

# HAEMATURIA AND COLIC CORRELATION AS CLINICAL PREDICTORS IN URETERAL STONES PATIENTS AT UROLOGY OUTPATIENT UNIT SOETOMO HOSPITAL WITHIN JANUARY 2011 - DECEMBER 2015 PERIOD

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## ABSTRACT

**Objective:** Determine the relationship between clinical symptoms of colic pain and haematuria as a predictor of ureteral stones incident at Dr Soetomo Hospital within a period of five years. **Material & methods:** This study is a descriptive analytic study using the sensitivity-specificity test with retrospective design. Data were collected from patient's medical records with a ureteral stone diagnosis at outpatient unit Dr Soetomo Hospital within 2011-2015. **Results:** Renal colic or ureter colic without haematuria had 88.32% specificity and 53.07% sensitivity in the incidence of ureteral stones at Urology Outpatient Unit Dr Soetomo Hospital within 2011-2015 period. Haematuria without colic complaint had 29.37% sensitivity and 90.17% specificity in the incidence of ureteral stones. Colic and haematuria compared with colic had 55.76% sensitivity for the incidence of ureteral stones and 70.09% specificity. While colic and haematuria compared with haematuria had a sensitivity of 77.41% for the incidence of ureteral stones and 65.92% specificity. Colic and haematuria compared with other complaints has a 58.77% sensitivity for ureteral stones incidence and 94.66% specificity. **Conclusion:** Colic and haematuria are clinical predictors that have a better value than the complaints of colic without haematuria and haematuria without colic, in the ureteral stones incident at Urology Outpatient Unit Dr Soetomo Hospital within 2011-2015 period. This is consistent with the literature that mentions prominent complaint in the incidence of ureteral stones is their colic pain caused by the stone through the ureteral passage, and followed by haematuria for their mucosal surface injury.

**Keywords:** Ureteral stone, ureter colic, renal colic, haematuria.

## ABSTRAK

**Tujuan:** Untuk mengetahui hubungan antara gejala klinis kolik dan hematuria sebagai prediktor kejadian Batu Ureter di RSUD Dr Soetomo Surabaya dalam kurun waktu lima tahun. Untuk dilihat kesesuaiannya dengan literatur-literatur yang ada. **Bahan & cara:** Penelitian ini menggunakan studi deskriptif-analitik menggunakan tes sensitifitas spesifisitas dengan desain retrospektif. Data dikumpulkan dari rekam medis pasien unit rawat jalan (poli) Urologi dengan diagnosis Batu Ureter di RS Dr Soetomo Surabaya tahun 2011-2015. **Hasil:** Kolik Renal/Kolik Ureter saja tanpa Hematuria di Poli Urologi RS Dr Soetomo Surabaya periode 2011-2015 memiliki spesifisitas 88.32% dan sensitivitas 53.07% dalam kejadian batu ureter. Hematuria saja tanpa keluhan kolik di Poli Urologi RS Dr Soetomo Surabaya periode 2011-2015 terhadap kejadian batu ureter memiliki sensitifitas sebesar 29.37% dan spesifisitas sebesar 90.17%. Kolik disertai hematuria dibandingkan dengan kolik saja memiliki sensitivitas 55.76% untuk kejadian batu ureter dan spesifisitas 70.09%. Sedangkan kolik disertai hematuria dibandingkan dengan hematuria saja memiliki sensitivitas 77.41% untuk kejadian batu ureter dan spesifisitas 65.92%. Dan kolik disertai hematuria dibandingkan dengan keluhan selain kolik dan hematuria memiliki sensitivitas 58.77% untuk kejadian batu ureter dan spesifisitas 94.66%. **Simpulan:** Kolik disertai hematuria di Poli Urologi RS Dr Soetomo Surabaya periode 2011-2015 adalah prediktor klinis yang memiliki nilai yang lebih baik dibandingkan keluhan kolik saja tanpa hematuria dan hematuria saja tanpa kolik, dalam dugaan kearah kejadian batu ureter. Hal ini sesuai dengan literatur yang menyebutkan keluhan yang menonjol pada kejadian batu ureter adalah adanya nyeri kolik yang disebabkan karena pasase batu melalui ureter; akan diikuti dengan hematuria karena adanya perlukaan permukaan mukosa oleh permukaan batu ureter saat pasase.

