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Status of SWL Indicated Patients with Urolithiasis during the Era of SARS-Cov-2 Pandemia

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Abstract | **Original Research Article**

Purpose*:** It was aimed to investigate the effects of the SARS-CoV-2 pandemic period on SWL indicated patients with urolithiasis. ***Method: Medical records of SWL indicated patients with urolithiasis were obtained before and after the SARS-CoV-2 outbreak, covering the period between January 2019 and December 2021. The study was divided into two time periods as the pre-lockdown and the post-lockdown periods due to quarantine curfew. The data regarding the patient and stone characteristics were obtained from the records and compared between the time periods. ***Results***: A sum of 286 patients who underwent SWL treatment due to urolithiasis between January 2019 and December 2021 were included into the study. 45% of these patients were treated with SWL in pre-lockdown period and 55% were treated with SWL in post-lockdown period. The mean size of SWL indicated stones were 10.84 ± 4.82mm. While the pre-lockdown mean size was 9.76 ± 4.31mm, the post-lockdown mean size was 11.71 ± 5.04mm (p=0.001) and there was a tendency to increase in stone size after the lockdown. A tendency to increase in stone firmness and radiodensity was observed after the lockdown. While there were recurrent stones in 43% of pre-lockdown patients, new stone formation occurred in 19% of post-lockdown patients that this finding might be interpreted as an increase in stone count. ***Conclusion***: According to these results, the stone characteristics of SWL indicated patients are directly affected as a result of lockdown due to the SARS-CoV-2 pandemic.

Keywords: SARS-CoV-2, COVID-19, SWL, urolithiasis.

INTRODUCTION

The SARS-CoV-2 pandemia, also known as COVID-19 pandemic is an entity that affects every aspect of daily life. SARS-CoV-2 first appeared in Wuhan, China in 2019, and on December 31, 2019, the World Health Organization (WHO) stated that it as a respiratory disease whose source could not be determined [1]. It was named as a pandemic on March 11, 2020 [2]. SARS-CoV-2, which progressed rapidly and caused an epidemic, required countries to take some precautions. Some of these are the obligation to wear masks, the closure of places such as restaurants, cafes, entertainment venues in environments with high human density, and the 3-month quarantine process. Quarantine, which lasted for 3 months, affected people's economic conditions, eating habits, degree of mobilization and sports life [3]. Normally, when stone patients apply to the physician as soon as stone symptoms occur, while there are no restrictions before the pandemic; size and location of the stone, follow-up according to the symptoms of the patient, medical expulsive therapy, shock wave lithotripsy (SWL), ureterorenoscopy (URS), retrograde intrarenal surgery (RIRS) and percutaneous nephrolithotomy (PCNL) etc. treatment options are considered [4]. For kidney stones with a stone size bigger than 2 cm where surgical intervention is considered, the first option is PCNL, and the second option is RIRS or SWL. If the kidney stone is smaller than 2 cm, the first choice is RIRS or SWL, but if it is a lower pole stone, RIRS should be considered [5, 7]. If it is bigger than 1 cm in proximal or distal ureteral stones, URS/RIRS is in the foreground. If the ureteral stone is lower than 1 cm, SWL or URS/RIRS may be preferred depending on the location of the stone [5]. It should be noted that there may be differences in the surgeon's approach according to previous surgeries, stone analysis, anatomical variations, degree of obesity, bleeding diathesis [8, 9]. Parameters such as stone size, composition and hardness of the patients referred to SWL treatment; in parameters such as stone size, composition and hardness of patients who

could not leave the house after the outbreak of the COVID-19 pandemic, were afraid to leave, had to change their lifestyle and delayed their treatment [10]. Demonstrating these changes concretely is the main reason for our study.

METHODS

Medical records of SWL indicated patients with urolithiasis were obtained before and after the SARS-CoV-2 outbreak, covering the period between January 2019 and December 2021. The study was divided into two time periods as the pre- lockdown and the post-lockdown periods due to quarantine curfew. The period between March 2020 and June 2020 was accepted as the lockdown period of Istanbul. The data regarding the patient and stone characteristics were obtained from the records and compared between the time periods. The exclusion criteria were that the SWL procedure was started in the pre-pandemic period, but patients whose next sessions were delayed due to quarantine were excluded from the study. The parameters of SWL patients such as stone size, composition and hardness before the pandemic; the main purpose of our study is to compare the changes in parameters such as stone size, composition and hardness due to being unable to leave the house and delay after the pandemic. The secondary aim of our study is to determine the rate of benefit from ESWL in the aforementioned cases before and after the pandemic. Research data evaluated with Mode-Median-Standard Deviation-Mean and similar basic statistical methods. Descriptive statistics will be presented as mean ± standard deviation, frequency distribution, and percentage. Pearson Chi-Square test, Fisher's exact chi-square test, Mann Whitney U test and Binary logistic regression tests were used as statistical methods and appropriate correlation analyses between parameters calculated. A p value of <0.05 was determined as the limit of significance. This study was approved by the Health Sciences University Istanbul Health Practice and Research Center, Clinical Research and Ethics Committee.

