

Unplanned Hospital Visit After Urinary Stone Procedure

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Abstract

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Background: Urinary stone is a multifactorial disease which is common in daily urological practice, and is also a substantial public health problem. Surgical management of urinary calculi has changed enormously during the past 20 years. Nowadays, the trend among urologists involved in the management of patients with urinary tract stones is to choose the less invasive and more effective option.

Objective: We evaluate the causes of the unplanned hospital visit following shock wave lithotripsy (ESWL), URS (Uretrorenoscope), and PCNL (percutaneous nephrolithotomy) surgical procedures for stone disease and determine the predictors affecting on the visit and readmission.

Patients and Methods: This study is a cross-sectional study carried out in Ghazi Al-Hariri hospital for subspecialized surgery in Medical City Complex in Baghdad city-Iraq. The duration of the study was 18 months throughout the period from January, 2019 till June 2020. The majority of SWL techniques were as an outpatient procedure. The patients received analgesia and in each SWL session, 3000 shocks were delivered at a rate of 60 to 90 shocks/min. For URS the patients were performed under general or spinal anesthesia. In cases where ureteral access was not possible, insertion of a ureteric stent was the option followed by ureteroscopy after 14 days. In PCNL the surgical procedure was fluoroscopic guided, prone position used. This procedure was performed under general anesthesia.

Results: A 362 patients with urinary stones; 41 unplanned visits were recorded within one month of surgical operation. The incidence of unplanned visits after management of urinary stone in Medical City Complex was (11.3%) and rate of unplanned visits according to management types (26.6%, 18.8% and 4.6% for PNL, URS and ESWL).

Conclusion: The rate of unintended visits within 30 days after treatment of urinary tract was treated at Martyr Ghazi Hariri Specialized Surgery at the Medical City Complex in the world, and the rate of unplanned visits within 30 days after the removal of the kidneys The percutaneous route is the highest, followed by ureteroscopy and the lowest level after extracorporeal lithotripsy. Factors influenced by unintended visits such as hospital exit, and not given cafés after exit, insufficient follow-up and therapeutic mistakes that are still large. Reservation therapy is the perfect treatment method for treating illegal visits special after the ureter end.

Keywords: Shock wave lithotripsy, percutaneous nephrolithotomy, Uretrorenoscope

Introduction

Urinary stone is a multifactorial disease which is common in daily urological practice, and is also a substantial public health problem[1].

The incidence of kidney stone disease (urolithiasis) is rising, with a lifetime risk of 10–15% and a recurrence rate of 50% within 10 years[2]. Globally, urinary stones are represented at a prevalence of 5–12% in males and 4–7% in females[3].

The surgical management of urinary calculi has changed enormously during the past 20 years. Nowadays, the trend among urologists involved in the management of patients with urinary tract stones is to choose the less

invasive and more effective option, based on patient and stone characteristics. Among these modalities are shock wave lithotripsy (SWL), percutaneous nephrolithotomy (PCNL), ureteroscopy (URS), retrograde intrarenal surgery (RIRS) and laparoscopic stone surgery [4].

Zhang, *et al.* mentioned that SWL, URS and PCNL being the most common minimally invasive treatment techniques with the highest stone-free rates (SFR) and minimal morbidity[5].

Indications for the treatment of renal stones, include [6]:

•stone growth:
•stones in high-risk patients for stone formation:
•obstruction caused by stones:
•infection:
•symptomatic stones (e.g., pain or haematuria)
•stones > 15 mm:
•stones < 15 mm if the observation is not the option of choice:
•comorbidity:
•patient preference
•social situation of the patient (e.g., profession or travelling)

Hospital readmission occurs when a patient is admitted to a hospital within a specified period after being discharged from an earlier (initial) hospitalization. For Medicare, this period is defined as 30 days and includes hospital readmissions to any hospital, not just the hospital at which the patient was originally hospitalized [7].

Readmissions are also classified as planned and unplanned. While planned readmissions

reflect complementary diagnosis and therapy, unplanned readmissions are associated with unexpected events and, therefore, are used for research purposes [8].

Many factors that increase the likelihood of readmission are modifiable, especially those that relate to clinician or system level issues. Such factors include [9]:

Early hospital discharge.
Inadequate post-discharge support
Insufficient follow-up
Therapeutic errors.
Adverse drug events and other medication-related issues
Complications following procedures
Nosocomial infections, stent symptoms

Patients and Methods

This study is cross-sectional study carried out in Ghazi Al-Hariri hospital for subspecialized surgery in Medical City Complex in Baghdad city-Iraq. The duration of the study was one year and six months throughout the period from 1st of January, 2019 till the 30th of June, 2020.

