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TO EVALUATE THE MODE OF PRESENTATION OF NEPHROLITHIASIS AND ITS OUTCOME FOLLOWING OPEN SURGICAL TREATMENT

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ABSTRACT

Background: Nephrolithiasis remains a major economic and health burden worldwide. It is considered as a systemic disorder associated with chronic kidney disease, bone loss and fractures, increased risk of coronary artery disease, hypertension, type 2 diabetes mellitus and the metabolic syndrome. **Objective:** To evaluate the mode of presentation of Nephrolithiasis and its outcome following open surgical treatment. **Methods:** This was a cross-sectional observational study. This study was conducted in the Department of Surgery and Department of Urology, Sylhet MAG Osmani Medical College Hospital, Sylhet during the period from 9th September 2014 to 8th March 2015. All patients admitted in the Department of Surgery and Department of Urology, Sylhet MAG Osmani Medical College Hospital, Sylhet for open surgical management of nephrolithiasis were the target populations and those fulfilling the inclusion and exclusion criteria were included in this study. **Results:** Among the total 30 patients 10 (33.3%) patients were between 41 to 50 years, 9 (30.0%) patients were between 21 to 30 years, 8 (26.7%) patients were between 31-40 years and 3 (10.0%) patients were between 51-60 years. distribution of the patients by postoperative complications. Among the patients 30 patients underwent open surgical treatment; haematuria developed in 3 (10.0%) cases, urinary leakage in 1 (3.3%) case and wound infection developed in 4 (13.3%) patients. **Conclusion:** Open surgery is a safe and effective procedure for the treatment of large, complex and multiple renal stones with a low risk of post operative complication.

KEYWORDS: Nephrolithiasis, Type 2 diabetes, Urinary stone disease, Renal stones.

INTRODUCTION

Urinary calculi are the third most common affliction of the urinary tract, exceeded only by urinary tract infections and pathologic conditions of the prostate. The history of the nomenclature associated with urinary stone disease is as intriguing as that of the development of the interventional techniques used in their treatment.[1]

The prevalence of renal calculi varies with the population studied, and rates of nephrolithiasis vary regionally.[2] The peak incidence is between the age of 30 and 50 years, and the prevalence is 2-3%. USA, UK, Scandinavian countries, northern India, Pakistan and China have particularly high levels,[3] but the prevalence is low in South African people. In Bangladesh, stone disease is more common in northern part of the country affecting predominantly male over female with a ratio of 3:1.[4]

Renal stone disease caused by a variety of conditions, including metabolic and inherited disorders and anatomical defects. Most cases are idiopathic, in which there is undoubtedly a genetic predisposition; but where environmental and lifestyle factors play an important role. Indeed, it is becoming apparent that renal stone disease is often part of a larger metabolic picture commonly associated with type 2 diabetes, obesity, dyslipidaemia and hypertension.[5] Vitamin A deficiency, altered urinary solutes and colloids, decreased urinary citrate, renal infection, inadequate urinary drainage and urinary stasis, prolonged immobilization and hyperparathyroidism are also predispose to renal calculi formation.[6]

The diagnosis of nephrolithiasis is initially suspected by the clinical presentation, confirmatory radiological tests include abdominal plain film (KUB), intravenous pyelography (IVP), ultrasonography and non-enhanced CT. Non-enhanced CT is the test of choice for accurate and rapid diagnosis of symptomatic nephrolithiasis.[7]

The surgical management of urinary stone disease has undergone dramatic changes with the implementation of technological innovations in the field of urological surgery over the past 20 years. The development of extracorporeal shock wave lithotripsy (ESWL) is probably the most significant factor responsible for the precipitous decline in the use of open stone surgery. Most of the remaining credit for the vast reduction in open stone operations attributed to the development of percutaneous nephrolithotomy.[8] The prevalence of open stone surgery in specialist urology departments is well under 2%, but in some developing countries open stone surgery still has a significant role. In tertiary referral centres open surgery is reserved for a selected group of patients with complex stone burden and for treatment failures. The procedures performed are pyelolithotomy, anatrophic and radial nephrolithomy and partial nephrectomy. In these few selected cases open surgery is a reasonable treatment alternative with a high success rate.[3] Stones that fill the greater part of the collecting system are called staghorn because they resemble the antlers of a male deer. These stones usually feel the pelvis, infundibula, and most of the calices. Partial staghorns fill a lesser portion of the collecting system.[9] Open operation is needed on all patients with complete staghorn calculi as well as patients with pelvic stones and simultaneous morphological obstruction. Partial staghorn calculi should be operated only if endoscopic treatment has failed.[10] Multiple stones behind an infundibular stenosis or in a calyceal diverticulum may be complicated. Moreover, stones in renal abnormalities, eg, Horse-shoe or medullary sponge kidneys are often difficult to manage.[11] Currently the surgical management of nephrolithiasis in children is similar to that in adults. However, only 1 to 3% of all urinary stones occur in childhood. In patients with anatomical abnormalities in children, open surgery continues to be the method of choice. However, because of the multi factorial causes of stones in childhood, in the long term surgical treatment can only be successful when combined with appropriate prophylaxis to prevent recurrence.[12]

