

ORIGINAL RESEARCH

Re-admission Rate of Patients with Ureteral Stone: A Descriptive Study

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Abstract: **Introduction:** Patients with acute renal colic need to choose between undergoing medical treatments and receiving interventions. The Aim of this study is to evaluate the outcomes of patients who are discharged from emergency departments with ureteral stones lesser than 6 millimeters. In doing so, the effect of diagnostic treatment approaches on clinical outcomes and referral rate is to be assessed. **Methods:** This study was performed on patients with ureteral stones referred to emergency department of Shohadaye Tajrish Hospital between May 2015 to June 2018. A checklist was filled out for each patient and it included their complete medical history, physical examination results and paraclinical data. Patients were then studied for 4 weeks to determine referral times to hospital and clinical outcomes. **Results:** 105 patients include 81 men (77.14%) with average age of 37.1 ± 12.4 years were studied. The mean stone diameter was 4.2 ± 2.1 mm. Most of ureteral stones were seen in the right-hand side (60 percent). 71 patients (67.6%) did not have any history of nephrolithiasis and 73 (69.5%) did not have positive family history for nephrolithiasis. Ureteral stones were still observed in 42 patients (40%) after two weeks of studies and only one patient (1.1%) had stone in Ultrasound Imaging after 4 weeks of observations. **Conclusion:** Most Patients (95%) with stones smaller than 6 mm responded to Medical Expulsive Therapy (MET) after 4 weeks and passed spontaneously ureteral calculi.

Keywords: Ureteral Stone, Re-admission Rate, Medical Exclusive Therapy, Emergency room

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1. Introduction

Nephrolithiasis is a common and increasing problem worldwide. Kidney stone is the third most prevalent disease of urinary tract and its occurrence is growing progressively over the past decades (1-3). The frequency of this condition is different in various regions. It is reported in 1-5% of Asia, 5-9% of Europe, and 3% of Northern America. The rate of growing urinary stone in normal populations is estimated to be 0.5% per year in United States and Europe (4).

Routine assessments in renal stone are often performed by Ultrasonography. Computed Tomography (CT) scans with low dose are the best choice in acute phase or when intervention is needed (5, 6). Exact determination of maximum stone size is very important in the clinical management for the treatment of renal stones (5, 7). Throughout the current decade, great advancements have been made in a number of methods and technologies. This includes minimally invasive treatment (8-10) and now, therapeutic options are included in Extracorporeal Shock Wave Lithotripsy (ESWL) (8, 11), Percutaneous Nephrolithotomy (PCNL) (7, 12, 13), retrograde intra renal surgery (RIRS) by laser (14), ureteroscopic lithotripsy, and stone disposal with Medical Exclusive Therapy (MET) (7). Patients with acute renal colic need to choose

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between undergoing medical treatments and receiving interventions. Stone size is the key determining factor in this decision making (5). In regards to the potential risks associated with this, it is not recommended to continue this conservative approach for more than 6 weeks (15). In most cases encountered in the emergency department, pain is managed by pain killers and patients are discharged with good general condition in a short period of time, with the therapeutic support process set in place. On the other hand, in some cases, patients need more hospitalization and receive more protective treatment (8).

According to the importance of renal stone management, the aim of this study is to evaluate the outcomes of patients discharged from emergency department with ureteral stones lesser than 6 millimeters. In doing so, the effect of diagnostic treatment approaches on clinical outcomes and referral rate is to be assessed.

2. Methods

2.1. Study Population

This study was a prospective cohort work, which was performed on patients with ureteral stones referred to emergency department of Shohada-E-Tajrish hospital between May 2015 to June 2018. Furthermore, patients with renal abnormality, ureteral stone more than 6 mm, fever, history of renal failure (serum creatinine ≥ 3 mg/dL), history of ureteral obstruction, single kidney, and positive urinary culture, as well as pregnant women were excluded from this study.