The inclusion criteria were adults (age ≥ 18 years old) patients with upper urinary stones managed by PNL, URS and ESWL, Patients who presented with an unplanned visit within 30 days of procedure. The exclusion criteria are younger age patients (<18 years age), Open stone surgery, longer duration of the unplanned visit (>30 days), congenital renal anomalies, pregnancy, and patients who refused to participate.

A total of three hundred and sixty-two patients with upper urinary stones were included and managed with different approaches PCNL (45 patients), URS (101 patients) and ESWL (216 patients), and a sample of 41 patients with unplanned visits after urinary stones management was studied.

Assessment of patients

After diagnostic assessment by history, physical examination, laboratory investigations, assessment of cardiac and pulmonary function by the cardiologist and internal medicine doctor, the confirmation of

diagnosis and selection of surgical decision was done based on last recommendations by American Urology Association (AUA), European Association of Urology (EAU) guidelines 2019 & 2020. All patients evaluated by preoperative imaging, including Ultrasonography (US) and abdominal CT as indicated.

The majority of SWL techniques were performed as an outpatient procedure. The patients received analgesia and in each SWL session, 3000 shocks were delivered at a rate of 60 to 90 shocks/min.

For URS the patients were performed under general or spinal anesthesia. In cases where ureteral access was not possible, insertion of a ureteric stent was the option followed by ureteroscopy after 14 days. The stones were fragmented by laser or pneumatic lithotripsy under visualization. In PCNL the surgical procedure was fluoroscopic guided, prone position used. This procedure was performed under general anesthesia. The track was made by selecting the target calyx, pneumatic or Ultrasonic lithotripter was used. In the end, we removed the ureteric catheter, insert an antegrade JJ stent and place a nephrostomy if needed.

Follow up

All patients were followed up for 30 days after completing their stones management for

unplanned visits and managing the complaints or complications which were the reasons for these visits after assessment for clinical presentation and implementing investigations in addition to treatment by the same Urological surgical team.

Patient's with unplanned visit assessment and management

The patients were divided into two categories according to their presentation:

1-Patients who are presented to the outpatient consulting clinic who are suffering from mild to moderate symptoms within 30 days from the procedure are evaluated by careful history, physical examination and essential investigation including urinalysis, urine culture, complete blood count, inflammatory marker and imaging then managed conservatively by reassurance, medical advice, oral antibiotics, oral analgesia, anticholinergic, alpha blocker and urine sterilizer.

2-Patient who presented to emergency department suffering from severe symptoms within 30 days from the procedure are managed according to advance life support measures followed by history and physical examination, blood sample send for complete blood count, blood culture, inflammatory marker, renal function and electrolyte, urinalysis and urine culture then managed by establishing intravenous catheter, correction of

fluid and electrolyte abnormality, empirical intravenous antibiotics, intravenous analgesic, antipyretics, bladder catheterization, bladder irrigation and blood transfusion.

The Clavien-Dindo grading system was used in the assessment of postoperative complications. The unplanned visits for patients surgically operated with PNL were assessed within 30 days following the surgical operation

Statistical analysis

The data of patients were analyzed by application of Microsoft Excel program and Statistical Package for Social Sciences (SPSS) version 23. Outcomes of analysis were arranged in scales variables (means and standard deviation) and categorical variables. Chi-square test and Fisher's exact test were used for categorical variables. P-value of 0.05 or less was regarded as significant.

Results

Incidence rate of unplanned visits were 11.3%. The incidence rates of unplanned visits for different management types of urinary stones were 26.6%, 18.8% and 4.6% for PCNL, URS and ESWL, respectively.

No significant differences were observed in our study between patients with unplanned visit ($p=0.2$) Table (1).