Objectives

General objectives

To evaluate the mode of presentation of Nephrolithiasis and its outcome following open surgical treatment.

Specific objectives

- To achieve the above mentioned general objectives, specific objectives were
- The age and sex distribution of patients with nephrolithiasis.
- The various mode of presentation of nephrolithiasis.
- The various findings of investigations of nephrolithiasis.
- The various modalities of open surgical management of nephrolithiasis.
- The outcome following open surgical treatment of nephrolithiasis.

METHODOLOGY

Study design: This was a cross-sectional observational study.

Place of study: This study was conducted in the Department of Surgery and Department of Urology, Sylhet MAG Osmani Medical College Hospital, Sylhet.

Study period: This study was conducted during the period from 9th September 2014 to 8th March 2015.

Study population: All patients admitted in the Department of Surgery and Department of Urology, Sylhet MAG Osmani Medical College Hospital, Sylhet for open surgical management of nephrolithiasis were the target populations and those fulfilling the inclusion and exclusion criteria were included in this study.

Inclusion criteria

- Patients with nephrolithiasis who were selected for open surgical management.
- Age above 12 years irrespective of gender.

Exclusion criteria

Renal stone along with:

- Ureteric stone
- Bladder stone
- Bilateral stone
- Below 12 years of age
- Having co-morbid conditions, eg, uncontrolled hypertension, diabetes mellitus, chronic hepatic or renal disease.
- Previous history of open renal surgery
- Patients who were not agree to participate in the study.

Sample size: 30 patients fulfilling the inclusion and exclusion criteria were enrolled in this study.

Sampling technique: Consecutive and convenient sampling technique was employed to select sample in this study.

Data collection tool: Data of both quantitative and qualitative were collected by researcher himself using pre-formed data collection sheet which was face validated and was performed by consulting with expert and available literature.

Procedure of data collection

The patients who got admitted for open surgical management for nephrolithiasis were the target population.

After admission a rapid diagnostic work up was made on the basis of a detailed history, thorough physical examination and both routine and specific investigations like plain x-ray KUB region, Ultrasonography of KUB, intravenous urography. Patients who fulfilled the inclusion criteria were enrolled in this study and those who fulfilled the exclusion criteria were excluded. In this way 30 patients with nephrolithiasis were selected.

Informed written consent was taken from the patients or their legal guardians after full explanation of the details

of the disease process, treatment options and purpose of the study.

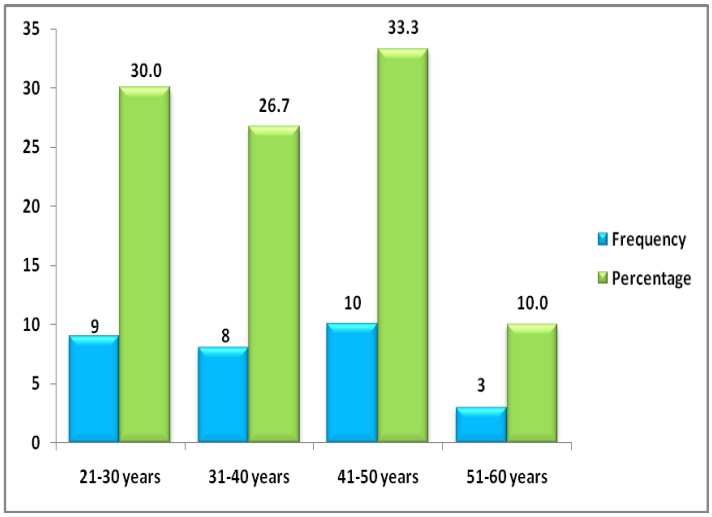
The patients were asked details of history regarding symptoms particularly pain, haematuria and fever. A detailed general survey and thorough abdominal examination were carried out. Hb %, urine routine examination, urine for culture and sensitivity, blood urea, serum creatinine, intravenous urography were done. Under general anaesthesia pyelolithotomy/ Extended pyelolithotomy with DJ stenting was done depending on the size and position of the stone.