2.2. Study Design

A checklist was filled out for each patient and it included their complete medical history and physical examinations. In another checklist, a senior resident completed clinical variables such as the site and diameter of ureter stone (according to sonographic and CT scan findings), pain score, presence or absence of hydronephrosis, hematologic tests, urine-analysis, duration of pain, times of referral to emergency department until stone passage. After recording primary data, patients were studied for 4 weeks to determine the times of their referral to the hospital and their clinical outcomes. During the four weeks of study, seven patients with ureteral stone and unrelieved pain who needed surgery were excluded. All of the patient underwent Medical Expulsive Therapy (MET) which included alpha-blockers and corticosteroids. According to clinical and diagnostic findings, stone passage time and treatment trend was investigated, and the best treatment was applied to reduce patients' pain and anxiety. If indicated as relevant, surgery or lithotripsy was evaluated and applied.

2.3. Ethical Considerations

The researchers and the personnel involved in this study carried out all processes based on the considerations and standards of the ethical committee of Shahid Beheshti University of Medical Sciences. Written informed consent was obtained from all patients after explaining the risks, options and benefits of the method as well as the whole study.

2.4. Statistical Analysis

We used SPSS software version 19.0 for data analysis in all steps. Quantitative data were expressed as mean values and standard deviation and qualitative variables as frequency and percentage. P value lesser than 0.05 was considered as significant.

3. Results

As mentioned above, 105 patients including 81 men (77.14%) were present in this study. 90 patients (85.7%) were located in Tehran. The mean age of participants was 37.1 ± 12.4 years. Most of ureteral stones were seen in the right-hand side (60 percent). Lastly, other demographic data are listed in Table 1. Amongst all the participants, 71 patients (67.6%) did not have any history of nephrolithiasis and 73 (69.5%) did not have positive family history for nephrolithiasis. Furthermore, 8 patients (7.6%) had fever at referral time. Presence of nausea, vomiting, frequency, dysuria, and urinary retention was studied and regarded as associated symptoms. As indicated throughout the study, most of the patients (32 patients, 30.5%) did not have any associated symptoms. After that, nausea and vomiting together had more prevalence. Pain scores were evaluated using the Numeric Rating Scale (NRS) method and patients scored their pain from one (least pain) to 10 (most severe pain). Pain in 100 patients (95.2%) was 10, in 1 patient (1.1%) was 6, in 2 patients (1.9%) was 5, and in 2 patients (1.9%) was 3. Throughout the study, 2 patients (1.9%) had their pain controlled by using only ketorolac, 4 patients (3.8%) by only receiving morphine, and for 99 patients (94.3%) through the prescription of both ketorolac and morphine. In the first two weeks, ureteral stone was still observed in the sonography of 42 patients (40%). However, after 4 weeks of studies, only one patient (1/1%) has their stone present.

4. Discussion

Kidney and ureteral stones are still some of the most common urological problems around the world. (16, 17) These conditions not only can cause severe pain in patients, but also may lead to significant financial loss due to patients' inability to work as well as the high costs of their hospitalization and the treatment of this condition. (18, 19) Accord-

Table 1: Demographic and clinical characteristics of patients

Characteristics	
Age, mean ± SD	37.1±12.4
BMI, mean ± SD	25.7±3.6
Stone laterality, No. (%)	
Right	65(60)
Left	38(36.1)
Bilateral	2(1.9)
stone diameter, mm, mean ± SD	4.2±2.1
Stone location, No. (%)	
Upper	11(10.4%)
Middle	56(53.3%)
Lower	41(39%)
Mild	48(45.7%)
Moderate	15(14.3%)
Sever	3(2.9%)
Cr, mean ± SD	1.1±0.3
GFR	
60-89, n (%)	3(2.9%)
30-45, n(%)	91(86.7%)
15-29, n (%)	10(9.5%)
<15, n (%)	1(1.1%)
U/A	
WBC>105, n (%)	10(9.5%)
RBC>104, n (%)	15(14.3%)
WBC>105+ RBC>104, n (%)	30(28.3)
Abnormal urine PH	50(47.6)

ing to the finding of this study, in patients with stones less than 6 millimeter in size, if there is no active indication of stone removal, observation with periodic evaluations is an optional treatment. These patients may be managed to facilitate stone removal within the period during which they are being observed. (20) Monitoring the diagnostic treatment system of health centers and hospitals, besides assessing the success and failure rate by examining the secondary complications as well as the frequency of patients' referral to the emergency departments, help to improve the overall effectiveness of therapy. (21) In doing that, with reduced cost of treatment, the satisfaction rate amongst the patients will increase (22). Hence, this study was designed to evaluate patients with urinary tract stones and the outcome of their treatments. In addition to the impact of the study design on the demographic characteristics of the population, many environmental factors lead to differences between the statistical communities of the various studies. (23) For example, the impact of patients' gender as well as their location, lifestyle, nutrition, etc., affects the distribution of gender and age of the statistical community. (24) In several articles, it has been mentioned that the incidence of kidney and ureteral stones in male patients and those who are diagnosed with obesity with high BMI is more than females and those with average BMI. (25) As far as this study is concerned, the prevalence of male patients is more than that of females, and the