**Kata Kunci:** Batu ureter; kolik ureter; kolik renal, hematuria.

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## INTRODUCTION

Ureteral stones are generally present with acute renal colic or acute ureter colic when a stone through the ureter peristaltic.<sup>1</sup> Another complaint also found is haematuria. In addition to these two main complaints, the other complaints that can be found are nausea, vomiting, dysuria, fever, UTI, body weakness and Anuria.<sup>1,2</sup>

The definitive diagnosis of ureteral stones can only be completely upright after doing identification with imaging such as ultrasound or tomografi.<sup>3,4,5</sup> Nevertheless some recent studies indicate there was a significant proportion of patients with ureteral stones come with colic pain with or without haematuria.<sup>4,6</sup> Moreover, some patients complained of flank pain continued for several days after acute colic pain.<sup>1,7</sup>

## OBJECTIVE

We investigate the relationship between the onset of colic pain, haematuria and final diagnosis ureteral stones.<sup>6,8,9</sup>

## MATERIAL & METHODS

This study is a descriptive-analytic study using the sensitivity-specificity test with retrospective design. We conduct his study at Urology Outpatients Unit Dr Soetomo Hospital Surabaya. The population of this study were all patients with ureteral stones diagnosis that were treated in the Urology Outpatient Unit, Dr Setomo Hospital Surabaya within 2011-2015 period.

The data were collected from patient's medical records with Ureteral Stone diagnosis at Urology Outpatient Unit Dr Soetomo Hospital within 2011-2015 period. The data then will be grouped according to demographic data, the type of the anatomical diagnosis of ureteral stones,

haematuria complaints and colic. We analyzed the correlation between colic, haematuria as clinical symptoms in the incidence of ureteral stones. All the results of the grouping will be shown analytically in the form of tables and narratives, and analyzed using the sensitivity-specificity test.

## RESULTS

Patients with ureteral stones in Urology Outpatient Unit Dr Soetomo Hospital during 2011-2015 period were 850 patients, with an average is 170 patients per year. The ureteral stones diagnosis which divided anatomically were found 427 patients with proximal ureteral stones or approximately 50.23% of the total ureteral stones patients, 144 patients with middle ureteral stones as many as 16.94% of total ureteral stones patients and 279 patients with distal ureteral stones or approximately 32.82% of total ureteral stones patients at urology outpatient unit Dr Soetomo Hospital during the period 2011-2015.

In this study, we collected data of patients with ureteral stones that came with complaints of colic without haematuria within 2011-2015 period. We were not grouping the colic by side of colic, the nature and the intensity and duration of colic. From the results of the data collection, patients with complaints of colic without haematuria was found 52 patients of the 172 patients with ureteral stones (30.23%) in the year 2011, 52 patients of the 168 patients with ureteral stones (30.95%) in 2012, 42 patients of the 170 patients with ureteral stones (24.70%) in 2013, 51 patients of 175 patients with ureteral stones (29.14%) in 2014 and 45 patients of the 165 patients with ureteral stones (27.27%) in 2015. While the total for 5 years, 242 patients from a total of 850 patients with ureteral stones (28.47%).

Furthermore, we collected data from patient's medical records at Urology Outpatient Unit for the years 2011-2015, we obtained that total of

**Table 1.** Description of ureteral stones patients with colic complaints.

Year	Ureteral Stones Patients	Colic	Percentage (%)
2011	172	52	30.23
2012	168	52	30.95
2013	170	42	24.70
2014	175	51	29.14
2015	165	45	27.27
Total	850	242	28.47

**Table 2.** Description of patients with colic symptoms.

	Ureteral Stones (+)	Ureteral Stones (-)	Total
Colic (+) Haematuria (-)	242	286	528

**Table 3.** Description of ureteral stones patients with haematuria complaints.

Year	Ureteral Stones Patients	Haematuria	Percentage (%)
2011	172	22	12.79
2012	168	20	11.90
2013	170	15	8.82
2014	175	20	11.43
2015	165	12	7.27
Total	850	89	10.47

**Table 4.** Description of patients who present with haematuria.

	Ureteral Stone (+)	Ureteral Stone (-)	Total
Colic (-) Haematuria (+)	89	236	325

**Table 5.** Description of ureteral stones patients who came with colic and haematuria complaints.

Year	Ureteral Stone Patients	Colic + Haematuria	Percentage (%)
2011	172	58	33.72
2012	168	65	38.69
2013	170	60	35.29
2014	175	64	36.57
2015	165	58	35.15
Total	850	305	35.88

patients who present with colic itself is 528 patients. This data can be summarized in the table 2.

