

ORIGINAL ARTICLE

Spontaneous Expulsion of Lower Ureteric Stones in Patients with Elevated Level of C-Reactive ProteinHARIS HAMID¹, ISRAR ALI², RAFI ULLAH³, AKHTAR GHANI⁴, ZUBAIDA KHANUM KLAZIR⁵, SIBGHAT ULLAH⁶, MUHAMMAD IJAZ KHAN⁷¹Associate professor of urology, Bannu medical college²Assistant professor of urology, Bannu Medical College³Assistant Professor of General Surgery, Bannu Medical College⁴Assistant Professor of general surgery, Bannu Medical College⁵Associate professor of Gynaecology, Bannu Medical College⁶Assistant Professor of Anesthesia, Bannu Medical College⁷House officer, Bannu Medical CollegeCorresponding author: Israr Ali, Email: isrardrkhan@gmail.com**ABSTRACT****Background:** Around 4–15% of people worldwide have urolithiasis, and ureteric stones account for around 20% of this condition. One of the most frequent situations a urologist has to deal with is acute renal colic caused by urolithiasis.**Objective:** To determine the spontaneous expulsion of lower ureteric stones in patients with elevated level of c-reactive protein
Methodology: This descriptive cross sectional study was performed at the urology department Khalifa Gul Nawaz Teaching Hospital, Bannu Medical College Bannu for a period of six months from January 2022 to June 2022. A total of 210 patients were included in the study using non probability consecutive sampling. All patients had lower ureteric stone and raised CRP. Patients were followed till spontaneous expulsion or stone clearance. Data was analyzed using IBM SPSS version 23.**Results:** A total of 210 patients were enrolled in this study. There were 112(53.33%) were female and 98(46.67%) were male. Patients included in the study had age range from 18- 60yr, mean age was 34.32±7.92 SD. Patients selected in the study had lower ureteric stones ranging from 5-9mm. mean stone size was 6.990 mm ±0.92 SD. Mean CRP was 3.36 mg/dl ±1.99 SD. 50 (31.25%) patients with CRP 0.5-4.9mg/dl passed stones spontaneously while 45 (90%) patients with CRP 5-9.9 mg/dl passed stone spontaneously.**Conclusion:** Serum CRP is a relatively newer marker now increasingly being used for the purpose of predicting spontaneous stone expulsion of small lower ureteric stones. However current evidence still does not support CRP levels alone to be recommended for this purpose. Clinical assessment of every individual patient is still the mainstay of decision for intervention.**Keywords:** Spontaneous expulsion; lower ureteric stones; c-reactive protein**INTRODUCTION**

Around 4–15% of people worldwide have urolithiasis, and ureteric stones account for around 20% of this condition ¹. One of the most frequent situations a urologist has to deal with is acute renal colic caused by urolithiasis ². The procedure is often treated with ureteroscopy and shock wave lithotripsy. These treatments are neither cheap nor without risks ³. However, multiple studies have demonstrated that spontaneous stone expulsion rates for smaller lower ureteric stones are about 98% ⁴⁻⁶. However, choosing conservative treatment in every situation is not always a good idea since it might lead to sepsis and compromise renal function ⁷⁻⁹. Medical expulsive treatment involves employing medications like tamsulosin to encourage naturally occurring stone evacuation ^{10,11}.

Stone size is one of the most important factor which could predict stone passage ¹². The incidence of spontaneous passage of distal ureteric stones 5mm or smaller can reach up to 71-98% in contrast to only 25-51% for larger stones ¹³. Other factors studied for prediction of spontaneous stone passage include significant pyuria, duration of pain, stone surface irregularity, and degree of obstruction ¹⁴.

C-reactive protein (CRP) is an acute-phase protein, released into the bloodstream in response to inflammation. It is synthesized in the liver and activates complement system after binding with phosphocholine receptors ¹⁵. Role of CRP has been assessed in certain urological conditions, such as determination of degree of renal injury in pyelonephritis ¹⁶, assessing the severity of urinary tract infection in children¹⁷, and in avoiding micturating cystourethrogram in paediatric patients with vesicoureteric reflux ¹⁸.

Our rationale is based on the fact that it is currently not clearly established whether inflammatory markers like CRP can be used as an independent factor in predicting spontaneous stone expulsion. Further, identifying such factors at initial presentation can help make us early decision regarding intervention and thus prevent unnecessary conservative treatment. The objective of our study was to determine the frequency of spontaneous stone

expulsion of small lower ureteric stones in patients with raised serum CRP

MATERIALS AND METHODS

This study was descriptive Cross Sectional study carried out at the department of urology, Khalifa Gul Nawaz Teaching Hospital, Bannu Medical College Bannu for duration of 6 months from Jan 2022 to June 2022. The overall sample size was 210 based on WHO sample size calculator.

