

RIRS (Retrograde Intrarenal Surgery) is safe and effective in aging male patients: A single surgeon experience

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Abstract

Aim: Kidney stones are one of the most common diseases around the world. Used together with Extracorporeal Shockwave Lithotripsy (ESWL), Retrograde Intrarenal Surgery (RIRS) is the most common method used for kidney stones below 2 cm. The purpose of our study is to evaluate the safety and efficacy of RIRS in aging male patients with kidney stones.

Material and Methods: Our study contains 213 patients who underwent RIRS in Beylikduzu State Hospital between March 2017 and March 2019. Patients were examined retrospectively and divided in four groups according to their age [(between 40 and 49 for Group 1), (between 50 and 59 for Group 2), (between 60 and 69 for Group3), (70 and above for Group 4)]. Demographic data, stone size and location, and American Society of Anesthesiologist (ASA) scores of patients have been recorded. Stone-free rate at postoperative month 3, hospitalization period, double J (DJ) stenting period, ESWL, or whether they have had a second operation have been recorded. ANOVA, Chi-Square tests were used in statistical analysis.

Results: Stone characteristics and demographic data of four groups have been examined. Stone size was similar. ASA scores increased with increasing age as expected ($p=0.001$). Patients had similar mean operation period, hospitalization period and DJ stenting duration, and no statistically significant difference was detected ($p>0.05$). Upon examining stone-free rate at postoperative month 3, still no statistically significant difference was determined ($p>0.05$). There was no need for perioperative blood transfusion.

Conclusion: These results show that RIRS is an efficient and safe method in elderly male patients with kidney stones. Well-designed studies with large scales are required for the confirmation of this study.

Keywords: Aging male; kidney stone; RIRS (Retrograde Intrarenal Surgery).

INTRODUCTION

Kidney stones are one of the most common diseases around the world and in daily Urology practices. While the possibility of urinary tract stones is 2%-3% in general population, the possibility of developing kidney stones is around 12% (1). For this reason, the treatment of kidney stones bears crucial importance. The purpose of kidney stone treatment is maximum stone-free rate with minimally invasive interventions. In kidney stone treatment, ESWL, retrograde intrarenal surgery (RIRS) performed with Flexible Ureterorenoscopy (URS) and Percutaneous Nephrolithotomy (PNL) are the most common treatment modalities around the world. The method used varies according to the location, size and magnitude of the stone. While PNL is generally recommended for stones larger than 2 cm, ESWL and RIRS

are recommended for stones below 2 cm. Also, methods such as Mini percutaneous nephrolithotomy (M PNL) and Micro percutaneous nephrolithotomy (McPNL) have been introduced. RIRS is the first line treatment particularly in stones resistant to ESWL, and in conditions requiring immediate treatment (2,3). With the use of Holmium:YAG laser with URS in our day, stone-free status can largely be obtained even in large stones. RIRS laser systems and flexible URS imaging systems are becoming more popular upon their technological progress (4).

Although there are numerous studies on elderly patients about the efficacy and safety of PNL, there is a limited number of studies on RIRS (5,6). Recent RIRS studies are often performed on pediatric population (7-9). There is a need for new studies and new data on elderly patients about RIRS. Urinary stone disease is commonly observed

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in our region. For this reason, kidney stone applications, especially RIRS, are often performed in our clinic. Our purpose in this study is to evaluate the complications, safety and efficacy of RIRS applications performed with URS on aging men.

MATERIAL and METHODS

Committee dated 16.04 2019 and numbered 1234. Two hundred thirteen male patients over the age of 40, who underwent RIRS between March 2017 and March 2019, were evaluated retrospectively.