In this study, we also classify patients with ureteral stones with the chief complaint when it comes to redness urine or macroscopic haematuria. But in this study, we only point at the total number of patients with symptoms of haematuria without researching the old complaint, the intensity of the complaints and the drugs that had been consumed. The following data were obtained patients with complaints of haematuria from ureteral stones patients medical records at the Urology Outpatient Unit Soetomo Hospital within 2011-2015 period.

We obtained 22 patients out of 172 patients with ureteral stones (12.79%) in 2011, 20 patients out of a total of 168 patients with ureteral stones (11.90%) in 2012, 15 patients of the 170 patients with ureteral stones (8.82%) in 2013, 20 patients out of 175 patients with ureteral stones (11.43%) in 2014

and 12 patients of the 165 patients with ureteral stones (7.27%) in 2015. Total for 5 years ureteral stone patients who present with haematuria without colic is 89 patients out of a total of 850 patients with ureteral stones (10.47%).

Furthermore, we collected data from patient's medical records at Urology Outpatient Unit for the years 2011-2015, total patients who present with haematuria itself is 325 patients. This data can be summarized in the table 4.

Patients also grouped into colic complaints with haematuria. In this study, we did not separate the data between macroscopic and microscopic haematuria as a broadcaster of colic. We only choose ureteral stones patients with only microscopic haematuria and colic. From the data collected, ureteral stone patients at Urology outpatient unit of Dr Soetomo Hospital during 2011-2015 that came with complaints colic and haematuria, obtained in

**Table 6.** Description of patients with colic and haematuria complaints.

	Ureteral Stone (+)	Ureteral Stone (-)	Total
Colic (+)	305	122	427
Haematuria (+)			

the year 2011 as many as 58 patients of the 172 patients with ureteral stones (33.72%), 65 patients of the 168 patients with ureteral stones (38.69%) in 2012, 60 patients of the 170 patients with ureteral stones (35.29%) in 2013, 64 patients obtained from 175 patients with ureteral stones (36.57%) in 2014 and 58 patients of the 165 patients with ureteral stones (35.15%) in 2015. And a total of 5 years ureteral stone patients who present with colic and haematuria is 305 patients from a total of 850 patients with ureteral stones (35.88%).

Furthermore, we collected data from patient's medical records at Urology Outpatient Unit for the years 2011-2015, total of patients who present with colic and haematuria were 427 patients. This data can be summarized in table 6.

The data mentioned above then regrouped for analysis and bench marking, with tabled to test the sensitivity and specificity. This can be explained in the table below.

**Table 7.** Data grouping for the sensitivity and specificity test of colic complaint without haematuria.

	Ureteral Stone (+)	Ureteral Stone (-)
Colic (+)	242	286
Colic (-)	214	2164

Specificity =  $[2164/(286+2164)] \times 100\% = 88.32\%$

Sensitivity =  $[242/(242+214)] \times 100\% = 53.07\%$

**Table 8.** Data grouping for the sensitivity and specificity test of haematuria incidence without colic.

	Ureteral Stone (+)	Ureteral Stone (-)
Haematuria (+)	89	236
Haematuria (-)	214	2164

Specificity =  $[2164/(236+2164)] \times 100\% = 90.17\%$

Sensitivity =  $[89/(89+214)] \times 100\% = 29.37\%$

**Table 9.** Data grouping for the sensitivity and specificity test of colic and haematuria compared with the incidence of haematuria without colic.

