



Retrograde ureteroscopic intrarenal surgery for renal calculus larger than 1.5 cm

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Abstract

Objective: To assess the feasibility of retrograde ureteroscopic intrarenal surgery (RIRS) as a viable alternate to percutaneous nephrolithotripsy (PCNL) in treating patients with renal calculus greater than 1.5 cm.

Materials and Methods: From March 2012 to March 2018, an aggregate of 120 instances of renal stones more prominent than 1.5 cm stone weight, were treated by RIRS with adaptable ureteroscope and stones divided with holmium laser. The vast majority of the patients were pre stented before the strategy. Access sheath was utilized in all cases. Olympus advanced video ureterorenoscope was utilized. Patients were released following 24 hours of the system and permitted to continue ordinary work following two days. X beam KUB for radio murky stones and ultrasound for every one of the cases were done following three weeks and if any leftover parts of any size were available the patient was taken up for re-look adaptable ureteroscopy under anesthesia. Stent and remaining pieces were expelled. In the event that there was no build up the stent was evacuated under local anaesthesia.

Results: Complete leeway was considered if there were no pieces on USG screening after three weeks. 40 patients had stone weight more prominent than 150 mm. 80 patients had stone weight under 150 mm. leeway was poor in 30% when the stone weight was more noteworthy than 150mm and 95% when the stone weight was under 150mm. second sitting was required 30% of the patients with bigger than 150mm stone weight and in 5% when the stone weight was under 150mm.

Conclusion: RIRS is a viable methodology with high freedom rates in stones under 150mm. Anyway in stones more prominent than 150mm, the leeway rate uniquely diminishes. Shorter clinic remain, less difficulty, less horribleness and great stone free rate are the benefit of RIRS. RIRS is the best alternative for overseeing extracorporeal shockwave lithotripsy fizzled and post PCNL leftover math. However RIRS ought to be painstakingly utilized for extensive calculi having stone weight of more prominent than 150mm.

Keywords: Kidney stones, flexible ureteroscopy, percutaneous nephrolithotomy, retrograde intrarenal surgery.

Introduction

Adaptable ureteroscopy was at first utilized just for analytic reason as there was no working channel in the more seasoned models. In any case, with the coming of new age scaled down adaptable ureteroscopes with better optics, improved avoidance system and wide scope of extra instruments like, tipless nitinol baskets, two fold floppy tip manage wire, more slender hydrophilic covered crimp safe access sheath and good irrigation siphons and great fracture gadgets like Holmium laser with more slender filaments (200 micron) to access lower calyx without influencing the diversion of the adaptable degree the signs for the utilization of flexible degrees have broadened to an assortment of methodology like treatment of kidney stones, renal pelvic tumours and calyceal diverticulum's.

Percutaneous nephrostolithotripsy (PCNL) is a best quality level strategy for substantial kidney stones with a potential bleakness of dying, which may require angioembolization, and furthermore has certain confinements in patients with draining diathesis,^[1] stoutness and malrotated kidneys. Retrograde ureteroscopic intra renal surgery (RIRS) is a less dreary method than PCNL. The use of RIRS is by and by restricted to patients who are contraindicated for PCNL/shockwave lithotripsy (SWL) like draining diathesis, sullen obesity, malrotated/malpositioned kidney, horse shoe kidney, and math (<1.5 cm) in horrible lower calyx. The specialized advancements in laser innovation and huge improvement in adaptable ureteroscopes have made RIRS for bigger ureteric/renal stones conceivable. The low intricacy rate gives RIRS for ureteric/renal stones prevalence over the intrusive percutaneous methodology, which is related with significant dreariness, even in experienced hands.

In our examination we assessed the plausibility of retrograde ureteroscopic intra renal medical procedure (RIRS) as a feasible interchange to percutaneous nephrolithotripsy (PCNL) in treating patients with renal math more prominent than 1.5 cm.