Table (1): Distribution of patients' clinical presentation according to management types

Variable	PNL		URS		ESWL		P
	No.	%	No.	%	No.	%	
Clinical presentation							0.2* NS
Fever	3	0.8	8	2.2	3	0.8	
Fever and rigor	3	0.8	1	0.2	0	-	
LUTS	0	-	4	1.1	1	0.2	
Hematuria	3	0.8	2	0.5	1	0.2	
Abdominal pain (loin pain)	2	0.5	2	0.5	4	1.1	
Others	1	0.2	2	0.5	1	0.2	

*Fishers exact test, NS=Not significant

The commonest PNL postoperative complications were UTI (3 patients), urosepsis (2 patients), urinoma (2 patients), AVF (2 patients), peritonitis (1 patient), pulmonary infection (1 patient) and subcapsular hematoma (1 patient), while common postoperative complications for URS were UTI (8 patient), uro-sepsis (8 patient), stent migration (3 patient), urinoma (1 patient), urinary obstruction (1 patient) and pulmonary infection (1 patient). The main postoperative complications for ESWL were UTI (3patient), uro-sepsis (1 patient), urinary obstruction (4 patients) and stent migration (1 patient).

There was a significant difference in Double J stent insertion between different management types of urinary stones (p=0.001); The DJ stent was commonly done after PNL and URS, while the DJ stent was commonly done for ESWL. A significant difference was observed in alpha blockers between different types of management types for urinary stones (p=0.01); URS patients were applied alpha blockers, while PNL and ESWL applied less alpha blockers. A highly remarkably association was observed between planning for 2nd ESWL session and patients treated with ESWL (p<0.001) Table (2).

Table (2): Distribution of ancillary medical and surgical procedure for the study group

Variable	PNL		URS		ESWL		P
	No.	%	No.	%	No.	%	
DJ							
DJ	12	100.0	17	89.4	6	60.0	0.001* S
No DJ	0	-	2	10.5	4	40.0	
Alpha blockers							
Yes	9	75.0	18	94.7	6	60.0	0.01* S
No	3	25.0	1	5.1	4	40.0	
Planned for second ESWL session							
Yes	3	25.0	1	5.3	7	70.0	<0.001* S
No	9	75.0	18	94.7	3	30.0	

*Fishers exact test, NS=Not significant, S=Significant

A significant difference was observed in intra-operative course between different types of management for urinary stones (p=0.04); abnormal intra-operative complications were significantly more for patients operated with PNL, while all stones managed with ESWL had normal

intraoperative course. There was a highly significant difference in intra-operative abnormalities between different management types of urinary stones (p<0.001); bleeding was commonly related to PNL, while long duration was significantly related to URS Table (3).

Table (3): Distribution of intra-operative course according to management types

Variable	PNL		URS		ESWL		P	
	No.	%	No.	%	No.	%		
Intra-operative course								
Normal	4	33.3	13	68.4	10	100.0	0.004* S	
Abnormal	8	66.7	6	31.6	0	-		
Intra-operative abnormalities								
Normal	4	33.3	13	68.4	10	100.0	<0.001* S	
A b n o r m a l	Bleeding	6	50.0	0	-	0		-
	Perforation	2	16.7	0	-	0		-
	Complex procedure	0	-	4	21.1	0		-
	DJ related issues	0	-	2	10.5	0		-

*Fishers exact test, NS=Not significant, S=Significant

There was a significant difference in management of unplanned visits between different management types of urinary stones (p=0.009); conservative treatment was

commonly related to URS, while DJ insertions were significantly related to ESWL Table (4).

Table (4): Distribution of management plan according to management types

Variable	PNL		URS		ESWL		P
	No.	%	No.	%	No.	%	
Management plan							0.009*^S
Conservative	8	66.6	17	89.4	6	60.0	
Blood transfusion	2	16.7	0	-	0	-	
Angio-embolization	2	16.7	0	-	0	-	
DJ insertion	0	-	2	10.6	4	40.0	

*Fishers exact test, NS=Not significant, S=Significant

Among patients treated with PNL, one patient does not respond to conservative treatment while another PNL patient responds to blood transfusion and angio-embolization. All patient operated by URS and ESWL respond to conservative treatment while 2 patients need DJ insertion post URS and 4 patients post ESWL, no patient required DJ reinsertion post PNL.