RESULTS

A sum of 286 patients who underwent SWL treatment due to urolithiasis between January 2019 and December 2021 were included into the study. 45% of these patients were treated with SWL in pre-lockdown period and 55% were treated with SWL in post-lockdown period (Table). The SWL visit frequency was not different in terms of distribution between the groups, and it was statistically insignificant (p=1.01). 72% of patients were male, 28% were female. Gender distribution was found to be equal in terms of periodicity. Mean age of patients was 47.64 ±13.18 (p=0.001). In terms of gender, the mean age of men was 46.94 ± 12.70, and the mean age of women was 52 ± 13.47. Women tended to be older at pre- and post-lockdown periods. Mean creatinine value of the patients was 0.91 ± 0.38. Interestingly, the creatinine value of the patients was lower in the pre-lockdown period and higher in the post-lockdown period (0.85 ± 0.21 vs. 0.96 ±0.47, p=0.022). The mean size of SWL indicated stones were 10.84 ± 4.82mm. While the pre-lockdown mean size was 9.76 ± 4.31mm, the post-lockdown mean size was 11.71 ± 5.04mm (p=0.001) and there was a tendency to increase in stone size after the lockdown. Of the stones treated with SWL, 34% were in the ureter and 66% were in the kidney. No difference was observed in stone position in terms of periodicity. The mean Hounsfield unit value of the stones was 1081.5 ± 309.1, the pre-lockdown value was 1020 ± 320.4 and the post-lockdown value was 1131.5 ± 291 (p=0.04). A tendency to increase in stone firmness and radiodensity was observed after the lockdown. In the condition where p=0.001 was accepted as significant, 57% of the pre-lockdown patients had solitary calculus, while 81% of the post-lockdown patients had solitary calculus. While there were recurrent stones in 43% of pre-lockdown patients, new stone formation occurred in 19% of post-lockdown patients that this finding might be interpreted as an increase in stone count.

Table 1: Characteristics of patients before and after quarantine

	Before Quarantine	After Quarantine	p value
Number Of Patients	%45(129)	%55(157)	p=1.01
HU	1020±320	1031,5 ±291	p=0.04
Multiple Stone	43%	19%	p=0.001
Stone Size	9,76±6,31mm	11,71±5,04mm	p=0.001
Creatinine	0,85±0,21 ng/dl	0,96±0,47 ng/dl	p=0.022
p < 0.05 represented that the difference was statistically significant; HU: Hounsfield units			

DISCUSSION

The COVID-19 pandemic has caused more than 6 million deaths and unpredictable morbidities worldwide. Measures were tried to be taken by the policies and health systems of the countries, but due to the rapid transmission rates, the late inception of the vaccination processes, the inability to reach the desired level of vaccination rates and the genomic variations, the pandemic was controlled too late. Depending on the factors such as the fear of catching the disease and the fear of death caused by this process on the patients, the rate of admission to the hospital of the patients with symptomatic urinary stones decreased [11- 13]. Those with urinary stone disease preferred oral analgesics instead of intravenous analgesics when applying to the emergency department in order to reduce the time spent in the hospital during or after the quarantine period.

Patients who needed catheterization due to obstruction-related hydronephrosis, renal colic, high creatinine values, and infections preferred stents that can be inserted in a short time under local anesthesia or nephrostomy [10- 14]. It was observed that the planned process for the stone after catheterization was disrupted in general. The reason for this is the prolonged infection attacks, the decrease in the number of operations in hospitals during the quarantine period, the use of beds in intensive care units and clinics for pandemic patients, and the delay in the follow-up of patients who want to minimize the time spent in the hospital, who cannot leave the house, who are afraid to leave, who have to change their lifestyles and who delay their treatment. When the data of SWL patients were examined, it was observed that the stone sizes increased, the new stone formation process accelerated, and the HU values of the stone increased. This increased stone hardness and increased stone mass decreased the success of SWL. Although not included in the study, when the data of the patients were examined, it was observed that endoscopic procedures such as URS/RIRS increased due to SWL failure after quarantine. Since the effect of the pandemic continued in the post- quarantine period, patients preferred endoscopic procedures, which we accept as minimally invasive surgery, by moving away from SWL, which has fewer complications but covers a longer period [14].

During this 3-month quarantine period and the following pandemic period, people's social lives, eating habits have changed, their immobilization period has been prolonged, and their metabolic activities have changed [15- 17]. In this period, especially the rates of cigarette and alcohol consumption increased, consumption of red meat and processed meat products, consumption of fast-food, sweets consumption has increased [16, 18]. In a systemic review, smoking was associated with stone formation, while the relationship between alcohol and physical activity and stone formation was clarified [19]. Normally, it is recommended to consume plenty of fluids, consume less salt and animal proteins, increase the consumption of vegetables and fruits containing fiber, and increase the consumption of milk and dairy products (foods containing calcium) to reduce stone formation [20]. Increased eating activity, irregular and unhealthy diet may have affected the size, number and hardness of the stone.

The point we consider as the missing part of the study is the stone analysis we had before the quarantine. Stone analysis was performed as much as possible in urinary stone patients who were treated in the urology clinic. However, due to the lack of personnel during and after the quarantine period, the patients did not bring their existing stones for analysis, and they did not follow this process, stone analyzes could not be performed and the data remained incomplete. During the pandemic process, a clear assessment could not be made of the incidence and characteristics of stone types.

CONCLUSION

According to these results, the reason for SWL failure in the post-quarantine period varies significantly due to multifactorial causes. The stone characteristics of SWL indicated patients are directly affected by the outcome of the curfew due to the SARS-CoV-2 pandemic.

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Author Contribution

Research conception and design: Hikmet Köseoğlu. Data acquisition: Tolga Eroğlu, Tural Miriyev. Data analysis and interpretation: Hikmet Köseoğlu. Drafting of the manuscript: all authors. Critical revision of the manuscript: Hikmet Köseoğlu. Supervision: Hikmet Köseoğlu. Approval of the final manuscript: all authors.

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