overall complication among the three groups [19].

Our study showed that majority of the patients without preoperative stenting were successfully performed RIRS at first attempt. The procedures of non prestented RIRS for renal stones have an acceptable operative outcomes or complications such as SFRs, operative times or perioperative complications, when compared with the stenting group in our study. If a preoperative stenting is optional, our study may help the patients and clinicians to make a decision. Large scale prospective randomized controlled studies are required to further figure out the prediction of patients who may need preoperative stents before RIRS procedure.

CONCLUSIONS

RIRS without preoperative stenting had similar effects in terms of operative outcome and complications, when compared with RIRS with preoperative stenting. In our study, RIRS was possible in majority of the cases without preoperative stenting. RIRS without prior DJ stenting is a feasible option in managing renal stones and whenever possible it should be performed without prior stenting to avoid undergoing the procedure twice.

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