Materials and Methods

From March 2012 to March 2018, a sum of 120 instances of renal calculus of more noteworthy than 1.5 stone weight for which PCNL would be done generally were dealt with by RIRS. The stone size was estimated on a Ct filter and the longest distance across of the stone was measured. The stone weight was determined by including every one of the stones and the kidney. Every one of the patients were animated with CT urography, routine blood and urine examination and treated as outpatient with fitting anti-microbials if the urine culture was positive. The patients were conceded the earlier day night of the strategy and they experienced this procedure under general anaesthesia if required. We routinely pre stent the patient yet as of late we began without introducing and our convention is to post patients for essential RIRS and after that under sedation we endeavor ureteroscopy. If the sheath passes then we convert it to full broad anesthesia generally a stent is put. Every one of the patients experienced ureteric hole dilatation with a 6/12 ureteraldilator. RGP was done now and again, in which there was trouble in distinguishing the ideal calyx, to comprehend the calyceal anatomy systems. Ureteroscopy with a semi unbending ureteroscope (wolf 7/8.5 F) was done in chosen cases. Renal pelvic or upper calyx calculi, if effectively available, are divided with Holmium: YAG laser. A both end floppy tip direct wire (COOK) was embedded under the C arm direction into the semi inflexible URS and placed in the renal pelvis. An entrance sheath crimp safe and hydrophilic covered (cook inward measurement 12/10 F, outer diameter 14/12 F, 35/45cm) is ignored the guide wire under C arm direction up to the PUJ. If the get to sheath can't be passed because of tight ureter the adaptable ureteroscope (Storz Flex-X2) was back loaded over the guide wire and the extension was consulted into the ureter up to the renal pelvis and afterward the guide wire was evacuated. Way discoverer is constantly used to keep the field clear. Stones from the calyx were repositioned into the upper calyx with the

assistance of a (2.2 F Cook) N-Circle basket, this step helps in expanding the life of the adaptable ureteroscope. On the off chance that the stone is huge and not basketable, a270 micronfiber was utilized to part the calyceal stone into a few pieces. The parts were repositioned into the upper calyx and the stones in the upper calyx were divided with 375 micron laser fiber [8.4 watts (1.2 joules and 7 hertz) for delicate stones and 9.1 watts (1.3 joules and 7 hertz) for hardstones]. Little stones were basketed out with N-Gage crate. Three strategies were utilized to part the stones:

a. Painting strategy- The laser fiber was moved over the stone simply like painting with a brush, this method was utilized on account of delicate stones.

b. Penetrating strategy - Multiple drills were made over the stone and after that the discontinuous edge was fragmented to make it into little bits.

c. Popcorn impact - This strategy was utilized to break extensive pieces into modest bits; the laser was terminated in the centre of the huge sections with a separation of around 5 mm without concentrating on any particular fragment. The vitality was not changed but rather the recurrence was expanded to 9-10 hertz. This causes the sections to fly like popcorn and in this procedure the stones get hit by the laser fiber and become tiny pieces. This strategy makes the parts into minor bits, which are permitted to be passed out in urine. It spares a great deal of time when contrasted with breaking singular pieces. The free flying of the pieces with the water system liquid demonstrates that the parts are adequately little to be gone out in the urine. The biggest section was basketed out to survey the size. All the calyces were examined both with direct vision through the adaptable ureteroscope and C arm to make sure that no vast parts were forgotten in any calyx. Two fold J Stenting was routinely done in all cases. The patient was released following 24 hours of the technique and permitted to resume normal work following two days. X beam KUB for radio murky stones and Ultrasound for every one of the cases were done following three weeks

and if any leftover sections of any size were available the patient was taken up for look adaptable ureteroscopy under anaesthesia. Stent and lingering parts were evacuated. On the off chance that there was no residue the stent was expelled under local anaesthesia.

Results

Persistent socioeconomics are given in table 1. Stone area lower shaft were 88/120 (73.6%), upper, midpole and pelvis were 32/120 (26.6%). Patients were partitioned into two gatherings dependent on total stone weight, in the < 150mm were 80/120(66.6) patients and >150mm were 40/120(33.3%). In view of the quantity of stones 78/120 had single stone, 20/120 had two stones and 22/120 had 3 stones or more noteworthy. Every one of the stones was radiopaque affirmed by advanced X ray.

Table 1 Demographic characteristics:

Variable	No. of patients n=120	percentage
Male/female	64/56	53.3/46.6
Left/right	68/52	56.6/43.3
Concomitant ureteric stones	16	13.3
Stone location		
Lower pole	88	73.3%
Mid calyx & pelvis	32	26.6%
Cumulative stone burden		
≤150mm	80	66.6%
≥150mm	40	33.3%
Number of stones		
01	78	65.8%
02	20	16.6%
≥3	22	18.3%

Essential RIRS bunch had 72patients, 16 patients had a corresponding ureteric stone additionally, 10 patients had atypical urinary tract, 8 patients had an upward movement amid URS, 10 patients were fizzled ESWL , 4 were lingering PCNL.

Working time was 45 minutes to an hour and a half (normal time an hour) the time was determined from starting the endoscopic technique till catheterization. Anaesthesia, situating and planning time were not included. Complete leeway was considered if there were no pieces on USG screening after 3weeks.

