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BODY MASS INDEX; CAN BE AFFECT THE SUCCESS RATE OF FLEXIBLE URS IN THE KIDNEY STONES PATIENTS

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Keywords:

Body Mass Index, Flexible URS, Obesity, Kidney Stones.

Abstract

Objectives: Management of the kidney stones can be a challenge especially in obese patients, in this study we evaluated the results of flexible urs success rates in obese patients.

Material And Methods: Retrospective regarding of the 107 kidney stones patients who performed flexible ureteroscopy in our clinics between December 2012 with February 2016. Patients were categorised according to WHO BMI classification. Fluoroscopy time, operative time, complications that occur during the procedure were recorded. Overall stone-free rates were evaluated after the four weeks later the operation by taking the KUB or Abdomen CT. All procedures were performed under general anaesthesia using with the three different flexible ureteroscopy and Ho:Yag Laser. Except to two patient, we used access sheats in all patients. We analysed the dates with using IBM SPSS 21 software.

Result: There were no statistically significant differences in the frequency of among these groups ($p > 0.05$); when to compare the operative, fluoroscopy and hospitalisation time and stone-free rates between of groups. The overall mean stone volume was 337.2 +/- 231. 5 mm3, mean operative time was 79.6 +/- 22.6 minutes, average fluoroscopy time was 12.8+/- 17.5 second and hospitalisation time is 34 +/- 25.9 hour. Average operative time was measured (77.7 +/-20.7 min) in the obese two as the shortest one. The shortest average fluoroscopy time (8.18+/-8.83 sec) was taken in obese two group. Same statistical insignificance was attained about the hospitalisation time; the overweight group had the shortest duration (31.68 +/- 25.2 hours). Moreover, we analysed the stone free rates; respectively we got relatively high success rates in obese 1 (%75.9), obese 2 (%72.7) compare the others but it also was not statistically significant.

Conclusion: Flexible Urs is a powerful treatment modality in the kidney stone patients, irrespective of the body mass index. Based on the body weight, make predictions about the operation, fluoroscopy and hospitalisation time and stone free rates shouldn't be recommended.

Introduction

Obesity is defined as an abnormal fat accumulation in the body and so, damage to the health of persons. BMI is a measurement scale to regard to the patient according to weight and length; if it is equal or greater than 30 kg/m2 means obese. More than %10 of the adult population are obese and this rate is progressing speed highly. Overweight people's fatality rate much more compare with underweight.[1]

Renal surgery in overweights need to plan attentively because anaesthesia risk, Device Access and length, stone location, fragmentation can be a challenge. Europan Urology Guidelines recommend to smaller than 2 cm kidney Stones SWL or Flexible ureteroscopy.[2]. SWL, RIRS and miniPNL are modern techniques as used treatment of the Kidney Stones. Especially; stone to skin distance, signal attenuation and shock targeting problems on the

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Shockwave therapy of the obese patient can decrease the success rate and require additional interventions.[3]. mPNL is an acceptable method kidney stones however longer operation, fluoroscopy time and fewer complications keep a placement inferior of RIRS. [4]

To regard with these issues, Furs still is a gold treatment method for kidney stones. Our target in this research depends on the BMI; there are any changes parameters like as success rate, operation, fluoroscopy time and complications.

Materials and methods

Study Design, Settings, Selection and Evaluation

We have regarded retrospective cohort study of the 107 kidney stone patients who performed retrograde intrarenal surgery between December 2012 with February 2016 in our hospital urology clinics.And patients were divided into four different groups according to WHO BMI classification.

At the Preoperative assessment, some demographic and medical features and historical data were collected. Patients features are Gender, age, Hypertension diabetes, hyperlipidemia, renal abnormalities, previous swl treatment, endoscopic or open Stone surgery and grade of hydronephrosis were queried. Stone side, count, volume, location and Hounsfield unit were recorded.Postoperative duration; data which operative, fluoroscopy, hospitalisation time, stone free or rest and inserted pigtail stent or not were also recorded.All of these data were regarded to stratified groups.

All patients were informed about the alternative treatment modalities, the requirement of the additional session and interventions and longer antibiotic treatment duration. Questions were responded about the procedure and enlightened to them according to evidence-based medicine about the flexible urs is a certain way of the renal lithotripsy. Patients assigned to two informed consent form one copy was delivered to patient another one was left at the hospital.

Patients were divided four different group according to WHO BMI Classification(<25kg/m2; normal weight, 25-30 kg/m2; overweight, 30-35; obese one, >35 kg/m2; obese two). All analysis were done as a view of these groups. Stone-free status was regarded by KUB or CT 4 weeks later after the operation and smaller than 4mm fragments were accepted Clinical insignificance rest fragment as called stone free. And operative, fluoroscopy, hospitalisation time and complications were also recorded according to Clavien-Dindo classification.

Procedures

All procedures were performed under general anaesthesia with the three different flexible ureteroscopy. After the placement of double 0.035-inch polytetrafluoroethylene-coated guidewire, Ureteral Access sheat (9,5/11,5 Fr) was inserted over one of the guidewires with the C-arm fluoroscopy device. Unless the Access sheath insertion were accomplished, the double-j stent was put the pelvicalyceal system then the operation was delayed the next session two or three weeks later.