mean BMI of patients is above the normal level. Some studies revealed that obesity, diabetes, hypertension, atherosclerosis, and chronic kidney disease (CKD) may increase the risk of urinary tract stones. (26) In the previous study, however, 87.6% of patients did not mention any history of disorders which they may have experienced. In saying that, due to the multifactorial nature of the occurrence of diseases in the science of medicine, especially urinary stones (27), our finding cannot be considered as contradictory to the previous studies. In the present study, stones located in middle third of the ureter were more frequent and the upper third of the ureter were less prevalent. (28) According to Moosanejad et al. (25) the highest prevalence of stones was in the middle calyx and the least prevalence was in the upper urethra. In this paper, the location of the least prevalence was consistent with that of Moosanejad's finding. More prevalence of calyx stones in the study of Moosanejad was due to various factors involving the characteristics of the statistical society and the difference in the number of patients studied, and it is acceptable. In 43 patients (41%) the diameter of the stone was less than 3 mm, and in 44 patients (41.9%), the diameter of the stone was greater than 3 mm. In contrast to this investigation, other studies did not use the cut off value to report the size of the stone, but instead, reported the mean size value. In addition, most articles are based on the evaluation of various therapeutic methods and invasive devices, so the reported average size of the stones is higher than that of this study. For example, in Fayed et al., (16) average stone size was reported to be 1.44 cm in patients or in the study of Moosanejad (11) this variable was 3.99 cm. According to the findings of the CT scans of the patients, most of them had mild hydronephrosis. However, ultrasonography results recommended that most of the patients did not have hydronephrosis. This is largely due to the value of CT Scan in comparison with ultrasonography. In this investigation, the average level of Creatinine (Cr) was 1.18, the mean uric acid level was 5.8, the mean urea level was 19.83, the mean calcium level was 9.37, the mean phosphorus level was 3.6, and the average level of hemoglobin was 14.39. Considering the epidemiological and the cross-sectional nature of the study without any intervention, the laboratory findings were measured once and were part of the characteristics of the study population. In other studies, there are often two methods of treatment and intervention in patients with renal stones, and there are not any studies which investigate laboratory findings. Ultimately, to put the key findings of this project in one place, it can be said that the majority of patients with ureter stones are male and their BMI is higher than normal. A positive personal or family history of renal stone is very important in the formation of stone and the creation of this condition. The existence of disorders like diabetes mellitus and hypertension can increase the chances of urinary stones' forma-



tion. Pain and fever are common symptoms of this disorder, and the most common associations are nausea and vomiting. Morphine plays a significant role to control pain and nausea in patients and is more effective and useful than other substance. In 95% of the cases, patients with stones less than 6 mm in size were relieved of their condition after 4 weeks of studies and relevant treatments.

5. Conclusion

In conclusion, it can be proposed that most of the patients with urolithiasis are male and their BMI levels are higher than those of normal individuals. The presence of diseases such as diabetes mellitus and hypertension can lead to higher rates of stone formation. Furthermore, experiencing pain is a common symptom of this disorder, and the most common complications are nausea and vomiting. It can also be suggested that the prescription of Morphine is an effective way to control pain and nausea in patients who experience this condition. Most Patients with stones smaller than 6 mm would respond to MET for a duration of 4 weeks and pass spontaneously ureteral calculi.

6. Limitations

It is recommended for other cohort studies to be carried out with a larger number of patients in order to further investigate this condition and henceforth confirm our results.

7. Appendix

7.1. Acknowledgements

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7.2. Author contribution

All authors have the same Contribution.

7.3. Funding/Support

All authors declare that this study was accomplished without any funding or support.

7.4. Conflict of interest

This investigation has no conflict of interest to declare by any author.

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