All procedures were carried out under general anesthesia. Preoperative antibiotics were administered

to patients with positive urine culture results according to the antibiotic susceptibility tests. Before the operation, all patients underwent non-contrast upper and lower abdominal computed tomography (CT). Furthermore, contrast imaging methods were also used for patients that were deemed necessary. First of all, urethra, bladder and ureter were observed in all patients with semi-rigid URS. Afterwards, guide-wire was left in the kidney. Urethral access sheath (Navigator HD Boston Scientific 111-13 F) was sent over the guide wire. In 23 patients who could not be accessed with Urethral Access sheath, direct entry was performed over the guide wire with flexible URS (The Storz Flex-X2 Flexible Ureteroscope). After reaching the kidney with flexible URS, the stone was found. The stones were turned into calculi with Holmium;YAG laser (QUANTA Holmium;YAG laser litho DK30 watt). Double J (DJ) stent was applied to all patients. 24 hours after the operation, the kidney and the urinary tract was imaged with X-ray. DJ stent was removed three weeks later. Exclusion criteria in our study were previous stone ,kidney and ureter surgery. Study is included patients who treated ESWL.

Patients were divided in four groups according to their age, consisting of Group 1 between ages 40-49, Group 2 between

ages 50-59, Group 3 between ages 60-69, and Group 4 was aged 70 and above. The presence of hypertension and diabetes, operation period, stone location, stone size, and American Society of Anesthesiologist (ASA) score were recorded in all patients. Postoperative stone-free rate, hospitalization period, DJ stenting duration, ESWL or the need for a second operation have been recorded for the patients. The rate of stone-free patients was determined according to the imaging methods applied 3rd month after the operation. In addition, serum creatinine levels and GFR levels were determined for all patients on preoperative and postoperative 3rd month.

The SPSS 15.0 software package (SPSS for Windows,15.0, SPSS Inc., Chicago, IL) was used for statistical analysis. The Kolmogorov-Smirnov test was used for normal distribution analysis. In case the data showed normal distribution, ANOVA was used for the comparison of the four age groups. Otherwise, Kruskal-Wallis test was used. The Chi-square test was used for the examination of the qualitative data. The paired t test was used to analyze the perioperative and postoperative change in GFR level. The p values of less than 0.05 were deemed significant.

RESULTS

Ten of 213 patients had a solitary kidney. Six of these patients had nephrectomy before due to various reasons. Four patients had atrophic kidney. Kidney function of atrophic kidney patients was lower than 10% in dimercaptosuccinic acid (DMSA) imaging method. The rate of diabetes and hypertension increased with increasing age. ASA scores of patients were 1.65 ± 0.62 , 1.78 ± 0.71 , 2.09 ± 0.76 , and 2.27 ± 0.82 in group 1, 2, 3 and 4, respectively ($p=0.001$). Stone characteristics and demographic data have been shown in Table 1. Mean stone size was $390 \pm 160 \text{ mm}^2$ in Group 1, $395 \pm 165 \text{ mm}^2$ in Group 2, $380 \pm 155 \text{ mm}^2$ in Group 3, and $375 \pm 158 \text{ mm}^2$ in Group 4.

Table 1. Demographic data and Stone characteristics

	40-49(n=80)	50-59(n=59)	60-69(n=40)	≥70(n=34)	P value
Hypertension	12 (15%)	11 (18%)	12 (30%)	11 (32%)	0.001*
Diabetes Mellitus	7 (%)	7 (11%)	6 (15%)	6 (18%)	0.001*
Mean stone size mm ²	390 ± 160	395±165	380±155	375±158	0.3
Stone location					
-Pelvis	28 (35%)	20 (34%)	14 (35%)	11 (32.4%)	
- Lower calyx	12 (15%)	8 (13.5)	7 (17.5)	4 (11.7%)	
- Upper calyx	8(10%)	6 (10%)	6 (15%)	6 (17.7)	
- Middle calyx	16 (20%)	13 (22%)	8 (20%)	7 (20.5%)	
- 2 or more zones	16 (20%)	12 (20.5%)	5 (12.5%)	6 (17.7%)	
ASA category					
Mean	1.65 ±0.62	1.78 ± 0.71	2.09±0.76	2.27 ± 0.82	0.001*
-ASA I	36 (45%)	22 (37.2%)	10 (25%)	6 (17.6%)	
-ASA II	32 (40%)	22 (37.2%)	16 (40%)	10 (29.4%)	
-ASA III	12 (15%)	15 (25.6%)	14 (35%)	18 (53%)	

