



ROLE OF DETECTING MICROSCOPIC HEMATURIA IN URETEROLITHIASIS – A SINGLE INSTITUTIONAL PROSPECTIVE STUDY

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ABSTRACT

Objective: Aim of our study was to examine the patients presenting with urolithiasis and the relationship of the incidence of clinically significant hydronephrosis in patients with and without microscopic hematuria.

Methods: This is a prospective study of 180 patients who presented to the emergency department with ureteric calculus during the period of December 2018 – May 2019 (6 months) in the Department of Urology, Government Kilpauk Medical College, Chennai. All patients who met the inclusion criteria underwent non-contrast computed tomography of the abdomen and pelvis and urinalysis. We compared the mean stone size and the severity of obstruction found on imaging in patients with and without microscopic hematuria on urinalysis

Results: In our study a total of 180 patients who met the inclusion criteria were included. Out of these, 134 patients (74%) had microscopic hematuria on urinalysis. Patients with negative microscopic hematuria had severe obstruction with Grade II -III hydronephrosis and the mean stone size was higher.

Conclusions: Patients with ureterolithiasis in absence of microscopic hematuria on urinalysis are at increased risk of having severe obstruction in comparison to those with microscopic hematuria.

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INTRODUCTION

Urolithiasis affects 5 -15% of the population globally. The important goal in managing patients presenting with ureteric calculi is early detection of obstruction and to prevent irreversible renal damage and urosepsis. About 20% of patients with ureterolithiasis will have negative results for microscopic hematuria on urinalysis. In this study we analysed the role of detecting microscopic hematuria in patients with ureterolithiasis in determining the severity of obstruction.

MATERIALS AND METHODS

In this prospective analysis 180 patients who were diagnosed with ureteric calculus were included. The study was conducted in the Department of Urology in Government Kilpauk Medical College. Our study period was 6 months from December 2018 – May 2019. Patients above 18 years with ureteral calculus diagnosed with non-contrast CT abdomen and pelvis without any anatomical anomaly causing ureteral obstruction were included in this study. Patients with history of recent endourological procedures & passage of urinary calculus, with anatomical obstruction, concomitant renal, vesical or urethral calculus, any genitourinary pathology other

than ureteric calculus were excluded from this study. A total of 180 patients who met the inclusion criteria were included in this study.

All underwent Non contrast CT of abdomen and pelvis. Ureteric calculus was defined as a calculus present anywhere between pelvi-ureteric junction to the vesico-ureteric junction.

Severity of hydronephrosis was classified as following

Grade 0 – no pelvicalyceal dilatation

Grade 1 – only dilatation of pelvis

Grade 2 – Dilatation of pelvis with mild calyceal dilatation

Grade 3 – Dilatation of pelvis with severe calyceal dilatation

Grade 4 – Severe dilatation of pelvicalyceal system with parenchymal thinning

All patients included in the study were subjected to microscopic urinalysis for presence or absence of microscopic hematuria. Microscopic hematuria was defined as presence of 3 or more RBCs per high power field.

We classified the patients into two groups based on the presence or absence of microscopic hematuria. We compared the ureteral stone size, severity of urinary tract obstruction and the incidence of microscopic hematuria.

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RESULTS

A total of 215 patient visits were studied and 180 patients who met the inclusion criteria were included in this study. The median age of presentation in our study was 36 years (range: 18-75 years). Among these males predominated with 71%. 134 patients of 180 patients (74%) had positive microscopic hematuria on urinalysis and 46 patients (26%) showed absence of microscopic hematuria.

Among the patients who were negative for microscopic hematuria, a higher proportion of patients had severe urinary tract obstruction with Grades 2-4 hydronephrosis. Among the 134 patients who were positive for microscopic hematuria, 51 (38%) patients had higher grades of HUN with mean ureteral calculus size of 4.5mm. Among the 46 patients who tested negative showed higher proportion of 28 (61%) patients with higher grades of HUN with mean ureteral calculus size (6.1mm) greater than those who were positive for microscopic hematuria.

Table 1

Microscopic hematuria	Positive	Negative
Total No of patients	134 (74%)	46 (26%)
Mean Ureteral calculus size (mm)	4.5	6.1
Severe obstruction (Grade 2-4 HUN)	51 (38%)	28 (61%)

DISCUSSION

Ureterolithiasis accounts for a significant number of emergency visits globally. Urinalysis for microscopic haematuria is a simple and routine screening test in patients suspected of ureteric colic, but its sensitivity ranges between 69% and 84%.

The challenge in treating patients with ureterolithiasis is to identify those who are at risk for developing significant obstruction and instituting emergency intervention to prevent irreversible renal damage. At present the non-contrast CT is the diagnostic imaging modality to accurately diagnose the presence or absence of stones, size, numbers, exact location, density and severity of obstruction.

Microscopic haematuria was less sensitive in detecting urolithiasis in patients with more severe disease. Our study analysis also showed the same results. The hypothesis proposed is that “larger ureteral stones may obstruct bleeding resulting in the absence of haematuria on urinalysis”; however, no studies have proven this. Additionally, factors like dehydration, location of stones, the time interval between onset of pain and urine collection may confound the results.

Emergency physicians should be cautious in managing patients with suspected ureteral colic without microscopic haematuria, as these patients are at increased risk of more severe hydronephrosis.

Our study also showed a significant difference in the mean size of ureteral stones in patients with and without microscopic haematuria. These findings suggest that the severity of an obstructive complication may increase significantly with the increase in ureteral stones size. This knowledge carries important clinical implications as it might aid in better estimating a patient’s likelihood of an obstructive complication. However previous studies failed to demonstrate a significant correlation between stone size and presence of haematuria.

Small sample size, limited duration of study and single institutional study were the limitations of our study.

CONCLUSION

Patients with ureterolithiasis on non-contrast CT and absent microscopic hematuria are at high risk for having obstructive uropathy than patients with microscopic hematuria on urinalysis. Presence or absence of microscopic hematuria can be used to prognosticate the patients who would greatly benefit from intervention for ureterolithiasis. Further evaluation of the pathophysiological mechanisms responsible for hematuria in urolithiasis will aid further the interpretation of detecting hematuria in this population.

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