

Analysis of demographic & clinical characteristics and management of patients presenting with ureteric colic in the emergency department

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Abstract

Background: Ureteric colic is commonly diagnosed and treated in the emergency department ^[1]. It is a large worldwide ^[2]. It is caused by acute partial or complete ureteric obstruction due to a calculus in the vast majority of cases ^[3]. Many factors have been suggested to contribute to the occurrence of renal & ureteric stones, including diet, water hardness, geographical location, race, occupation, sex, and climatic conditions ^[7-9].

Aim of the study: to evaluate the demographic, clinical characteristics and management of patients presented with ureteric colic per one year.

Subjects & Methods: This study was carried out in the surgical emergency department of Baghdad Teaching Hospital of Medical City through one year (from 01/12/2011 to 30/11/2012). Any patient older than 13 years of age presented to the surgical emergency department complaining of ureteric colic were evaluated by history, clinical examination & investigations diagnosed to have stone, may be renal &/or ureteral, will be included in the study. Age, sex, chief complaint, clinical details of history & examination. also the variables include the investigations & drugs given, will be assessed. The study exclude any patient \leq 13 years of age & the pregnant female patients, as these patients were usually received by the emergency department of the pediatric & gynecological emergency departments, respectively. The trauma patients of any age who presented with ureteric colic due to trauma also excluded because of their complaining of abdominal pain mostly related to trauma.

Results: A total of 371 patients with ureteric colic & 264 patients diagnosed as urolithiasis were enrolled in this study. The results showed that the most common cause of ureteric colic was stone (71.16%) with males (75.38%) affected more than females (24.62%). The most common age period of presentation was (21-30). Clinically most commonly the patients presented with loin pain (82.9%), with mostly right side (49.25%). Ultrasound is the most investigation used (88.14%), followed by general urine examination (78.17%) showing that crystals is the most common its finding (91.29%). The best conservative management used is the combination of tramadol & diclofenac. Most patients discharged well after receiving management & getting improvement of their emergent condition with advice to be followed by a uro-surgery outpatient clinic, while (11.56%) need admission, mostly due to unresolved symptoms in spite of receiving good analgesic management.

Conclusion: Urolithiasis is the most common cause of ureteric colic, while other causes include musculoskeletal pain, pyelonephritis, bowel diseases, tumors, abscesses, pneumonia & others are less common. Males affected more than females. Twenty to thirty years of age is the most common age period of presentation. Increasing weather temperature associated with increasing presentation of ureteric colic patients. Loin pain is the most clinical presentation. Ultrasound is the most investigation used in our hospital. Tramadol & diclofenac is the best treatment used.

Keywords: urolithiasis, ureteric colic, emergency department

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I. Subjects and Methods

Design and Settings: This study was carried out in the surgical emergency department of Baghdad Teaching Hospital of Medical City through one year from (1st of December 2011) to (30th of November 2012).

Sample and sampling technique: Any patient older than 13 years of age presented to the surgical emergency department complaining of ureteric colic & by history, clinical examination & investigations diagnosed to have stone, may be renal &/or ureteral, will be included in the study. The total number(no.) of these patients will be assessed as a no. & percentages in relation to the total no. of patients attending the surgical emergency department.

Definition of variables : For each patient, the following variables were assessed: age, sex, chief complaint, clinical details of history & examination including the pain & its site, onset, radiation, associated symptoms of nausea, vomiting, fever, dysuria & change color of urine in addition to any aggravating or relieving factors. Also the variables include the investigations & drugs given to the patient in the emergency department. The day of presentation will be assessed in relation to its temperature & season.

Methods and data collection: At presentation to the emergency department the patient usually complaining of severe pain that prevent his compliance & cooperation with the physician, so after rapidly excluding the life threatening conditions, an analgesia will be given to the patient, then complete data of history & clinical examination will be collected, followed by investigations including: laboratory (general urine examination & blood investigations for white blood cells &/or biochemical) & Radiological (ultrasound, X-ray &/or CT scan). The response to the treatment will be assessed & collected. The total no. of patients presented to the surgical emergency department will be collected from the emergency department records per one year & the no. of the renal colic patients & no. of patients with urolithiasis & their percentages will be assessed. The temperature data & its changes over one year were collected from the Iraqi Meteorological Organization & Seismology.

Limitations of the study : The study exclude any patient ≤ 13 years of age, the pregnant female patients & the trauma patients of any age who presented with renal colic due to trauma. Not all patients presented with ureteric colic had complete investigations may be due to the refuse of the patients to complete their management & discharge on their responsibilities or some investigations as ultrasound & CT scan may be not available especially at night. The study including the total no. of patients presented to emergency department complaining of any surgical diseases but this having exceptions during certain conditions as explosions where the victims patients would be excluded & their no. would not be involved in the total no. of patients.