While Among patients treated with PNL, one patient had postoperative ICU admission

and one patient with high serum creatinine/GFR, while patients treated with URS, no patients had postoperative morbidity and for patients treated with ESWL, one patient has been developed high serum creatinine/GFR. According to Clavien-Dindo classification, the postoperative complications of patients treated with different management types were classified into:

Table (5): The postoperative complications of patients treated with different management types were classified According to Clavien-Dindo classification

Grade	Complications	No.	%
I	LUTS	4	9.7
II	UTI	14	34.1
	Subscapular hematoma	2	4.8
	Urinoma	3	7.3
	Blood transfusion	2	4.8
IIIa	AVF	2	4.8
IIIb	DI insertion	6	14.6
IV	Uro-sepsis	8	19.5
V	Death	0	-
Total		41	100.0

Discussion

Stone diseases are the common urological diseases with a prevalence rate of 10% to 15% and with a recurrence rate reaching 50% within 10 years [10]. Emergency department visits related to stone diseases are common and over 90% of those patients were discharged after treatment, but information after discharge is limited. Some of them had an unplanned visit, which was characterized by inconvenience, cost and a big burden on the national health system [11]. In the present study, the incidence of unplanned visits after the management of urinary stone in Ghazi Al-Hariri hospital for subspecialized surgery in Medical City Complex was (11.3%). This incidence rate is similar to results of Scales *et al* [12] retrospective cohort study in the USA, which found that of total 128,564 patients with stone diseases, 13,684 (11%) patients had unplanned visits after their discharge.

However, our study incidence rate (18.8%) is slightly higher than the results of Bloom *et al* [13] study in the USA, which reported that 15.6% of patients discharged after ureteroscopy had unplanned visits to an emergency department within 30 days. Another American retrospective review survey on 157 patients with stone diseases by Du *et al* [14] found that (28.0%) patients had unplanned phone calls, 23 (14.6%) patients had unplanned emergency department visits, and 8 (5.1%) patients had readmissions. For that, acceptable proportion of patients in our study required further evaluation or management, which led to the elevation of unplanned visits rate and more burden on the health budget and resources that must be notified by health policymakers and finding solutions to decrease the rate. In general, our

study incidence rate of unplanned visits after stone diseases is within international rates, which were ranged from 5% to 15% [15].

In our study, PNL had the highest incidence of unplanned visits after treatment. This finding is consistent with results of Khanna [16] study in USA, which revealed that PNL had the highest frequency of unplanned visits within 30 days postoperatively (13.2%), followed by URS (10.6%) and ESWL (7.5%). Our study findings are also in agreement with results of Scales *et al* [12] study in USA, which revealed that the cost of unplanned visits was lowest after ESWL and highest after PNL. However, our study rate for unplanned visits after PNL is higher than the results of Tepeler [17] study in Turkey which reported that emergency department and re-hospitalization rates after PNL were 5.7% and 5.2%, respectively. This difference in unplanned visits incidence rate might be attributed to many factors like discrepancies in surgical techniques and availability of types of equipment in addition to the difference in surgeon skills, frequency of operations and learning curve.

A recent study carried out by Mittakanti [18] in the USA on a cohort of 16,060 ureteroscopy patients found that 6.6% of them had unplanned visits to the ER and 2.2% had re-admission with no effect of the ureteral stent on the rate of unplanned visits.

The present study revealed that postoperative complications were higher for patients treated with URS (UTI and sepsis) than PNL (UTI and sepsis) and lowest for ESWL (urinary obstruction). These findings differ from many Iraqi studies which reported that URS (diagnostic or therapeutic) is accompanied with low grade of infectious

complications, while PNL is mainly associated with postoperative fever and sepsis, which is less frequency than URS[19]. The present study showed low grades of postoperative complications regarding Clavien-Dindo classification. These findings are similar to results of Ibrahim study in Iraq 20 and Mandal *et al* [21] study in India which all reported low grades of complications regarding Clavien-Dindo classification after different management approaches of renal stones.

Conclusions

The incidence rate of unplanned visits within 30 days following PCNL is the highest, followed by URS and lowest following ESWL.

Risk factors for unplanned visits like immature discharge, inadequate post-discharge advice, insufficient follow-up, therapeutic errors are still significant and underestimated. The difference in unplanned visits incidence rate might be attributed to many factors like discrepancies in surgical techniques and availability of types of equipment in addition to the difference in surgeon skills, frequency of operations and learning curve. Conservative management is the common treatment method for patients during unplanned visits specifically for patients after ureteroscopy.

The postoperative morbidity rate is more common in patients following percutaneous nephrolithotomy

Recommendations

Risk factors for unplanned visits must be taken into consideration to reduce the incidence rate of unplanned visits. Encouraging Urologists to adopt the updated International and National guidelines in

selecting the best approach in managing urolithiasis to avoid complications and unplanned visits. Further national large-sized multi-center studies discussing risk factors for unplanned visits following urolithiasis management should be supported.