Statistical analysis

Data were processed manually and analyzed with the help of SPSS (Statistical Package for Social Sciences) Version 21.0.

RESULT

Age distribution of the patients

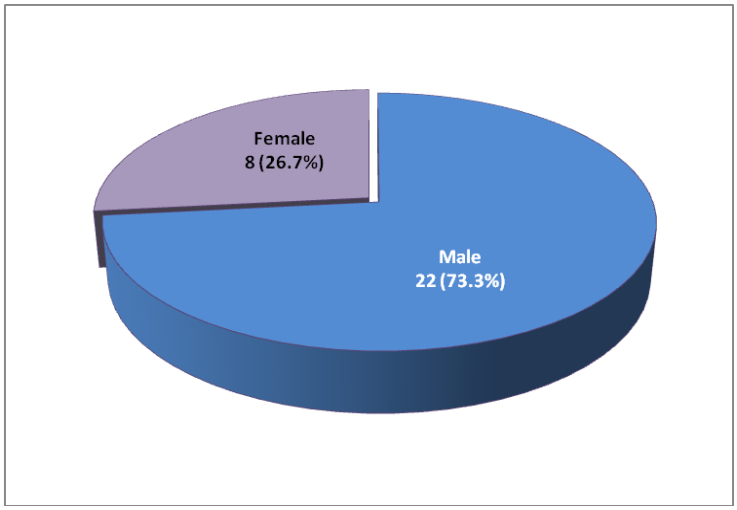


Figur 1: Age distribution of the patients (n=30).

The age of the patients ranged from 21 to 60 years with the mean age of 39.73 (SD ±10.37) years. Age distribution of the patients is shown in figure-1.

Among the total 30 patients 10 (33.3%) patients were between 41 to 50 years, 9 (30.0%) patients were between 21 to 30 years, 8 (26.7%) patients were between 31-40 years and 3 (10.0%) patients were between 51-60 years.

Distribution of the patients according to sex



Figur 2: Distribution of the patients according to sex (n=30).

There were 22 (73.3%) male and 8 (26.7%) female with male to female ratio of 2.75:1. Distribution of patients according to sex is shown in figure-2.

Table 1: Mode of presentation (n=30).

Mode of presentation	Frequency	Percentage
Loin pain	30	100.0
Right loin	18	60.0
Left loin	12	40.0
Haematuria	2	6.7
Vomiting	1	3.3
Fever	12	40.0

In the present study all the patients presented with pain in loin of which 18 (60.0%) had right loin pain and 12 (40.0%) had left loin pain without any radiation. Other presentations were haematuria (6.7%), vomiting (3.3%) and fever (40.0%). Some patients have more than one presentation. Mode of presentation was shown in table-3.1.

Distribution of the patients by the number of stone (single/multiple)

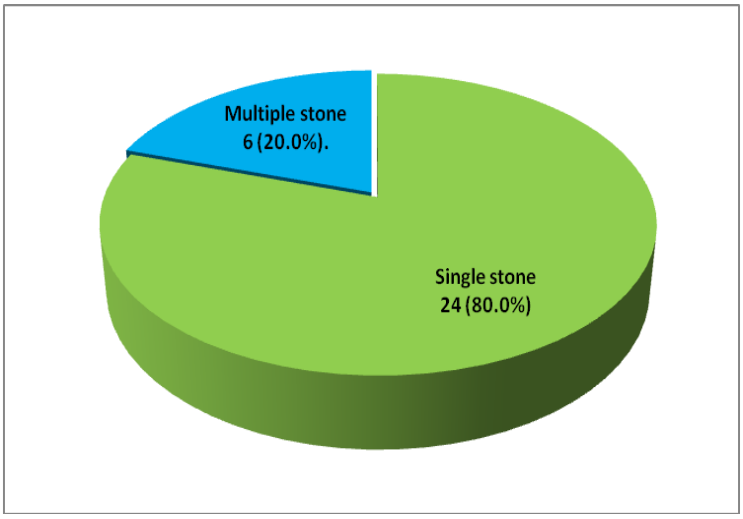


Figure 3: Distribution of the patients by the number of stone (Single or multiple) (n=30).