Statistical analysis: The data analysed using computer facilities. The statistical analyses were completed using SPSS-16 (Statistical Packages for Social Sciences- version 16). Statistical analysis included the descriptive measures of frequency and percentages and the application of analytic test of significance, the Pearson chi-square test, for testing the significance of difference between percentages for the qualitative variables was used with a P value of <0.05 as cut-off level of significance.

II. Introduction

Ureteric Colic:

Acute severe colicky pain in the flank region is termed as renal colic, which is commonly diagnosed and treated in the emergency department^[1]. It is caused by acute partial or complete ureteric obstruction due to a calculus in the vast majority of cases. In approximately 5% of the patients, ureteric colic may be caused by abnormalities of the urinary tract unrelated to a stone disease such as pyelonephritis and pelviureteric junction(PUJ)obstruction. A proportion of up to 10% of patients with ureteric colic may have extrinsic ureteral obstruction by a variety of other conditions including intestinal, gynecological, retroperitoneal and vascular lesions^[3].

The worldwide occurrence of urolithiasis is estimated at around 1–6.6% with the likelihood to form stones depending on the geographical location^[4-6]. Many factors have been suggested to contribute to the occurrence of renal stones, including diet, water hardness, geographical location, race, occupation, sex, and climatic conditions^[7-9].

The traditional explanation for renal colic has been that the ureteric obstruction causes a direct increase in intraluminal pressure of the collecting system, physically stretching it, and stimulating nerve endings in the lamina propria. In response to this distension, the smooth muscle in the wall of the ureter contracts as it tries to move the stone.^[10]

Effects of Acute, Complete & Prolonged Ureteral Obstruction :-

The effects of ureteral obstruction on renal blood flow (RBF), endoluminal pressure and glomerular filtration rate (GFR) were described by Moody et al. in 1975. He found three phases:^[11-13]

- (1) In the first 90 min there is an increase in intraluminal pressure and RBF, with a minimum decrease of GFR (to about 80% of pre-obstruction values).
- (2) From the 90th minute to the 5th hour of obstruction, there is an initial decline in RBF and GFR, while ureteral pressure reaches a plateau.

- (3) After the 5th hour of obstruction, a progressive decrease is observed in ureteral pressure, RBF and GFR (to 40–50% of pre-obstructive values)

Diagnosis:

- History & clinical examination :

Clinical examination and history-taking are the most commonly used diagnostic methods in acute abdominal pain. associated with gastrointestinal symptoms because of reflex stimulation of the celiac ganglion and because of the proximity of adjacent intraperitoneal organs. Thus, renal pain may be confused with pain of intraperitoneal origin^[14,15]. Atypical presentation of renal colic may also occur in patients with horseshoe kidneys or renal ectopia^[10].

- Laboratory investigations

Blood tests :

Blood tests including a full blood count may reveal typically a mild leucocytosis seen as part of an acute phase response in patients with ureteric stones ..Urea & creatinine and electrolytes are mandatory to assess renal function.^[16]

Dipstick urinalysis :

Dipstick urinalysis will be positive for blood in 85% of cases and may also demonstrate leucocytes and nitrites if there is infection present , pH may be indicative of the type of stone, acidic urine suggests uric acid stones whilst alkaline urine is suggestive of infection.^[16]

Stone analysis :

Stone analysis should be performed if available, as this may direct treatment in patients who suffer from recurrent stone disease.^[17,18]

- Imaging :

In the past decades alternatives to Intra-Venous-Pyelography (I.V.P) have been proposed for the study of patients with ureteric colic.^[19,20] In 1992 it was suggested to replace (I.V.P) with plain film of the abdomen (Kidney – Ureter – Bladder : KUB) & ultrasonography.^[24] In 1995 , it was suggested to replace urography with unenhanced helical CT (UHCT)^[25]. The use of NCCT & the introduction of DUS , has changed the strategy of diagnosis of renal colic , while MRI and radionuclide renal study are less commonly used methods for the diagnosis of renal^[26,27]

Management:

The goals of treatment of renal colic are to relieve the pain and maximally preserve renal function by release of ureteric obstruction. The first step in the treatment for acute renal colic caused by obstructing ureteral stones is medical relief of symptoms.^[28] When a drug therapy does not resolve the symptoms, the placement of a ureteral catheter or a nephrostomy tube has routinely represented the next step^[29]. They are usually followed by ureteroscopy (URS) or extracorporeal shockwave lithotripsy (ESWL), which currently represents the mainstay of treatment for symptomatic ureteral stones^[30].

- Conservative Management

Ureteral stones with a diameter less than 5 mm will pass in up to 68% of cases; however^[31]. Overall, stone size and position, degree of impaction and of obstruction at the initial presentation are factors influencing the likelihood of and the time to spontaneous passage^[33]. pain relief still remains as the most urgent step in patients with an acute stone episode. More recently the NSAIDs have gained increasing use , and opiate analgesics are still required as rescue analgesia^[34,35].