Table 2 Presentation of stones and outcome of the procedure:

Stone location	No. of patients n=120	SFR	%	P Value
Upper pole, mid pole & pelvis /Lower pole with or without others	32/88	30/75	93.7/85	0.275
Cumulative stone burden ≤150mm ≥150mm ²	80/40	76/28	95/70	≤0.0001
Primary RIRS	106	87	82%	0.070
Secondary RIRS	14	08	57.1%	
Stone No				
1-2	98	87	88.7%	≤0.0001
≥3	22	8	36.3%	

Quick post operation stone free rate dependent on computerized X-beam relied upon different components like the stone area , Upper , mid shaft and pelvis analytics had a SFR of 93.7% (32/30), lower shaft math had a SFR of 85% in correlation P esteem was 0.275 which was not factually huge.

Table2

In light of the total stone weight <150 mm had a SFR of 95% (76/80) and >150 mm had a SFR of 70% (40/28).The p value between the two was noteworthy ≤0.0001. table2

Essential RIRS 87/106 the SFR was 82% while in auxiliary RIRS 8/14 the SFR was 57.1%.The P value was 0.070 was not factually huge. Table 2

In view of the stone number the 1-2 bunch had SFR of 88.7% (87/98), while as the >3 had a SFR of 36.3(8/22) which was statically significant (p=≤0.0001). table2

30 patients had stent related grumblings like dysuria, flank torment amid urine and mild hematuria which settled with expanded liquid admission and analgesics. 15 quiet created fever which settled with bed rest, anti-microbials and analgesics. Every one of the patients were released after 24 hrs of the method; Most of the patients could continue normal work following two days of the methodology.

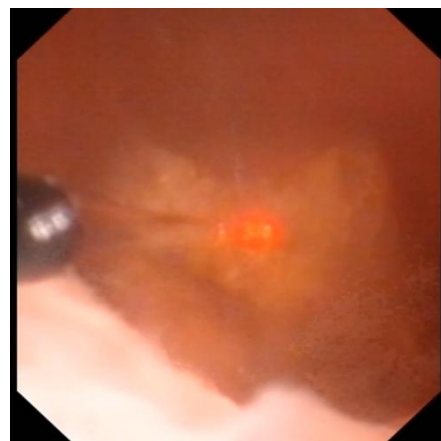


Fig.(i) Broken Stone

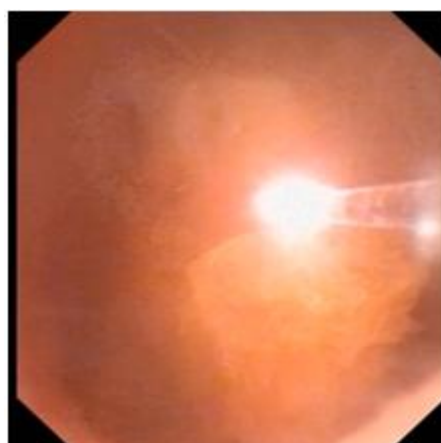


Fig. (ii) Stone lased

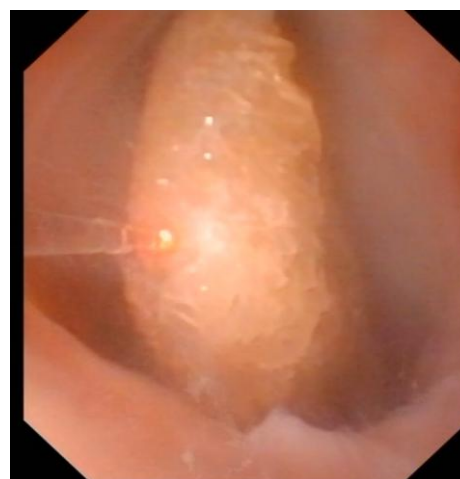


Fig.(iii) Stone Lased

Discussion

PCNL was the main alternative to treat vast upper ureteric/renal stones before the presentation of RIRS. Huffman and associates^[2] first announced the utilization of ureteroscopy to treat renal pelvic math in 1983. Grasso and associates^[3] have demonstrated the utilization of RIRS for extensive

renal stones in patients who had comorbid conditions and were not fit for PCNL. A few creators have proposed a mix of ureteroscopy with SWL as the administration option to PCNL.^[4,5]