Figure-3.4 showed the distribution of the patients by the number of stones (single/multiple). Among the total 30 patients single renal stone was diagnosed in 24 (80.0%) cases and multiple renal stone was diagnosed in 6 (20.0%) cases.

Distribution of the patients by the type of open surgical techniques for nephrolithiasis

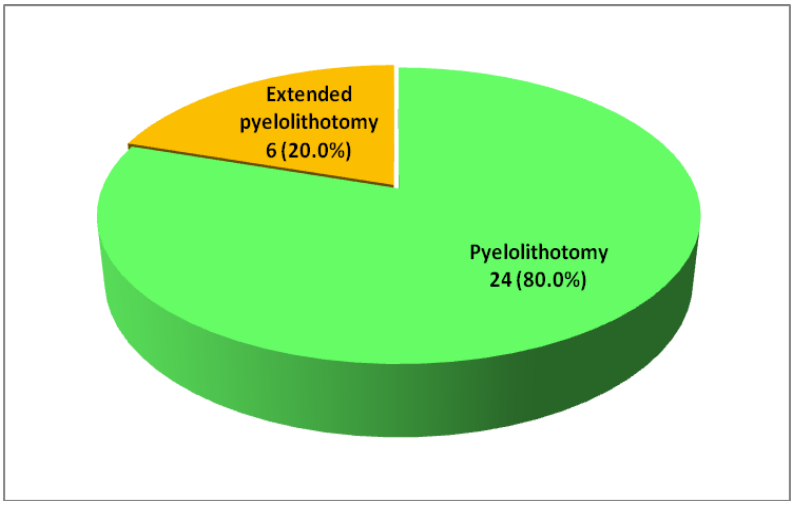


Figure 4: Distribution of the patients by the type of open surgical techniques for nephrolithiasis (n=30).

Figure-3.5 showed the distribution of the patients by the type of open surgical techniques for nephrolithiasis. Among the total 30 patients pyelolithotomy was done in 24 (80.0%) cases and extended pyelolithotomy was done in 6 (20.0%) cases. DJ stent was placed in all 30 patients.

Distribution of the patients by stone clearance after open surgical treatment of nephrolithiasis on one month follow-up

Figure 4: Distribution of the patients by stone clearance after open surgical treatment of nephrolithiasis on one month follow-up (n=30).

Figure-3.6 showed the distribution of the patients by stone clearance after open surgical treatment of nephrolithiasis. Clearance of stone was 28 (93.3%) cases and a single small stone remains in kidney in 2 (6.7%) cases on one month follow -up.

Table 2: Distribution of the patients by postoperative complications(n=30).

Postoperative complications	Frequency	Percentage
Haematuria	3	10.0
Urinary leakage	1	3.3
Wound infection	4	13.3

Table-3.3 showed the distribution of the patients by postoperative complications. Among the patients 30 patients underwent open surgical treatment; haematuria developed in 3 (10.0%) cases, urinary leakage in 1 (3.3%) case and wound infection developed in 4 (13.3%) patients.

DISCUSSION

Severe pain on one or both sides of the back, feel a frequent urge to urinate, or a burning sensation during urination, abnormal urine color, chills, fever, and nausea are the main symptoms complained by anyone having renal stones.[13]

In the past two decades, advances in endoscopic management of nephrolithiasis, in the form of newer refined endoscopes and stone fragmentation energies, have resulted in a major shift toward minimally invasive therapy.[14] Four common procedures are commonly used if a kidney stone is too big to be passed naturally (6-7mm in diameter or larger). Extracorporeal shock wave lithotripsy (ESWL) is the most common, easiest and non-invasive procedure. Percutaneous nephrolithotomy (PCNL) is an alternative procedure of ESWL which involves using a thin telescopic instrument called a nephroscope. Ureteroscopy (Endoscopic treatment) is minimally invasive procedure, no incision is given as the instruments go through the patient's existing "plumbing" and the patients can go home on the same day. Open surgery is less used since the development of ESWL and endoscopic and percutaneous techniques and less than 1% of cases require this type of surgery. It needs a large incision to remove the stone from the urinary tract.[55] However, in spite of these advances, there still remains a need for open surgical stone removal as a second-or third-line treatment option in few cases.[14] Due to the availability of the equipments, expertise and experience in surgical treatment of urinary stones, most urological centers worldwide report a need for open surgery in only 1–5.4% of the cases. However, in developing countries, the rate of open stone surgery amounts to up to 14%.[15-17] In addition to the modern technique of management of renal stones, an appreciable number of renal stone cases were treated with open surgery Sylhet MAG Osmani Medical College Hospital during the period of study.