-Medical Expulsive Therapy

Medical expulsive therapy (MET) has recently emerged as an appealing option for the initial management of ureteral stones^[36]. Both α -antagonists and calcium channel blockers have been shown to inhibit the contraction of ureteral muscle responsible for ureteral spasms while allowing antegrade stone progression^[37,38].

- Active Stone Removal

Active stone removal should be considered for stones with a diameter ≥ 7 mm and when adequate pain relief cannot be achieved. Stone obstruction is associated with infection & there is a risk of urosepsis in single kidneys with obstruction or in cases of bilateral obstruction^[29]. When an active ureteral stone treatment is warranted, the best procedure to choose is dependent on several factors, besides stone size and location, including operators' experience, patient preference, available equipment and related costs^[30].

Aim of study

This study is designed to evaluate the demographic , clinical characteristics and management of patients presented to the emergency department complaining of ureteric colic and diagnosed as urolithiasis with their seasonal variation per one year.

III. Results

The total no. of patients presented to the surgical emergency department of Baghdad Teaching Hospital per one year (from 01/12/2011 to 30/11/2012) had been recorded 17941 with 11027 (61.46) for males & 6914 (38.54%) for females .The no. of patients presented with ureteric colic (right or left side abdominal pain) was 1722 (9.6 %) , of them 1063 (61.73%)patients were males while females were 659 (38.27%) .Just 371 (21.54%) patients of these 1722 , complete their assessment of history , clinical examination , investigations & receiving full management for their complains , 227 (61.19%) were males & 144 (38.81%) were females with male to female ratio (1.58:1) & revealing that only 264 (71.16%) patients diagnosed as urolithiasis (renal &/or ureteral) , 199 (75.38%) were males & 65 (24.62%) were females with male to female ratio (3.06:1) .

Then, the patients with urolithiasis no.= 264 (71.16%) of the patients with complete assessment 371 , had been categorized according to their ages & gender into groups of age periods with the no. of patients & their percentages in each period ,as shown in table -2- , with their mean & range of ages , revealing that patients with ages ranging between (21 - 30) years of age were the more presenting patients with urolithiasis 96 (36.36%) , while the least common presentation is for patients with 60 years of age & more = 13 patients (4.93%) for both males & females .Patients ages range between (15 – 75) with mean age of (34.02) & (SD = ±13.09)

History & clinical examination are very important tools in the diagnosis & assessment of patients with urolithiasis ,so in our study we categorized the patients according to the previous positive history of stone for both males & females which shows that the percentage of females with positive past history was (29.23%) which is more than that of males (24.12%) , the history of previous similar attack within the previous 5 years from the time of presentation showing that about (69.7%) of patients having previous similar attacks for at least one time within 5 years , & (28.79%) of patients with renal colic as their 1st attack ,the family history of urolithiasis revealing that about (21.97%) of patients having positive family history .

Also the clinical data show that the most common presenting symptom is loin pain for both males (84.2%) & females (78.9%) , while the presentation with anuria is the least common symptom also for both males (3.4%) & females (1.7%)

The patients with urolithiasis usually presented with unilateral pain of the right side (49.24 %) more than of the left side (46.21 %) & bilateral for (4.5%) .

The results of laboratory investigations show that the general urine examination being the most one used (78.17%) ,followed by Complete Blood Count (CBC) (54.17%) ,especially white blood cells (WBC) , the other blood tests (23.18%) , the biochemical tests ,as : blood urea , serum creatinine ,& random blood sugar were done to assess the renal function in certain conditions including the old age & diabetic patients , while the radiological investigations show that the ultrasound is the most commonly used 327 patients (88.14%) followed by X-rays (KUB) Kidney-Ureter-Bladder 69 patients (18.6%) , 60 patients of them(18.35%) having combined U/S & KUB , while 38 patients having CT-scan (10.24%).

The results of general urine examination show that most patients with urolithiasis having crystals in their urine (91.29%) ,(78.03%) having RBC , &(58.33%)having pus ≥ one plus (+) .The complete blood count used in urolithiasis patients is mainly for the leukocyte count (white blood cells WBC) &they are classified into patients with leukocyte count < 10.000 & with ≥ 10.000 , the results show that 196 patients with urolithiasis of the total 264 (i.e.74.24%) having WBC count <10.000. The PH of urine & the composition of stone by stone analysis , although beneficial in directing the management , usually not available in the emergency department lab. , because need more facilities , so not included .

The clinical assessment & radiological investigations , show that most patients having renal stone(74.24 %) more than ureteric(25.76 %) & usually with hydronephrosis(71.59%) .

