

# Efficacy of Retrograde Intra Renal Surgery (RIRS) in Patients with Lower Pole Renal Stones of Size Less than 2.5 Cm

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## Abstract

### ➤ Objective:

To evaluate the efficacy of RIRS in patients with lower pole renal stones of <2.5cm.

### ➤ Methodology:

This Descriptive Case Series was conducted at Urology Department, Galway University Hospital, Galway, Republic of Ireland from 1<sup>st</sup> January 2018 to 31<sup>st</sup> December 2018. Total 75 patients with lower pole renal calculi of <2.5 cm in size were included. RIRS was done after completion of all investigations. All patients were given prophylactic antibiotics. Stone free rate 4 month post-operatively was assessed. The stone free rate at the end of 4th month was the endpoint of this study. The collected information was analysed by using SPSS 23. Frequencies and percentages were calculated for qualitative data like efficacy and gender. Mean and SD were calculated for quantitative data like age. Stratification was used for gender, age and stone size to investigate modifiers effects. In post stratification Chi-Square test was used at p value < 0.05 (significant).

### ➤ Results:

Total 75 patients with renal calculi were enrolled. Among these patients, 45(60%) were males, while 30(40%) were females. Age range in this study was from 18 to 65 years with mean age of 42.11±13.55 years. Mean size of the stone was 1.22±0.15. Most of the patients 52(69.33%) had the size of stone <1.25 cm, while 23(30.67%) patients had the size of stone >1.25 cm. Overall success rate with RIRS was 88.0% in patients with lower pole renal calculi.

### ➤ Conclusion:

The technique (RIRS) are safe and effective for stones, with best success rate, low morbidity and proper duration of operation.

**Keywords:-** Retrograde Intra Renal Surgery (RIRS), Lower Pole Renal Calculi.

## I. INTRODUCTION

Stone disease is ranked 3rd most common pathology in urology after UTI and prostatic diseases.<sup>1</sup> It has prevalence about 1% to 15% with different probabilities according to age, gender, race and geographic areas.<sup>2</sup> Since stone recurrence rate within 5 years is quite high; nearly 50%, after open surgery, various new techniques have evolved over years to surpass traditional open surgery repetitions.<sup>3</sup>

In 1978, for the first time, pediatric cystoscope was used to reach distal ureter.<sup>4</sup> Nowadays minimal invasive techniques are recommended like ESWL, PCNL, mini-PCNL, retrograde intra renal surgery (RIRS) and micro-PCNL for the treatment of stone disease.<sup>5</sup>

European guidelines recommend extra corporeal shock wave lithotripsy (ESWL) in stones less than 1 cm, either ESWL or PCNL, while percutaneous nephrolithotomy is safer for stone larger than 2 cm. Either PCNL or RIRS is recommended for stones >1cm with HU>1000 in lower pole due to limited efficacy of ESWL.<sup>6</sup>

New Generation flexible ureteroscopes with effective holmium lasers can make RIRS even effective for larger stones and to surpass PNL related limitations and complications.<sup>7</sup> Efficacy of RIRS has been assessed in limited number of patients as primary approach in different circumstances. In a study conducted by Bansal P showed stone clearance rate of 86.4% in 74 patients.<sup>8</sup>

In another study conducted by Lim H.S, RIRS efficacy was 69.7% in 66 patients.<sup>9</sup> As it is an evolving technique, this study on RIRS in lower pole stones will be helpful in evaluation and adopting this technique as primary technique.

### ➤ Objective:

To evaluate the efficacy of RIRS in patients with lower pole renal stones of <2.5cm.

## II. METHODOLOGY

This Descriptive Case Series was conducted at Urology Department, Galway University Hospital, Galway, Republic of Ireland from 1<sup>st</sup> January 2018 to 31<sup>st</sup> December 2018. Total 75 patients with lower pole renal calculi of <2.5 cm in size were included. The inclusion criteria was, male and female patient with lower pole renal stone less than 2.5 cm in size between 18-65 years of age. The exclusion criteria was, patients with fever >99 F at the time of presentation, patients with positive urine culture >10<sup>5</sup> or with pyuria on urine analysis > 5-6 pus cells per high power view at presentation and patients with more than one calculus found in the same kidney on CT-Scan and IVU.

All the patients were managed on NSAIDs in case of pain until operation. After prophylactic antibiotics, under general anesthesia lithotomy position of patient was made. Under aseptic measures cystoscopy was performed, after cystoscopy hydrophilic guide wire 0.38 passed and coiled in kidney. With the help of fluoroscopy, C arm ureteral access sheath was passed over guide-wire reaching the pelvis and retrograde pyelogram was done to evaluate anatomy. Flexible scope (6.5Fr tip and 7.5Fr base) was used.

With the help of holmium laser 100W laser fiber the stone was vaporized and DJS passed. The patient was labelled for clearance of renal stone (efficacy, yes or no) at

follow up after 4 weeks on computed tomography (CT). The collected information was analysed by using SPSS 23. Frequencies and percentages were calculated for qualitative data like efficacy and gender. Mean and SD were calculated for quantitative data like age. Stratification was used for gender, age and stone size to investigate modifiers effects. In post stratification Chi-Square test was used at p value < 0.05 (significant)

## III. RESULTS

In this study, 75 patients with lower pole renal calculi were enrolled. Among these patients, 45(60%) were males, while 30(40%) were females. Age range in this study was from 18 to 65 years with mean age of 42.11±13.55 years. Majority of the patients 29(38.66%) were between 46 to 65 years of age. While 22(29.33%) and 24(32%) patients were between 18-30 and 31-45 years of age respectively.