Preoperative CT image was sought with all details and calyceal anatomy and stone location was discussed with the operations team. After the stone had been found, fragmentation was done with Ho: Yag laser (273 µm fibers) until the stone diameter was smaller than 4 mm. At the end of the operation 4.8/6, Fr Double J stent was inserted.

Statistical Analysis

Variables distribution was regarded as the Kolmogorov-Smirnov test (p <0,05) and it was not normal so; Quantitive variables was conducted using the Mann- Whitney U test. Qualitative data were analysed with the Chi-square test or Fisher Exact test in the SPSS 21 Software. A P value <0.05 was accepted as significant.

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Results

Totally 107 patient was regarded as a retrospective cohort study 66 of them was men and the mean age was 43.2± 13,9 years. Patients were stratified according to WHO BMI Classifications; Groups distribution were as a NW:41(%38,3) OW:26(%24,3) O1:29(%27,1) O2:11(%10,3) patient.Then, patients were grouped demographic features and previous medical history (systemic disease, preoperative double j stent and preoperative SWL treatment). There was no significant difference between the four groups on the evaluation of the medical history and previous treatments. (Table I.)

Complications related with the procedure was uncommon.Four patients in NW and two patients in O1 group took antibiotic treatment for septic findings (fever, chill, nausea, vomiting, fatigue and high acute phase reactant). And one patient in both of the OW, O1 group; the pelvicalyceal system was injured, contrast extravasate from collecting system, therefore; percutaneous nephrostomy tube was inserted to them. There was also no significant correlations complications rate with the BMI.

The overall mean stone volume was 337.2± 231.5 mm3, mean operative time was 79.6± 22.6 minutes, average fluoroscopy time was 12.8± 17.5 second and hospitalisation time is 34± 25.9 hours. There were no statistically significant differences in the frequency of among these groups about the evaluated parameters ($p > 0.05$). Average operative time was measured (77.7± 20.7 min) in the obese two as the shortest one. The shortest average fluoroscopy time (8.18± 8.83 sec) was taken in obese two group. Same statistical insignificance was attained about the hospitalisation time; the overweight group had the shortest duration (31.68± 25.2 hours). Moreover, we analysed the stone free rates; regarded in a two different heading; primary analysis perioperative stone status was monitored by the C-arm fluoroscopy device. Secondary analysis was controlled by KUB or CT at the end of the first month. NW groups SFR is significantly lower compared with the others in our primary analysis. In our secondary analysis; we got relatively high success rates in obese 1 (%75.9), Obese 2 (%72.7) compare the others, but it also was not statistically significant. To check against among of these different endpoints was undergone with paired qualitative non-parametric test (Kappa or Mc Nemar) and there is no difference between of the group's over the stone clearance when compared perioperative and first-month SFR.(p-value,802). (Table 2.)

Additional interventions require the treatment of the rest calculi after a one-month watchful waiting period. The vast majority of these stones; SWL treatment performed and resistant to shock wave stones flexible urs was planned.

Discussion

Overweight cases always can be a challenge for the surgeons on all steps of the procedure. The physician must be attentive and wise for the obese patients who especially require a recurrent operation such as lithotripsy. High kidney stone prevalence rate is well-known that with obesity. Increased fat accumulation, Diabetes, Hypertension and Hyperlipidemia as called Metabolic syndrome patients prone to kidney Stones formation; because of the malabsorption, lower urinary ph and high excretion of lithogenic substances. [5]

Management of the Kidney Stones have undergone different forms invasive or non-invasive and effective treatment since ever. Guidelines recommend SWL and RIRS or PNL as an invasive method for Kidney Stones. Particularly smaller than 2 cm calculi; SWL can take over the other procedures.[2] Ackermann et al. [6] stone size, number, location, and BMI were significant factors for the success of theSWL treatment on the obsolete studies. Skin-to-stone distance, lower penetration depth and focusing problems were determined independent factors for SWL fail obese patients.[7] However; new generation shock devices overcome these limitations. Hatiboglu et al.[8] reported a BMI, skin to stone distance and stone location aren't effective parameters over the success rate of SWL; only Stone size and presence of ureteral stent affect the treatment outcomes.