For treatment used in the emergency department, the patients with urolithiasis (264) receive analgesia , i.v. hydration , &/or antiemetic .The most common analgesic drug used , after assuring that patients having no allergy & no contraindications to these drugs , is the diclofenac (by intramuscular injection of 3 ml / 75 mg ampoule) , followed by tramadol (by intramuscular or intravenous injection of 2 ml / 100 mg ampoule) , of these (264) patients (247) response to analgesia (93.56%), assessed by resolving their pain in ≤30 minutes (mainly for patients treated by tramadol) or in >30 minutes following the drug injection , while (17) patients (6.44%) not responded to analgesic drugs used, which also show the recurrence rate of pain in ≤ 8 hours after response to analgesia , that may occur during the period of patient observation or in short time after discharge from the emergency department .

Analysis of demographic & clinical characteristics and management of patients presenting with ..

Most patients 223 (84.47%) discharge from the emergency room within (2hours to 8hours), i.e. after complete resolve of their complains ,but 41 patient (15.53%) need consultations with other disciplines & 32 patients of them need hospitalization (11.9% of the whole sample) , the admission of these patients was due to : persistent pain (17 patients) despite analgesic management (6.4%) ; & (15 patients) due to infected hydronephrosis (5.5%) .

These results were analyzed in relation to weather temperature & season. We saw that the highest no. of patients presentation was in summer season for total patients & for patients with urolithiasis (38.64%) with the highest weather temperature all over the year (mean temperature of summer = 46.33 C°) ,while the least no. of presentation was in winter (14.77%) with the least weather temperature (mean temperature of winter = 16.7).

The total no. of patients not proved as urolithiasis were 107 (28.84%) , the males were 56 (52.34%) & the females were 51 (47.66%) with male to female ratio (1.2:1) , these different diagnoses & their percentages are shown in table -11- , from which we can see that musculoskeletal pain is the most common probable cause(24.3%) as a total for whole patients , for males it is followed by pyelonephritis (23.21%) , but for females, pyelonephritis is the most common cause (23.53%) followed by gynecological diseases (19.61%).

The total no. of patients per year in relation of gender to assessment

Assessment	Total no.	Total n (%) 17941 (100%)	Male n (%) 11027 (61.46%)	Female n (%) 6914 (38.54%)	P value	Male to female ratio
Patients with renal colic		1722	1063	659	0.8101	1.61:1
		100%	61.73%	38.27%		
Renal colic patients complete their assess.		371	227	144	0.7567	1.58:1
		100%	61.19%	38.81%		
Patients with diagnosis other than stone		107	56	51	0.4942	1.10:1
		100%	52.34%	47.66%		
Patients diagnosed with stone		264	199	65	< 0.0001	3.06:1
		100%	75.38%	24.62%		

The relation of patients with stone to age period of presentation

Age		13-20	21-30	31-40	41-50	51-60	≥ 60	Total
Male	n	10	73	57	30	19	10	199
	%	5.03%	36.68%	28.64%	15.08%	9.54%	5.03%	100.00%
Female	n	10	23	16	8	5	3	65
	%	15.38%	35.38%	24.62%	12.13%	7.69%	4.62%	100.00%
Total	n	20	96	73	38	24	13	264
	%	7.58%	36.36%	27.65%	14.39%	9.09%	4.93	100.00%

Chi-squar (X²) = 7.714

df = 5

P = 0.1727

Patients ages range between (15 – 75) with mean age of (34.02) & (SD = ±13.09)

History of patients with urolithiasis

Positive History	Total n (%) 264 (100%)	Male n (%) 199 (100%)	Female n (%) 65 (100%)
Previous history of stone	67 (25.38%)	48 (24.12%)	19 (29.23%)
Previous similar attack within 5 years	184 (69.7%)	138 (69.35%)	46 (70.7%)
Positive family history of stone	58 (21.97%)	45 (22.61%)	13 (20.0%)
1 st attack presentation of renal colic pain	76 (28.79%)	55 (27.37%)	21 (27.63%)

Clinical presentation of patients with urolithiasis

Clinically	Total n (%) 264	Male n (%) 199	Female n (%) 65	P value
Loin pain	218 (82.9%)	167 (84.2%)	51 (78.9%)	0.314
Pain Radiation	76 (28.8%)	31 (40.7%)	45 (59.3%)	<0.001
Abdominal cramps	49 (18.7%)	27 (14.0%)	22 (33.3%)	<0.001
Back pain	22 (8.5%)	15 (7.9%)	7 (10.5%)	0.4131
Nausea & vomiting	22 (8.5%)	14 (7.3%)	8 (12.3%)	0.1818
Color change of urine	18 (6.6%)	15 (7.9%)	3 (3.5%)	0.4171
Dysuria	16 (5.9%)	11 (5.6%)	5 (7.6%)	0.5254