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Conflict of interest: Nil

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زيارات المستشفى الغير مخطط لها بعد اجراء التداخلات الجراحية لحصى المسالك البولية

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المخلص

خلفية الدراسة: حصى المسالك البولية مرض متعدد العوامل وهو شائع في العيادات الاستشارية اليومية لجراح المسالك البولية، كما أنه يمثل مشكلة صحية عامة في الآونة الاخيره لقد تغير العلاج لحصى المسالك البولية بشكل كبير خلال العقدين الماضيين. في الوقت الحاضر، إن الاتجاه السائد بين أطباء المسالك البولية لعلاج المرضى الذين يعانون من حصى المسالك البولية هو اختيار الطريقة الأقل ضرراً والأكثر فعالية، بناءً على خصائص المريض وحصى المسالك البولية.

اهداف الدراسة: نقوم بتقييم أسباب زيارة المستشفى غير المخطط لها بعد الإجراءات الجراحية لتفتيت الحصوات بموجة الصدمة (ESWL)، و URS (منظار الحالب)، و PCNL (استئصال حصى الكلى عن طريق الجلد) لمرض الحصوات وتحديد المؤشرات التي تؤثر على الزيارة وإعادة القبول.

المرضى والطرائق: هذه الدراسة هي دراسة متتابعة سريرية مستقبلية أجريت في مستشفى الشهيد غازي الحريري للجراحات التخصصية في مجمع مدينة الطب في مدينة بغداد العراق، مدة الدراسة سنة وستة أشهر طوال الفترة من كانون الثاني ٢٠١٩ ولغاية حزيران ٢٠٢٠.

النتائج: ثلاثمائة واثنتون مريضاً يعانون من حصى المسالك البولية تم تسجيل ٤١ زيارة غير مخطط لها خلال شهر واحد من العمليات الجراحية. بلغ معدل حدوث الزيارات غير المخططة بعد علاج حصى المسالك البولية في مدينة الطب (١١,٣٪) ومعدل الزيارات غير المخطط لها حسب نوع التداخل هو (٢٦,٦٪، ١٨,٨٪ و ٤,٦٪ لناظور الكلى، وناظور الحالب الصلب والتفتيت بالموجات الصادمة) وكانت لمضاعفات الشائعة بعد ناظور الكلى هي التهاب المسالك البولية (٣ حالات) (تسمم الدم) (حالتان، الورم البولي) (حالتان) (ناسور الشريان الكلوي) (حالتان) (التهاب الغشاء البرتوني) (حاله واحده) (التهاب الرئة) (حاله واحده) (نزيف تحت غشاء الكلى) (حاله واحده) (في حين كانت مضاعفات ناظور الحالب الصلب هي التهاب المسالك البولية الحاد) (٨ حالات) (تسمم الدم) (٨ حالات) (هجرة قصطره الحالب) (٣ حالات) (الورم البولي) (حاله واحده) (بينما المشاكل الرئيسية لمرضى التفتيت بالموجات الصادمة كانت التهاب المجاري البولية) (٣ حالات) (تسمم الدم) (حاله واحده) (انسداد المسالك البولية) (حاله واحده) (هجرة قصطره الحالب) (حاله واحده).

الاستنتاجات: كان معدل حدوث الزيارات غير المخطط لها في غضون ٣٠ يوماً بعد علاج حصى المسالك البولية في مستشفى الشهيد غازي الحريري للجراحات التخصصية في مجمع مدينة الطب ضمن النسبة المقبوله عالمياً، كما أن معدل حدوث الزيارات غير المخطط لها خلال ٣٠ يوماً بعد استئصال حصى الكلى عن طريق الجلد هو الأعلى، و يليه تنظير الحالب وأدنى مستوى بعد تفتيت الحصى خارج الجسم. العوامل المؤثرة للزيارات غير المخطط لها مثل الخروج المبكر من المستشفى، وعدم إعطاء التعليمات الكافية بعد الخروج، والمتابعة غير الكافية والأخطاء العلاجية التي لا تزال بنسبه كبيرة. العلاج التحفظي هي طريقة العلاج الأمثل لعلاج مرضى الزيارات الغير المخطط لها خاصة بعد تنظير الحالب.

الكلمات المفتاحية: تفتيت حصى الكلى عن طريق الجلد (PCNL) (ناظور الحالب و الكلى) (URS)، (ESWL) تفتيت الحصى بالموجات الصادمة من خارج الجسم

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