	Ureteral Stone (+)	Ureteral Stone (-)
Colic (+), Haematuria (+)	305	122
Colic (-), Haematuria (+)	89	236

Specificity =  $[236/(236+122)] \times 100\% = 65.92\%$

Sensitivity =  $[305/(305+89)] \times 100\% = 77.41\%$

**Table 10.** Data grouping for the sensitivity and specificity test of colic and haematuria compared to the incidence of colic without haematuria.

	Ureteral Stone (+)	Ureteral Stone (-)
Colic (+), Haematuria (+)	305	122
Colic (+), Haematuria (-)	242	286

Specificity =  $[286/(286+122)] \times 100\% = 70.09\%$

Sensitivity =  $[305/(305+242)] \times 100\% = 55.76\%$

## DISCUSSION

During the period January 2011 until December 2015 there were 850 cases of ureteral stones are handled in the Urology Outpatient Unit Dr. Soetomo Hospital, with the average per year is 170 patients. The ureteral stones diagnosis which divided anatomically were found 427 patients (50.23% of the total ureteral stones patients), 144 patients middle ureteral stones (16.94% of total ureteral stones patients) and distal ureteral stones with 279 patients (32.82% of total ureteral stones patients). The number of male patients were 486 patients (57.17%) and female patients were 359 patients (42.83%). While the percentage of ureteral stones incidence over a period of 5 years is 28.20% out of the total

patients Urology Outpatient Unit which reach the number of 3014 patients for 5 years. Data distribution is not much different from that we get the literature that says that the average incidence of ureteral stones is 20% of all cases within a period of 3 years observation.<sup>1,2</sup> Male patients is more than female patients with a ratio according to the literature as much as 1.47 times, although it is mentioned that in the last 3 years the range of patients with stones in women experiencing significant increases up to 8-10% per year.<sup>1,5,10</sup> From the data obtained, it can be said that the distribution of ureteral stones new cases at Urology Outpatient Unit Dr. Soetomo Hospital is the same from the existing literature and journals.

We were not grouping the colic by side of colic, the nature, the intensity and duration of colic in this study. We counts the total number of patients with ureteral stones that came with colic complaints only, because of the incomplete medical records that we get. From the data collected, patients with colic complaints without haematuria was found 52 patients of the 172 patients with ureteral stones (30.23%) in the year 2011, 52 patients of the 168 patients with ureteral stones (30.95%) in 2012, 42 patients of the 170 patients with ureteral stones (24.70%) in 2013, 51 patients out of 175 patients with ureteral stones (29.14%) in 2014 and 45 patients of the 165 patients with ureteral stones (27.27%) in 2015. While the total for 5 years was about 242 patients from a total of 850 ureteral stones patients (28.47%). Total patients who present with colic complaint only is 628 patients. From the data above, we analyzed using tables and calculation of specificity and sensitivity tests. We obtained colic without haematuria had a specificity 88.32% and a sensitivity 53.07%, this means that when a complaint obtained without ureteral colic then the probability it is true that an incident ureteral stones is 53.07%, whereas in patients who did not have colic complaint then 88.32% probability of occurrence is not a ureteral stone. This indicates colic complaint with the absence (absence) haematuria and actions need to further investigation on the truth of ureteral stones incidence, and the possibility of another diagnosis still need to be considered. It is appropriate with some literature indicating that the absence of haematuria in the colic complaint indicates that the ureteral stone is not the main idea and the need to better diagnosis consideration.<sup>4,6,8,11</sup>

We obtained data from the medical records of ureteral stones patients in the Outpatient

Department of Urology Hospital Dr Soetomo period 2011-2015, that patients with haematuria complaints in 2011 was 22 patients of the 172 ureteral stones patients (12.79%), 20 patients of the total 168 ureteral stones patients (11.90%) in 2012, 15 patients of the 170 ureteral stones patients (8.82%) in 2013, 20 patients out of 175 ureteral stones patients (11.43%) in 2014 and 12 patients of the 165 ureteral stones patients (7.27%) in 2015. Total ureteral stone patients who present with haematuria without colic is 89 patients out of a total of 850 ureteral stones patients (10.47%) for 5 years. Total patients who present with haematuria only is 325 patients. From the data above, we analyzed with tables and calculation of specificity and sensitivity tests. It showed that haematuria without colic complaint in the ureteral stones incidence had sensitivity 29.37% and specificity 90.17%. This means that when a patients only have haematuria complaint without colic is possible to 29.37% for ureteral stones incidence, and if the patient is not have haematuria complaint so the possibility 90.17% it is not ureteral stone incidence. In this part of the study, it can be concluded that haematuria without colic is not a good predictor into suspicious towards ureteral stones, which should be considered another diagnosis is more likely to occur before finally discovered ureteral stones after further examination. It is appropriate with some literature that haematuria without colic complaint is not a good predictor of urinary tract stones incidence in general because another diagnosis is more likely to be suited (e.g cancer) when only haematuria complaint occur.<sup>12-14</sup> Therefore, when we found haematuria without colic, the ureteral stone incidence is not our first consideration until we discover it by further examination later.<sup>12,15,16</sup>