Fever	15 (5.7%)	10 (5.0%)	5 (7.6%)	0.420
Groin pain	9 (3.4%)	7 (3.4%)	2 (3.5%)	0.865
Anuria	8 (2.9%)	7 (3.4%)	1 (1.7%)	0.491

Side of renal colic presentation

Side of renal colic	Males n () % ()	Females n () % ()	Total n () % ()
Right – sided	98 (49.25 %)	32 (49.23 %)	130 (49.24 %)
Left – sided	92 (46.23 %)	30 (46.15 %)	122 (46.21 %)
Bilateral	9 (4.52 %)	3 (4.62 %)	12 (4.55 %)
Total n () % ()	199 (100 %)	65 (100 %)	264 (100 %)

Chi-square (χ^2) = 0.001 df = 2 P value = 0.9995

Laboratory investigations ordered to patients with urolithiasis

The investigation	Total no. of patients 371	
	No. of patients have investigation	Their %
General urine examination	291	(78.17%)
Complete Blood Count	201	(54.17%)
Other Biochemical Blood Tests	86	(23.18%)

Radiological investigations ordered to patients with urolithiasis

The investigation	Total no. of patients 371	
	No. of patients have investigation	Their %
Ultrasound	327	(88.14%)
X-ray (KUB)	69	(18.6%)
U/S & KUB	60	(18.35%)
CT-scan	38	(10.24%)

Results of GUE & CBC

Constituents	No. of Patients	Their %
Crystals of GUE	241	91.29%
RBC of GUE	206	78.03%
Pus \geq (+) of GUE	154	58.33%
WBC of CBC <10.000	196	74.24%

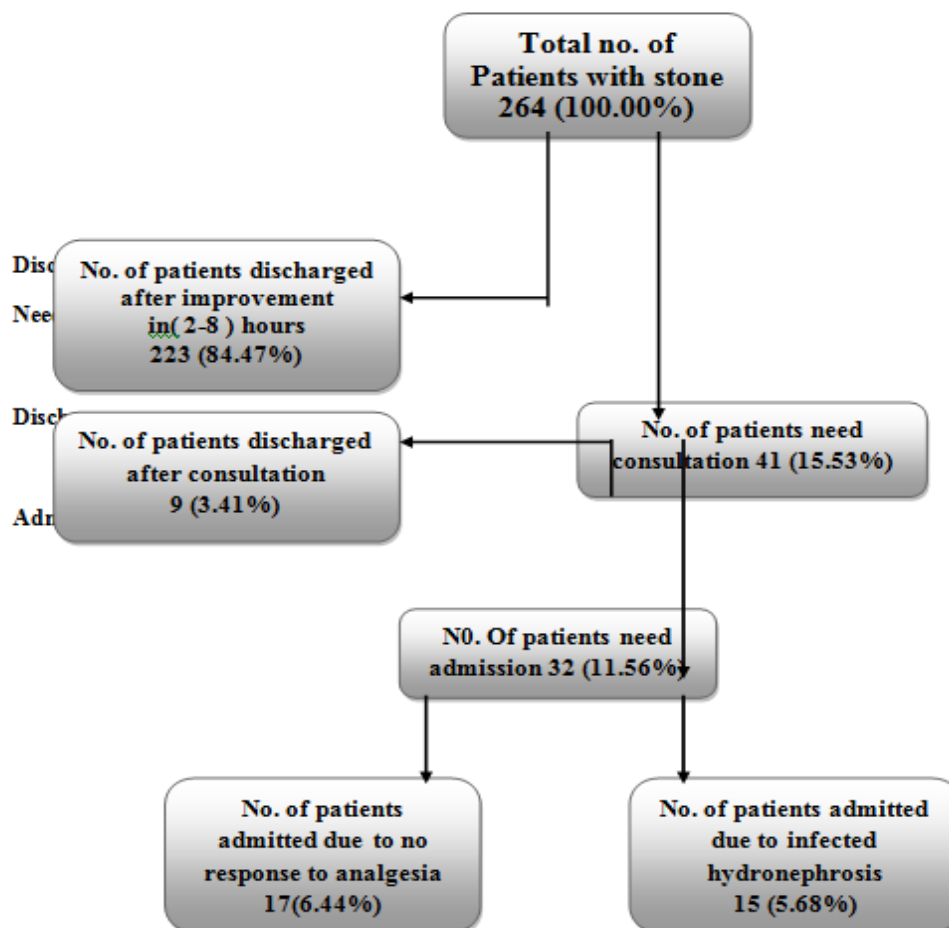
Site of the stone in relation to hydronephrosis

Pathology	No. of patients & %	Site of stone	
		Renal	Ureteric
Stone with hydronephrosis &/or hydroureter	189 (71.59 %)	138	51
Stone with out hydronephrosis or hydroureter	75 (28.41 %)	58	17
Total	264 (100.00 %)	196 (74.24 %)	68 (25.76 %)