Inclusion criteria

- Patients with distal ureteric stone size 4mm to 9mm and with raised CRP
- All male and female patients from 18-60 yrs.

Exclusion criteria

- Multiple ureteric calculi
- Pregnancy
- Solitary kidney
- Urinary tract infection
- Impaired renal functions
- Patients who do not want to undergo conservative treatment
- Patients suffering from other inflammatory condition like infections, arthritis, , diabetes, hepatic failure

Eligible candidate were selected from OPD and emergency department after their screening through the inclusion and exclusion criteria. Informed written consent was obtained from the patients before their enrollment into the study. History taking and examination was done from all patients for suspected ureteric stone. Urine r/e, blood investigation, including serum urea and creatinine levels were carried out followed by x-ray KUB and ultrasound of the pelvis and abdomen. CRP was measured only at initial presentation. All investigations were performed in the hospital laboratory using the same protocol to avoid any conflict. Patients were followed till stone expulsion or stone clearance by ESWL or URS. This data was recorded on a separate proforma for each patient. The data was analyzed using SPSS 17. Mean ± S.D were calculated for numeric variables like age, stone size and CRP

level. Frequency and percentage were calculated for qualitative variables like gender, stone size and spontaneous expulsion.

RESULTS

In the current study, a total of 210 patients were enrolled. There were 112(53.33%) female and 98(46.67%) male participants in our study. (Figure 1) Patients included in the study had age range from 18- 60yr with mean age was 34.32±7.92 SD. Based on age distribution, 18-30 years had 96 (45.71%) of the patients, group 31-45 had 96 (45.71%) and group 46-60 years had 18(8.57%) patients. (Figure 2)

Patients selected in the study had lower ureteric stones ranging from 5-9mm. mean stone size was 6.990 mm ±0.92 SD. Mean CRP was 3.36 mg/dl ±1.99 SD. 160 (76.19%) of the patients had CRP 0.5-4.9 mg/ dl levels where as 50 (23.82%) had CRP levels from 5-9.9 mg/ dl. Out of 210, 101 (48.10) patients had spontaneous stone expulsion while 109 (51.90%) patients had to undergo other interventions like ESWL, URS for stone clearance. 50 (31.25%) patients with CRP 0.5-4.9mg/dl passed stones spontaneously while 45 (90%) patients with CRP 5-9.9 mg/dl passed stone spontaneously.(Figure 3)