We grouped the data separately from ureteral stones patients who present with microscopic haematuria or colic complaint only. We obtained the ureteral stones patients data with colic and haematuria complaints 58 patients of the 172 patients with ureteral stones (33.72%) in the year 2011, 65 patients of the 168 patients with ureteral stones (38.69%) in 2012, 60 patients of the 170 patients with ureteral stones (35.29%) in 2013, 64 patients obtained from 175 patients with ureteral stones (36.57%) in 2014 and 58 patients of the 165 patients with ureteral stones (35.15%) in 2015. Total ureteral stone patients who present with colic and haematuria is 305 patients from a total of 850 patients with ureteral stones (35.88%) for 5 years.

From the medical records at Urology Outpatient Unit for the years 2011-2015, total patients who present with colic and haematuria is 427 patients. We sorted and grouped the data again for comparison respectively: the significance of colic and haematuria compared to colic only; the incidence of colic and haematuria compared to haematuria only; the incidence of colic and haematuria compared to other complaints on the ureteral stones patient, we study and compare which one is really clinically significant as predictors of the ureteral stones incidence.

Colic and haematuria compared to colic only in the clinical significance have a sensitivity 55.76% and a specificity 70.09% for incident ureteral stones at Urology Outpatient Unit Dr Soetomo Hospital within 2011-2015 period. It means when we found patients complaining of colic and haematuria then 55.76% is probably ureter stones, whereas for colic alone will have the possibility of ureteral stones as much as 44.24%. Furthermore, specificity means when a complaint is colic only compared to colic and haematuria complaint, 70.09% is not probably ureteral stones. This indicates that the colic and haematuria complaint have more clinically significant as predictors of the occurrence of ureteral stones compared with colic complaints only. This is consistent with the literature that the presence of haematuria as a broadcaster in colic gripe would be more meaningful in narrowing suspicion towards ureteral stones incident compared to a colic complaint only.<sup>4,9,14,17</sup> Colic without haematuria should get more extensive differential diagnosis prior suspicion towards ureteral stones that will be proved by further examination.<sup>3,12,18</sup>

After we analyzed the data, it was found that colic and haematuria compared with haematuria only have sensitivity 77.41% and specificity 65.92% for ureteral stones incident. It means when we found patients complaining of colic and haematuria then 77.41% is probably ureteral stones, whereas for haematuria alone will have the possibility of ureteral stones as much as 22.59%. The specificity means that when patient is only complaining haematuria only compared to colic and haematuria together, 65.92% is not true ureteral stones. This indicates that the colic and haematuria complaint have more clinically significant as predictors of the occurrence of ureteral stones compared to haematuria complaints only. This is consistent with the literature that the presence of haematuria as a broadcaster in

colic gripe would be more meaningful in narrowing suspicion towards ureteral stones incident compared to haematuria only complaint.<sup>13,14,16</sup> Haematuria without colic should get more differential diagnosis for example malignancy, prior suspicion towards ureteral stones that will be proved further examination.<sup>12,19</sup>

## CONCLUSION

Colic and haematuria are clinical predictors that have a better value than the complaints of colic without haematuria and haematuria without colic, in the ureteral stones incident at Urology Outpatient Unit Dr Soetomo Hospital within 2011-2015 period. This is consistent with the literature that mentions prominent complaint in the incidence of ureteral stones is their colic pain caused by the stone through the ureteral passage, and followed by haematuria for their mucosal surface injury.

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