Response to analgesia & recurrence after response

Drug (analgesic) Used	Total N (247) % ()	Response to analgesia		Recurrence of pain in 8 hour
		Pain start to resolve in \leq 30minutes	Pain start to resolve in >30minutes	
Diclofenac	102 (41.3%)	41 (40.2%)	61 (59.8%)	5 (4.9%)
Tramadol	94 (38.1%)	79 (84.1%)	15 (15.9%)	9 (9.6%)
Tramadol & diclofenac	51 (20.6%)	48 (94.2%)	3 (5.8%)	---

Diagram - Fate of patients with urilithiasis



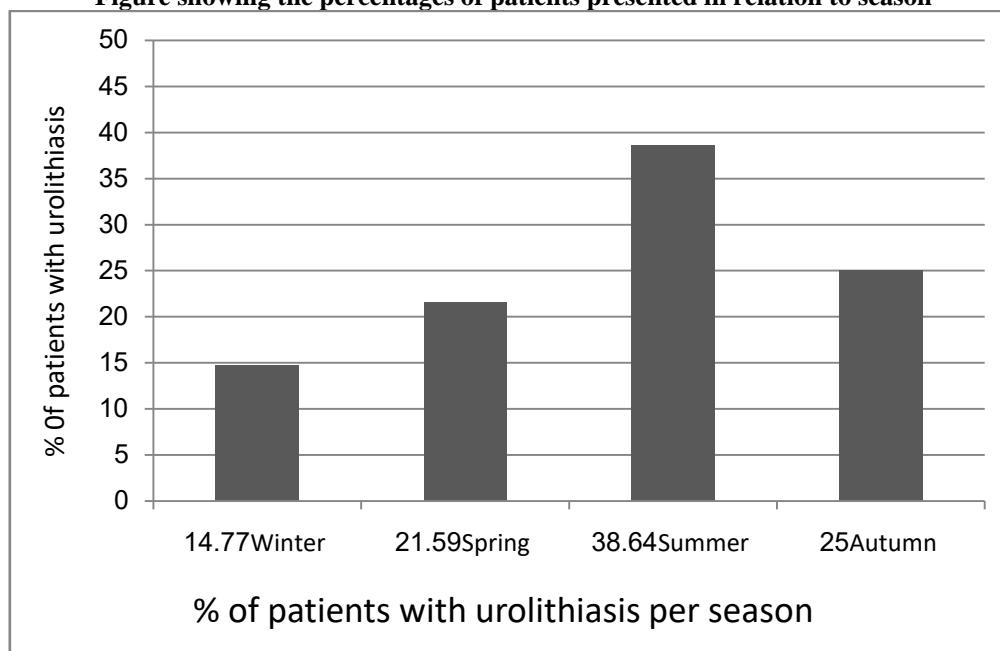
Seasonal variation of patients in relation to weather

season	month	Mean Temp. °C	Total no.of patients presented		Total no. of patients with renal colic		Urolithiasis patients no.(n)&(%)		Urolithiasis no.&% per each season	
			♂	♀	♂	♀	♂	♀	♂	♀
W I N T E R	Dec. 2011	16 °C	1275		104		11 (4.17%)		Winter n (39) %(14.77)	
			797	478	61	43	6	5		
	Jan. 2012	15 °C	1203		101		16 (6.06%)			
			745	458	53	48	10	6		
Feb. 2012	19 °C	1220		116		12 (4.54%)		24	15	
		755	465	71	45	8	4			
S P R I N G	Marc. 2012	21 °C	1367		117		12 (4.54%)		Spring n (57) %(21.59)	
			841	526	67	50	9	3		
	April 2012	33 °C	1644		129		17 (6.45%)			
			1043	601	77	52	12	5		
May 2012	35 °C	1708		205		28 (10.6%)		42	15	
		1036	672	126	79	21	7			
S U M M E R	Jun. 2012	47 °C	1609		192		27(10.23%)		Summer n (102) %(38.64)	
			948	661	135	57	19	8		
	July 2012	49 °C	1721		208		35(13.26%)			
			1010	711	139	69	26	9		
Aug. 2012	43 °C	1701		188		40(15.15%)		74	28	
		1007	694	124	64	29	11			

A U T U M N	Sep. 2012	39 C	1677		137		31(11.74%)		Autumn n (66) %(25.0)	
			1046	631	83	54	23	8		
	Oct. 2012	37 C	1510		128		21(7.95%)			
			943	567	70	58	15	6		
	Nov. 2012	23 C	1306		97		14(5.31%)		47	19
			856	450	57	40	9	5		
Total no.			17941		1722		264		Each total no. represent 100%	
Male	female	n	11027	6941	1063	659	199	65		
		%	61.46	38.54	61.73	38.27	75.38	24.62		