ASA: American Society of Anesthesiologists. * $p<0.05$

Table 2. Intraoperative and Postoperative evaluation

	40-49(n=80)	50-59(n=59)	60-69(n=40)	≥70(n=34)	P value
Operation period (min) median(min-max)	48.4 (30-100)	49.3 (35-96)	47.3 (33-89)	50.2 (40-106)	0.28
Hospital Stay (day) median (min-max)	1.4 (1-4)	1.3 (1-4)	1.5 (1-5)	1.5 (1-5)	0.26
DJ stent duration	18.4 (15-35)	19 (15-36)	19.2 (15-38)	19.6 (15-45)	0.18
Stone Free Rate	89%	90%	88%	92%	0.23
Secondary intervention	8 (10%)	6 (10%)	4 (10%)	4 (11%)	0.16

Intraoperative and Postoperative evaluation

Perioperative blood transfusion was not needed in any of 213 patients. Catheters were removed one day after the operation. Among all groups, nephrostomy was applied to only one patient in Group 4 after the operation due to suspected perforation. Mean operation periods was 48.4, 49.3, 47.3, and 50.2 minutes for Group 1, 2, 3 and 4, respectively, and no statistically significant difference was determined ($p=0.28$). DJ stent duration ($p=0.18$) and hospitalization period ($p=0.26$) after the operation was approximately similar, and no statistically significant difference was determined. At the end of 3 months, stone-free patient rates was 89%, 90%, 88%, and 92% in Group 1, 2, 3 and 4, respectively, and no statistically significant difference was determined ($p=0.26$). Also, no statistically significant difference was determined in the rate of patients who underwent a second intervention such as URS and ESWL ($p=0.16$). Intraoperative and postoperative statistics of patients are demonstrated in Table 2.

DISCUSSION

Numerous studies investigating the treatment of kidney stones have been performed since kidney stones are one of the most common diseases around the world. There are a limited number of studies on stone treatment in elderly male patients.

Halachmi and colleagues have a study on 238 patients where they investigated ESWL in elderly men. In this study, ESWL results were evaluated in 23 male patients aged 70 and above, and in male patients from other age groups. As a result, it has been reported that ESWL treatment alone does not show any effect (10).

Most of the studies are about PNL surgery among kidney stone operations in elderly patients. Öztürk H. has investigated 52 patients who underwent tubeless PNL and were aged above 65, and finally reported that tubeless PNL is safe in elderly patients (11). Also, Kumar S and colleagues have investigated 922 patients who underwent PNL. They have divided these patients in 3 groups as pediatric, adult and geriatric patients, and they have evaluated their complications. The result of the study revealed age did not affect complication rate and level (12). Furthermore, Lee C and colleagues have examined 2196 patients who underwent PNL. They have determined

that PNL did not show any difference in these patients with regard to efficacy and safety in pediatric and adult population (13). The most similar study with our study that was performed on PNL was the study performed by Besiroglu and colleagues. Besiroglu et al. examined 283 patients who underwent PNL by dividing them into 4 groups, and they have reported that PNL was safe in elderly male patients (5).

There is a limited number of kidney stone surgery studies performed on elderly patients about RIRS. Berardinelli et al. have examined 399 kidney stone patients who underwent RIRS, 91 of which were aged above 65. In this study, they have stated that age alone was not a risk factor with regard to safety and efficacy of RIRS surgery in elderly patients (14). Similar to this study, Tolga- Gulpinar et al. have examined 947 patients in different age groups. The study revealed that age is not a limiting factor in patients undergoing RIRS (15). Gokcen K et al. have also examined 165 patients by dividing them into groups aged above 65 and below 65. They have reported in the result of their study that age did not affect stone-free patient rate and hospitalization period in patients undergoing RIRS, and also age was not associated with serious complications (16). The difference of the study from other studies was that it was performed only in aging male patients. The contribution of our study to the literature is that RIRS treatment is an effective and safe method in aging male patients.