PNL is treatment modality which has higher stone-free rate, shorter treatment time and reduced symptomatic urinary infections of the kidney Stones.[9, 10].However; disadvantages of the PNL are longer hospitalisation time, operation time and complications such as haemorrhage that require blood transfusion and unrepairable renal injury.[11]At this point; Mishra et al..[12] presented that miniperc has higher stone-free rate and similar safety profile but shorter hospitalisation time and less bleeding are a superior way to conventional PNl. MiniPNL is

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preferable treatment way for small kidney Stones but; shorter fluoroscopy time and hospitalisation times and hemodynamic stability make the Furs more favourable. Another superior way of the Furs in especially obese patients; increased subcutaneous adipose tissue reduced the success of the procedure caused by the calibration and length of devices such as the nephroscope and amplatz sheath. [13]

Advances in the endourological area, new flexible and small calibre devices were developed and similar success rate can achieve with lower comorbidity and complications percentages.[14] Some complications can occur related on RIRS for instances ureteral injury, access problems, urinoma, stone migrations, sepsis. These complications prevalence similar in the Obese, OW and NW group.[15, 16] The Clavien system was used to classify complications. In our series; four patient in NW group, two patient in O1 group Clavien-Dindo Grade 2 complications which require longer hospitalisation and antibiotics treatment were observed. One patient in OW and one patient in O1 group grade3a complication that need to insert a percutaneous nephrostomy tube was seen. These complications frequency similar between of the groups like the literature. Caskurlu et al.[17] reported that only minor complications that grade one and two occurred in their study. Blood transfusions are not performed at the any of the patients. Similar complications rate was observed between of them.

BMI effect over the flexible urs success is studied previously published articles. Alkan et al. [18] studied that overall SFR is similar in all groups which divided four groups(%81, 87, 87.4, 85) according to BMI. In a study by Doizi et al.[19] 327 patients stratified to BMI obese, subgroup morbidly obese and NW.And overall success rate that controlled by CT at the end of the third month was similar %67.4, 68 in the NW and OP and it was only effected by Stone size. In our study stone free rate was regarded with CT or KUB a month later procedure respectively %61, 61.5, 75.9, 72.7 in an NW, OW, O1, O2 groups. There were no statistically significant differences among these patient groups.

Previously published studies mentioned that there were no statistical differences in operative findings such as operative time, fluoroscopy time, hospitalisation time divided BMI groups.Sari et al. [20]Have reported that mean operative time, fluoroscopy and hospitalisation time similar range between of the groups(p=0.523, 0.204, 0.527).Doizi et al. [19]studied that mean operative time operative times depend on the stone size but according to BMI outcomes were similar in NW, OP, MOP. Among our study groups, we didn't find the significant differences in outcomes of flexible urs stratified groups by BMI.

Our study has strengths and limitations. We calculated the stone volume and showed the distribution of Stones according to size was normal. Retrospective types of research, analysis of the outcomes after the secondary intervention, low patients volume are the restrictions of our study. At this point; it is clearly obvious that requirement of further investigation which prospective randomised control trial with high patient volume, long follow-up term and outcomes secondary and tertiary procedures.

Conclusion

Flexible Urs is a powerful treatment modality in the kidney stone patients, irrespective of the body mass index. Operative, fluoroscopy and hospitalisation time and stone-free rates were not significantly affected by BMI scale. As a conclusion; Flexible ureteroscopy can be performed safely and effectively in obese and morbidly obese patients.

Conflict Of Interest

None of the authors have financial support.

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Table1. Demographic features of the patients on the BMI groups

Groups	Normal weight	Overweight	Obese one	Obese two	P value
Patient	41(%38,3)	26(%24,3)	29(%27,1)	11(%10,3)	
Age(years)[m]	38,3±11,8	44,1±15,3	50,5±12,2	40,2±15,5	,507 [A]
Gender (F/M)	16/25	4/22	15/14	6/5	,026
Hypertension	4	8	6	5	,243
Diabetes	4	4	5	4	,148
Hyperlipidemia	1	3	4	3	,057
Stone Side (R/L)	20/21	12/14	15/14	8/3	,493
Preop Double J	7	10	12	4	,111
Preop ESWL	14	12	9	5	,627

[m] Mean / [A] ANOVA (TUKEY) Test

Table 2. Outcomes of the procedures based on the BMI groups

Groups	Normal weight	Overweight	Obese one	Obese two	P value
Stone volume(mm3)[m]	338,60± 268,8	322,39± 180,2	366,60± 206,1	290,05± 270,6	,407 [K]
Hounsfield Unit (HU)[m]	1142,7 ± 363,1	1079,2±327	946± 400	927,5± 340,5	,130 [K]
Stone Location					,213
Pelvis	7	9	11	6	
Upper Pole	6	2	1	1	
Middle Pole	13	4	6	1	
Lower Pole	17	14	14	3	
Proximal Ureter	1			1	
Flouroscopy time(sec)[m]	15,93± 23,9	9,48± 8,4	13,18± 14,7	8,18± 8,8	,420 [K]
Hospitalization time(hour)[m]	35,04± 29,7	31,68± 25,2	33,12± 19,6	37,20± 29	,949 [K]
Operation time(min)[m]	78,05± 19	80,58± 25,3	81,90± 26	77,73± 20,7	,956 [K]
Complications(Clavien Dindo)					,516
Grade 2	4		2		
Grade 3a		1	1		
Grade 3b					
Perioperative Stone status(Stone-free)	14(%34,1)	14(%53,8)	18(%62,1)	8(%72,7)	,041
Stone Free Rate	25 (%61)	16 (%61,5)	22 (%75,9)	8 (%72,7)	,537

m Mean / [K] Kruskal Wallis Test