Chi-squar (X^2) = 9.21 df = 3 p = 0.0266

Figure showing the percentages of patients presented in relation to season



Patients with diagnoses not proved as urolithiasis

Diagnosis	Males n & (%)	Females n & (%)	Total n & (%)
Musculoskeletal pain	17 (30.36%)	9 (17.65%)	26 (24.3%)
Pyelonephritis	13 (23.21%)	12 (23.53%)	25 (23.4%)
Bowel disease	6 (10.71%)	7 (13.73%)	13 (12.15%)
Appendicitis	4 (7.14%)	4 (7.84%)	8 (7.48%)
Cholecystitis	3 (5.36%)	3 (5.89%)	6 (5.61%)
Pancreatitis	2 (3.57%)	1 (1.96%)	3 (2.8%)
Gynecological diseases	-	10 (19.61%)	10 (9.35%)
Tumor / Abscess	4 (7.14%)	2 (3.92%)	6 (5.61%)
Congenital diseases	3 (5.36%)	1 (1.96%)	4 (3.74%)
Pneumonia	2 (3.57%)	2 (3.92%)	4 (3.74%)
Zoster infection	2 (3.57%)	-	2 (1.87%)
Total	56 (52.34%)	51 (47.66%)	107 (100%)

Chi-squar (X^2) = 68.49 df = 9 P = < 0.0001

IV. Discussion

The history, clinical examination & investigations show that 264 of 371 (71.16%) patients with ureteric colic presented to the surgical emergency department diagnosed as urolithiasis, so the most common cause of these patients with ureteric colic is stone, renal &/or ureteral. Urolithiasis affects 5-15% of the population worldwide [45] & there is an increase in urolithiasis cases which may be attributed to societal and lifestyle factors, including equality in the workforce; increased athletic activity with the risk of dehydration; dietary changes such as high-fat, high-protein diets, increased intake of soft drinks, and increased sodium intake from processed, preserved, and fast food consumption; and increasing rates of obesity and metabolic syndrome [46-48]. Other researchers suggest environmental and geographic factors, theorizing that global warming and higher population density in hot, sunny, arid areas account for the increase in incidence [49,50].

These results of our study were compared to other results :

Yasir T. Al-Wattar^[51] show that the stone were the main cause of ureteric colic in 83.8% of patients .

Adam Goldstone MD & Andrew Bushnell MD^[52] show that the stone were the main cause of ureteric colic in 63.6 % of patients .

For patients diagnosed as urolithiasis , the male:female was (3.06:1) , as we see that this proportion more than that for patients with ureteric colic as a whole (1.58:1), which mean that males were more than females with diagnosis of stone as the cause of ureteric colic . Some investigators claimed that stone might be more frequent in males than in females due to predominant activating factors in males versus inhibiting factors in females for stone formation^[54, 55]. Iguchi et al.^[56], in their experimental study, discovered that female sex hormones could inhibit renal crystal deposition in rats. Estrogen has been demonstrated to inhibit bone resorption and increase renal absorption of calcium^[59, 60] and urinary citrate levels^[57, 58]. A human study reported higher levels of testosterone and FSH in stone forming males relative to the controls^[61]. A recent review of over (28,000) 24 hr urine test results in the United States demonstrated that urinary volumes fall significantly in men, but not in women, during summer^[62]. This was associated with a fall in urinary pH and an increase in the supersaturation of both uric acid and calcium oxalate^[62].

The studies below show that males > females in presentation as urolithiasis in compare to our study :

Yasir T. Al-Wattar^[51] show that males with urolithiasis representing(62.6%).

Adam Goldstone MD^[52] show that males representing (63.3%).

Abd-Alhakim A. Al-Ta'i^[53] show that males representing (52%) .

Albert Tiu^[63]show that males representing (75.82%).

Mustafa Serinken^[64]show that males representing (75.7%).

Our study show that males representing (75.38%) .

Most patients with urolithiasis presented in summer season (38.64%) with the highest weather temperature in this season regarding our region (mean temperature of summer = 46.33 C°) , this is due to dehydration in hot weather from increased perspiration resulting in concentrated and acidified urine leading to more crystallization with a higher likelihood to form stones^[65-67]. There are also papers reporting that increased intake of fluids helps reduce stone formation^[68-70]. These patients having a mean age =34.02 & range of age (15-75 years) with most common age period of presentation (21-30) (36.36%) , followed by (31-40) years of age , as they are more susceptible to hot climates & having more exercises than other age groups leading to increase their dehydration state , also they having higher incidence of urinary tract infection , as one of the risk factors of renal stone, in this sexually active group of patients^[71].

