

Results

Fifty-two patients were tested for eligibility. Seven patients were excluded because they didn't meet the inclusion criteria and the remaining 45 patients were candidates for the trial. Finally, data of 40 patients were analysed after exclusion of 5 patients who were lost during the follow up period.

1-Patients' demographic data:

The age ranged from 17-54 years with mean age 35.28 ± 10.3 and male to female ratio was 22 to 18. The BMI ranged from 19.2 to 33.4 with mean of 25.75 ± 4.16 . (**Table 1**)

2- Preoperative and stone data:

➤ Preoperative data:

The pre-operative Haemoglobin level was ranged from 11.8 to 15 with mean haemoglobin 13.01 ± 0.92 (g/dl). All patients had adequate renal function with a mean serum creatinine of 1.02 ± 0.26 (mg/dl), and a mean eGFR of 87.95 ± 23.61 . Considering the presence of pus cell in the urine analysis there was no significant pyuria and all patients received preoperative antibiotic according to the institution guidelines. (**Table 1**)

The results of pre-operative non-contrast spiral CT urinary tract was as follow; The stone side was right to left, 23 to 17 (57.5-42.5%). The stone in 36 cases was in the renal pelvis (90%), while in the other 4 cases; the stone was staggering in 2 calyces (10%). The mean stone size was 24.68 ± 2.84 mm with mean Hounsfield unit of 931.38 ± 308.92 (**Table 1**).

Operative parameters:

All the procedures were performed in prone position with 2 tracts (one in the upper calyx for counter-irrigation and the other was in the desired calyx). The method of dilatation was only by metal dilators. A total of 4 cases (10%) required regular irrigation through the nephroscope in addition to the counter irrigation. A total of 22 cases underwent both laser and pneumatic lithotripsy (55%), 10 cases underwent laser lithotripsy (25%), and the remaining 8 cases underwent pneumatic lithotripsy (20%). For stone retrieval, 6 cases (15%) required extraction forceps to get out the fragmented stone. Mean operative time was 78.8 ± 13.62 minutes and mean time required for placing upper calyceal nephrostomy was 3.76 ± 1.25 minutes within the operative time mentioned before. A double J stent was inserted with the nephrostomy tube 12 Fr in only 6 cases (15%), while all other cases were left with open tip catheter (removed after 48 hours) and nephrostomy tube 12 Fr. (**Table 2**).

Post-operative data and follow up:

The immediate overall SFR was 90%. The SFR at one month raised to 95%. Auxiliary procedures included second look PCNL in 1 case, flexible ureteroscopy in 1 case and ESWL in 2 cases. Haemoglobin deficit was 0.54 ± 0.3 (g/dl). None of our patients require blood transfusion. Post-operative pain according to (VAS score) was 3.6 ± 1.4 . The mean hospital stay was 2.7 ± 0.5 days. The overall complication rate was 4 cases (10%). The complication included fever ($> 38^{\circ}$ C) that required antipyretics in 2 cases (5%), fever ($> 38^{\circ}$ C) that required I.V antibiotics in one case (2.5%) and one case (2.5%) presented with persistent mild haematuria that improved with coagulants and excess fluid intake (**Table 3**).

Tables:

Table 1: Patient demographics and stone characteristics:

Mean \pm SD age (years)	35.28 \pm 10.30 (17–54)
No. male/female	22 (55%)/18 (45%)
BMI (Kg/m²)	25.75 \pm 4.16 (19.2–33.4)
Mean \pm SD stone size (mm)	24.7 \pm 2.9 mm (20–30)
Mean \pm SD stone density (HU)	931.3 \pm 308.9 (280-1500)
Left/right side stone	17 (42.5%)/23 (57.5%)
No. positive preoperative urine culture	None
<u>No. of medical comorbidities</u>	
➤ Hypertension	4 (10 %)
➤ Diabetes	3 (7.5 %)
➤ Spinal disc disease	1 (2.5%)
➤ Bronchial asthma	1 (2.5%)
Mean preoperative Hb level \pm SD (g/dl)	13.01 \pm 0.92 (11.8–15)
Mean preoperative e- GFR \pm SD (ml/min/1.73)	87.95 \pm 23.61 (53-130)

Table 2: Procedural characteristics:

Parameter	N = 40
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Position (Prone/Supine)	40/0
Dilatation method (Metal/Balloon)	40/0
Lithotripsy (laser/pneumatic/both)	10/8/22
Drainage (Nephrostomy + open tip) / (Nephrostomy + DJ)	34/6
Mean operative time \pm SD(Min.)	78.8 \pm 13.62
Mean time required for upper calyceal nephrostomy \pm SD(Min.)	3.76 \pm 1.25 (2-6)

Table 3: Clinical outcomes:

Parameter	N=40
Mean Hb deficit \pm SD (g/dl)	0.54 \pm 0.3
Mean post-operative serum Cr \pm SD (g/dl)	1.12 \pm 0.27
Length of hospital stay (days)	2.7 \pm 0.5
Auxiliary procedures	
- Second look PCNL	1
- Flexible Ureteroscopy (RIRS)	1
- ESWL	2
Immediate stone free rate	36/40 (90%)
Post-operative pain (VAS score)	3.6 \pm 1.4
Post-operative complications	
No reported complications	36 (90%)
Fever > 38 C, (antipyretics)	2 (5%)
Fever > 38 C, (antipyretics, I.V antibiotics)	1 (2.5%)
Bleeding, I.V fluids	1 (2.5%)
Bleeding requiring blood transfusion	0
Renal pelvis perforation	0
Hydrothorax	0
Organ injury	0
Clavien-Dindo complication grading system³⁰:	
G0	36 cases (90%)
GI	3 cases (7.5%)
GII	1 case (2.5%)