A few procedures can be connected to improve the fracture and evacuation of expansive upper ureteric and renal math by RIRS and limit the requirement for re-look medical procedure. The real tedious move in RIRS is endeavouring to part the stone in lower or centre calyx. This can be overwhelmed by repositioning the stone in a positive upper calyx. This will assist the adaptable degree with being straight amid fragmentation process and evades strain on the avoidance instrument and the danger of laser fiber harming the extension. Creators have portrayed a technique for lessening the working time by utilizing the popcorn strategy in which every one of the pieces are placed in a solitary calyx and without cantering a specific part the laser fiber is terminated at the centre of the sections, this spares a great deal of time and breaks the stones in to measure <4 mm which is adequate to bypassed out in the urine. As far as we can tell we didn't observe to be beneficial. With the laser vaporization strategy the main part of remaining sections are extensively less,^[6,7] as contrasted and pneumatic lithotripter, in light of the fact that the laser vaporizes a large portion of the stones and the dust is washed out in the streaming saline amid the methodology. Non-stop stream weight siphon is helpful to keep the vision get all through the strategy which likewise diminishes the employable time.

Past examinations have tended to the issue of essential RIRS for kidney stones 1-2 cm size (Ave 1.25 cm).^[8] They have reflectively broke down and contrasted RIRS and PCNL. They have a without stone rate of 67% in RIRS bunch when contrasted with 87% in PCNL gathering. RIRS was done as outpatient and PCNL had an average of two days of medical clinic remain. The intricacy rate was nil in RIRS gathering while, 13% in PCNL group.

Sofer et al^[9] completed a review examination of 598 patients with upper tract calculi with mean size of 13.5mm and accomplished an overall stone free rate of 84% for renal calculi. Grasso et al.,^[3] treated renal stones 2cm or more prominent with RIRS, for patients who had comorbid conditions and in whom PCNL was not possible, and accomplished an overall stone free rate of 93% in renal and 100% in upper ureteric calculus.

In a review examination on 23 patients, chose for RIRS rather than PCNL because of Comorbidity, obesity, anatomical issues in kidney and past treatment disappointment, the general stone free rate was 74%.^[10] They stratified the areas inside the kidney with the stone free rate for lower shaft and areas other than the lower post which was 83% and 74% individually, demonstrating that the lower shaft stones had a better stone free rate. The direct determined distance across was conversely propositional to the stone free rate (10-20mm-100%, 20-30 mm-87.5%, 30-40 mm-60%, >40 mm-40%) Jason et al.,^[11] performed joined RIRS with SWL in same sitting for 14 patients who were advised PCNL and the patients were either unfit or not willing for PCNL. The mean determined stone surface area was 847 mm (Range 58 mm - 1850 mm). 14% of the patients were without stone after first sitting and generally speaking stone free rate was 77%.

Breda An et al^[12] have as of late appeared arranged second look RIRS (inside 15 days) was strong and ok for patients with substantial stone weight. In general sans stone rate was 93.3% with mean number of techniques 2.3 (2 - 4). 3 out of the 15 patients created minor complexities. Au WH et al^[13] have detailed our restricted nearby experience as of late in 8 patients. Indications included anatomical issues, fizzled ESWL and different stones. Mean stone size was 17.3mm (10 - 30) and mean number of stones was three (1 - 5). Effective result (sections <2mm) was accomplished in everything except one patient (87.5%); 5 patient underwent Day-medical procedure. A minor complication developed in one patient (post-operation fever). Akman et al

contemplated patients with renal stones 2–4 cm in size and revealed a triumph rate of 73.5% with a solitary session of RIRS^[14].

In our investigation, we have discovered a stone free rate of 82% in essential RIRS and 52% in the auxiliary RIRS. With bigger stone number and bigger stone size the stone free rate diminished. No major confusions were accounted for. Every one of the patients were discharged in 24 hrs. RIRS in the auxiliary setting was troublesome as the stones were spread out in all calyces and were hard to get to. RIRS for stone >1.5 cm has poor outcomes as contrasted and stones under 1.5cm and organized method is prudent in this setting. With the approach of littler fibreoptic extents of 7.5 Fr distance across (FLEX X2), RIRS should be possible without displaying the patients and if the entrance is troublesome patient can be stented and technique done after 2 wks. This investigation was not done in a randomized manner and did not have a control gathering. The line up for residual fragments was finished with ultrasound and X-beam KUB.

Conclusion

RIRS for renal stones with adaptable ureterorenoscopy and Holmium laser is a viable treatment alternative for ESWL stubborn renal calculi; it is particularly helpful in circumstances like patients with draining propensity or pregnancy. It has been shown that treatment of patients with substantial stone weight is practical, successful and safe and should be possible as an arranged strategy with or without displaying as an option to PCNL.

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Conflict of Interest: None declared.

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