By history assessment of patients, most patients (69.7%) having history of previous similar attack within previous 5 years , more than (20%) of them having family history of stone & more than (25%) of them having positive previous history of stone .Recurrence of stone disease is a consequence of most metabolic disorders^[73,74].Several metabolic disorders are known to be familial or genetically determined^[73,75].Other studies mentioned that hereditary genetic disorder could increase the risk of developing renal stone^[76-78].The stone recurrence rate varies from 10% to 100% ,this large variability may be caused by the different factors such as management methods^[79-81] .

These results compared to other result below :

Abd-Alhakim A. Al-Ta'i^[53] show that (22.7%) of patients having family history & (75.6%) having previous similar attacks.

Fakhria Jaber Muhbes^[82] show that (44%) of the patients whose relative have been afflicted with urinary calculi.

Phillip M. Hall^[83] show that urinary stone disease recurs in 30% to 50% of patients within 5 years.

Clinically most patients with urolithiasis presented with loin pain (82.9%) in addition to other signs & symptoms which are least common than it^[84,85]. Dysuria and fever are more common in patients with infection than with stone^[86]. The least presentation is anuria , which may occur in rare conditions including bilateral ureteric obstruction or ureteric obstruction in patients with a single & ureter .

Most patients with urolithiasis included in this study were right sided ureteric colic (49.25%) , the left sided ureteric colic representing (46.23%) while (4.52%) having bilateral ureteric colic , depending on the site of the pathological cause as stone which may be right or left , not specific to each of them , other studies show that the right side is the common side & others show the left side is more common .

The most radiological investigation used is the ultrasound (88.14%) followed by KUB , then combined U/S & KUB , while the least used in our emergency ward is CT-scan^[89]. The IVU not used in our emergency ward but done in special radiological department where the contrast media & experienced staff are available .

Cupisti et al. ^[90] reported that ultrasound is the first line diagnostic study in patients suspected to have stone disease and ureteric colic and have not recommended tomography, in spite of its high sensitivity & specificity, as the first choice as for financial reasons. On the other hand, Pfister et al. ^[91] advocated that tomography had a better economic outcome in patients with ureteric colic since it has high diagnostic accuracy, effectiveness, speed, lower risk, and slightly more costs when compared to intravenous urography. Another study recommended unenhanced spiral computed tomography in the initial radiological evaluation of stone disease and ureteric colic for its high diagnostic accuracy^[92,93].

Other laboratory investigations used were mainly GUE & CBC. GUE showing that most patients with urolithiasis having crystals (91.29%), RBC (78.3%), & Pus \geq (+) (58.33%). The urinalysis is the investigation most commonly ordered in patients with presumptive diagnosis of ureteric colic and reveals hematuria in 90% of patients with stones ^[95]. One-tenth of patients with ureteric colic would not exhibit hematuria ^[96]. One retrospective study found that 67% of patients with ureterolithiasis had more than (5) RBC per HPF and (89%) of patients had more than zero RBC/HPF on microscopic examination of the urine ^[66].

The CBC show that (74.24%) of patients having WBC $<$ 10,000. Other laboratory investigations (as blood urea & creatinine) are usually used for old patients & patients with comorbid diseases with suspected renal impairments for the assessment of their renal function⁽⁹⁴⁾.

In our study, most patients discharged after receiving treatment & resolve of their complain usually in (2-8) hours with advise to be followed by a urology outpatient clinic. Patients with urolithiasis may need admission as in patients with no response to treatment or infected hydronephrosis.

Providing relief from the debilitating pain caused by obstructing calculi is a therapeutic challenge. Singh et al ^[97] reported that the medical therapy of acute renal colic should be started with NSAIDs. They also claimed that supplementary agents should be added only if excruciating pain is persistent ^[97]. In our study, most analgesic drug used is the diclofenac used in (41.3%) of patients by intramuscular injection of (3ml/75 mg) while other analgesic drug used is tramadol used in (38.1%) of patients by intramuscular or intravenous injection of (2ml/100mg). The results show that the best treatment used is the combination of (diclofenac & tramadol) with rapid response & less frequency of recurrence.

Mustafa Serinken ^[64] show that NSAIDs used in (86.4%) of patients, while opiates used in (32.3%). Tunji A Lasoye ^[98] show that NSAIDs used in (85.8%) of patients, while opiates used in (9.4%).

V. Conclusions

- The most common clinical presentation is the loin pain.
- The most common cause of ureteric colic is the stone (urolithiasis) may be renal &/or ureteral.
- The males more affected than females.
- The middle age patients (20th & 30th) are the most common patients presented with urolithiasis.
- The weather temperature affects the incidence of urolithiasis, increasing weather temperature associated with increasing the incidence.
- The history & family history should be assessed by the emergency physician for patients with urolithiasis as $>$ 1/5 of patients having positive family history.
- The U/S is the most used & acceptable investigation used in our emergency ward for ureteric colic patients.
- The best treatment used for relieving the complain of patients with ureteric colic is the combination of centrally acting analgesic drugs & NSAID.

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