Mean size of the stone was 1.22±0.15. Most of the patients 52(69.33%) had the size of stone ≤1.25 cm, while 23(30.67%) patients had the size of stone ≥1.25 cm. Overall success rate with RIRS was 88.0% in patients with lower pole renal calculi.

There was no significant difference between gender and age in efficacy as shown in table 5 and 6 respectively. It was reported that there was significant difference in efficacy between stone size (p=0.021).

Gender	Efficacy		Total	P-value
	Yes	No		
Male	40	5	45	0.21
	88.8%	11.2%	100.0%	
Female	26	4	30	
	86.6%	13.4%	100.0%	
Total	66	9	75	
	88.0%	12.0%	100.0%	

Table 1:- Comparison of Efficacy with Respect to Gender

Age Groups	Efficacy		Total	P-value
	Yes	No		
18-30	20	2	22	0.08
	90.90%	9.10%	100.0%	
31-45	28	5	24	
	91.66%	8.34%	100.0%	
46-60	35	2	29	
	82.75%	17.25%	100.0%	
Total	66	9	75	
	88.0%	12.0%	100.0%	

Table 2:- Comparison of Efficacy with Respect to Age Groups

Stone Size Groups	Efficacy		Total	P-value
	Yes	No		
≤1.25 cm	46	6	52	0.021
	88.46%	11.54%	100.0%	
≥1.25 cm	20	3	23	
	86.95%	13.05%	100.0%	
Total	66	9	75	
	88.0%	12.0%	100.0%	

Table 3:- Comparison of Efficacy with Respect to Stone Size

**IV. DISCUSSION**

Endoscopic technology with advanced flexible ureteroscope (URS) is increasingly used in the burden of renal stones. For stones > 2.5 cm, RIRS is used as standard for care.<sup>10</sup> The rate of being stone free is higher for such procedure, up to 95%. The renal access complications are become a matter of serious concern sometimes. In patients where significant comorbidities like bleeding diathesis and morbid obesity, the PNL becomes contraindicated.

Prone position for PCNL increase anesthetic risk in difficult airways and extremities.<sup>11</sup> With advancement of technology, it is presently possible to handle intra renal stones with RIRS. Lower pole renal calculi can effectively and safely be handled by endoscopic technique that looks to compete with most invasive open surgery or percutaneous manoeuvres.<sup>12</sup> It is still not clear that retrograde intra renal surgery might be useful for large stones of size (> 2 cm).<sup>13</sup>

Kursad Zengin et al concluded in their study that RIRS bear a suitable rate of success that has low complication rate ie fever than PCNL and looks like an alternate to PCNL to remove large stones.<sup>14</sup> Present recommendations are that ESWL may be the choice of first therapy for calculi of size < 20 mm while PCNL for bigger stones than this.

Presently flexible URS is not mentioned in many guidelines. It may be an alternative to PCNL or ESWL. Hardly, small amount of work is mentioned in literature at the use of flexible URS for renal calculi. New generation URS permits access to all calyces, combined with laser lithotripsy, ureteral access sheath and tools for retrieval to renal calculi.

The rate of being stone free reported for < 2.5 cm calculi is 50 to 80 %, while main stones may also be treated successfully.<sup>15</sup> Further the link between endoscopic management and long operative time is stressed in literature. Many reports have described the variable

operative time of URS and LASER. Mariani et al. described mean operative time was 64 minutes (from 30 to 240 minutes) for the stones of 2-4 cm of RIRS.<sup>16</sup>

In the current study, the overall success rate with RIRS was 88.0% in patients with lower pole renal calculi. In a study conducted by Bansal P showed stone clearance rate of 86.4% in 74 patients.<sup>8</sup> In another study conducted by Lim H.S, RIRS efficacy was 69.7% in 66 patients.<sup>9</sup> RIRS have minimum complications as compared to PCNL. Major complications of RIRS are not as common in experience increases.<sup>17</sup>

In present situations, due to the small size ureterorenoscopes, important complications like ureteral avulsion are rare. In addition, at present the RIRS provide a safe alternative in high risk patients, morbid obesity, co morbidities like pregnant women, bleeding diathesis and in those in whom PCNL is contraindicated.<sup>18</sup>

In the study, outcomes of treatment in patients with important co-morbidities who underwent RIRS were monitored and no main complication was observed. Laser lithotripsy and RIRS may be done effectively and safely with high rate of success and low rate of complications in renal stone patients. In this study 42 patients were studied that include 14 female and 28 male patients<sup>19</sup>

The mean size of stone was 24.09±6.37 mm and the success rate was 92.8% after procedure and there was no main complication to observe.<sup>20</sup> Huang et al. did a study in 25 patients. RIRS overall success rate after 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> method was 70%, 92% and 92% respectively.<sup>21</sup>

**V. CONCLUSION**

The RIRS is safe and effective for renal stones, with high success rate, low morbidity and acceptable duration of operative time.

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