There are various limitations in our study. These consist of the facts that our study is retrospective and contains limited number of patients. Also, fluoroscopy application period was not recorded during the operation.

CONCLUSION

The results of our study reveal that RIRS is an efficient and safe treatment option in kidney stone surgery on aging male patients. There is a need for better designed studies with large series on this subject in order to support our results.

Competing interests: The authors declare that they have no competing interest.

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Ethical approval: This study was carried out with the approval of Okmeydanı Training and Research Hospital Ethics Committee dated 16.04 2019 and numbered 1234.

REFERENCES

1. Johnson CM, Wilson DM, O'Fallon WM, et al. Renal Stone epidemiology: a 25-year study in Rochester, Minnesota. *Kidney Int* 1979;16:624-31.
2. Kijvikai K, Haleblan GE, Preminger GM, et al. Shock wave lithotripsy or ureteroscopy for the management of proximal ureteral calculi: an old discussion revisited. *J Urol* 2007;178:1157-63.
3. Maltaga BR. Contemporary surgical management of upper urinary tract calculi. *J Urol* 2009;181:2418-34.
4. Galvin DJ, Pearle MS. The contemporary management of renal and ureteric calculi. *BJU Int* 2006;98:1283-8.
5. Besiroglu H, Merder E, Dedekarginoglu. Percutaneous nephrolithotomy is safe and effective in aging male patients : a single center experience. *G.Aging Male* 2019;12:1-6.
6. Michel MS, Trojan L, Rassweiler JJ. Complications in percutaneous nephrolithotomy. *Eur Urol* 2007;51:899-906.
7. Ekici M, Ozgur BC, Senturk AB et al. Efficacy and Reliability of Retrograde Intrarenal Surgery in Treatment of Pediatric Kidney Stones. *Cureus* 2018;10:3719.
8. Sarikaya S, Ebiloglu T, Selvi I et al. Retrograde Intrarenal Surgery or percutaneous nephrolithotomy :Which one is more effective for 1-2 cm renal stones in the pediatric patients? *Arch Esp Urol* 2019;72:54-60.
9. Samotyjek J, Jurkiewicz B, Krupa A. Surgical treatment methods of urolithiasis in the pediatric population. *Dev Period Med* 2018;22:88-93.
10. Halachmi S, Meretyk S. Shock wave lithotripsy for ureteral stones in elderly male patients. *Aging Male* 2006;9:171-4.
11. Ozturk H. Tubeless versus standard PCNL in geriatric population. *Actas Urol Esp.* 2015;39:494-501.
12. Kumar S, Keshavanurthy R, Karthikeyan V.S et al. Complications after prone PCNL in pediatric, adult and geriatric patients - a single center experience over 7 years. *Int Braz J Urol* 2017;43:704-12.
13. Lee LC, Violette PD, Tailly T et al. A comparison of outcomes after percutaneous nephrolithotomy in children and adults: a matched cohort study. *J Pediatr Urol* 2015;11:250.
14. Berardinelli F, De Francesco P, Marchione M et al. RIRS in the elderly: Is it feasible and safe? *Int J Surg* 2017;42:147-51.
15. Tolga-Gulpinar M, Resorlu B, Atis G et al. Safety and efficacy of retrograde intrarenal surgery in patients of different age groups. *Actas Urol Esp.* 2015;39:354-9.
16. Gokcen K, Dundar G, Bagcioglu M et al. Safety and Efficacy of RIRS in Geriatric Patients: A Comparative Evaluation on an Age Based Manner. *Urol J* 2019.