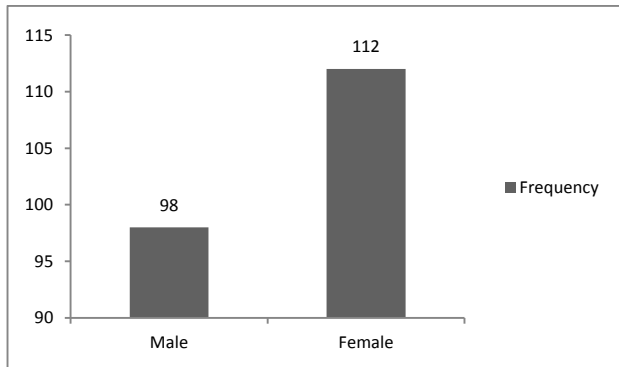


Figure 1: Distribution of patients based on gender

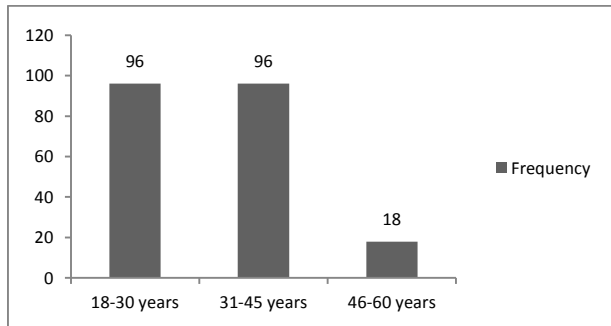


Figure 2: Distribution of patients based on age

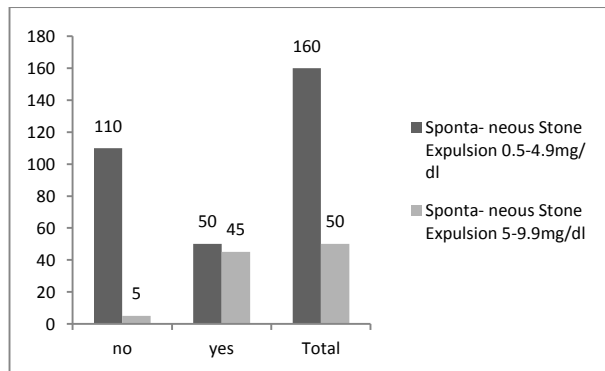


Figure 3: Distribution of patients based on spontaneous expulsion of stone

DISCUSSION

Ureteric stone prevalence is about 15% of the population and acute ureteric colic is one of the most frequent emergency, a urologist has to deal with ². There are different treatment options including conservative management, shock wave lithotripsy (SWL) and ureteroscopy (URS). Advancement in minimally invasive surgery has resulted in widespread acceptance of ESWL and URS are very efficient modalities with success rates ranging from 63-86% and 57-92% respectively ¹⁹⁻²¹. Nevertheless both these interventions are associated with complications and are expensive. On the other hand conservative management can be very successful and cost effective in favorable candidates with spontaneous expulsion of up to 98% for stones 5mm or less according to American Urological Association meta-analysis ^{9,26}. However this approach can also lead to morbidity in the form of recurrent colic, infections, loss of work, uncertainty and derangement of renal functions as well ^{7,22}.

The decision to elect between conservative therapy and minimally invasive treatment for small ureteric stones is challenging for a urologist. Urgent surgical decompression is required only in cases where there is evidence of sepsis, deranging renal function, ongoing severe pain despite medical treatment. Different factors have been studied which could predict spontaneous expulsion of stones, the most significant being the stone size and location. Increasing evidence is now showing the role of inflammatory markers in this regard. Use of such markers would be extremely helpful in improving the management of distal ureteric stones by not only predicting the spontaneous expulsion but also in deciding early to undergo intervention and hence prevent complications.

Inflammatory markers mostly studied are white blood cell count CRP. There is conflicting data about their usefulness ²³. Sfoungaristos has shown statistically significant increased chances of spontaneous stone expulsion with raised WBC count and neutrophil count. Reason being as stone passes along the ureter it provokes the inflammatory response and those passing through the entire length of ureter would result in higher levels of these counts ²⁴.

However park et al. has shown increased rates of spontaneous stone expulsion with normal neutrophil count as compared to raised counts. Furthermore they proved statistically significant increased spontaneous expulsion rate with raised CRP levels. They reasoned that greater degree of inflammation would result in more edema and higher CRP levels and hence less chances of spontaneous expulsion ²³. Angulo et al have found CRP levels of 2.8mg/dl to be cut off for intervention ²⁵.

In the current study, a total of 210 patients were enrolled. There were 112(53.33%) female and 98(46.67%) male participants in our study. Patients included in the study had age range from 18-60yr with mean age was 34.32±7.92 SD. Based on age distribution, 18-30 years had 96 (45.71%) of the patients, group 31-45 had 96 (45.71%) and group 46-60 years had 18(8.57%) patients.

Patients selected in the study had lower ureteric stones ranging from 5-9mm. mean stone size was 6.990 mm ±0.92 SD. Mean CRP was 3.36 mg/dl ±1.99 SD. 160 (76.19%) of the patients had CRP 0.5-4.9 mg/ dl levels where as 50 (23.82%) had CRP levels from 5-9.9 mg/ dl. Out of 210, 101 (48.10) patients had spontaneous stone expulsion while 109 (51.90%) patients had to undergo other interventions like ESWL, URS for stone clearance. 50 (31.25%) patients with CRP 0.5-4.9mg/dl passed stones spontaneously while 45 (90%) patients with CRP 5-9.9 mg/dl passed stone spontaneously. The results of our study showed significant association between spontaneous stone expulsion and CRP levels. Patients with higher CRP levels had more spontaneous expulsion while patients with lower CRP levels were more likely to have undergone intervention. Similar results were shown by Sfoungaristos et al for stone passage in terms of WBC and neutrophil count. Theoretically stones passing through the entire length of ureter would result in degree of inflammation and

hence higher CRP in contrast to those stones who fail to pass the entire length. However the inflammation persisting for longer time can also lead to impedance of stone passage as well ²⁶. So this should be kept in consideration that markers like CRP and WBC count are only laboratory values and any decision for intervention or conservative management should be taken after assessing all relevant clinical factors.

CONCLUSION

Serum CRP is a relatively newer marker now increasingly being used for the purpose of predicting spontaneous stone expulsion of small lower ureteric stones. However current evidence still does not support CRP levels alone to be recommended for this purpose. Clinical assessment of every individual patient is still the mainstay of decision for intervention.

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