In this study the age of the patients ranged from 21 to 60 years with the mean age of 39.73 ±10.37 years. This

result was correlated with the study by Ullah et al.[18] The mean age in their study was 39.55 ±11.98 years. Joshi et al.[62] also found the mean age of their patients with renal stones was 37.2 years. This result was also correlated with the study of Al-Hunayan.[19] The mean age of their patients with renal stones was 41.2 ± 11.7 years. But Rajaian et al.[20] found the mean age of their patients with renal stone was 49.8 years (range 11–65 years). Ho et al.[21] found the mean age of the patients with renal stone was 49.4 years (range 15 - 72 years). Lim et al.[22] found the mean age of the patients with renal stone was 51 years (range 20-81 years). Whereas Ahmad and Rahman,[23] found lower mean age than that of the present study. The mean age of their patients with renal stone was 27.6 years (range 14 - 59).

The present study also showed 10 (33.3%) patients were between 41 to 50 years, 9 (30.0%) patients were between 21 to 30 years, 8 (26.7%) patients were between 31-40 years and 3 (10.0%) patients were between 51-60 years. This result was supported by Kabir,[24] he found in his study 7 (25.9%) patients with renal stone were the age group of 41–50 years, 6 (25.9%) patients in 51–60 years, 5 (18.5%) between the ages of 31–40 years, 6 (22.2%) patients were 61 years old and above. This result was also supported by Ullah et al.[18]

In the present study 22 (73.3%) patients were male and 8 (26.7%) patients were female with a male to female ratio was 2.75:1. This result was consistent with the study of Kabir,[24] where 20 (74.1%) patients were male and 7 (25.9%) patients were female with a male to female ratio was 2.86:1 among 27 patients with renal stone. This result was also supported by some other studies.[25,26] However, this ratio varies from study to study. Ghayalini et al.[27] showed a ratio of 1: 0.3; whereas a ratio of 12.3:1 was shown by Salman et al.[28] They also showing different proportion in male to female ratio in different areas. This disparity may be due to the nature of patients included in this study.

In this study all the patients with renal stone presented with pain in loin of which 18 (60.0%) patients had right loin pain and 12 (40.0%) patients had left loin pain without any radiation. Other presentations were haematuria (13.3%), vomiting (6.7%) and fever (40.0%). This result was similar to the study of Kabir.[24]

In this study urine for routine examination (RE) showed pus cell above 10/ HPF in 9 (30%) cases and RBC in 11 (36.7%) cases. Urine culture revealed growth of E. coli in 6 (20.0%) cases. Plain X-ray KUB region showed right renal stone in 18 (60.0%) cases and left renal stone in 12 (40.0%) cases. Intavenous urography (IVU) showed normal excretion of radio opaque contrast in 29 (96.7%) cases and of delayed excretion in 1 (3.3%) cases. Ultrasonography (USG) of KUB region showed right renal stone in 18 (60.0%) cases and left renal stone in 12 (40.0%) cases.

Single renal stone was in 24 (80.0%) cases and multiple renal stones were in 6 (20.0%) cases in the present study. This result was correlated with the study of Traxer et al.[29] They found single renal stone was in 70.2% of cases and multiple renal stones were in 29.8% of cases. Gyawali et al.[27] reported single stone in 87.9% and multiple stones in 12.1% of patients with renal stone.

Postoperative complications in this study were haematuria (10.0%), urinary leakage (3.3%) and wound infection (13.3%). Charig et al.[29] found urinary leakage in 7.8% and wound infection in 10.4% of patients with renal stone underwent open surgery.

In this study, on one month follow up 28 (93.3%) cases had complete Clearance of stone and only in 2 (6.7%) cases small residual stone was found in kidney. Amir,[26] reported complete clearance of stone in 92.0% of cases and small stone remained in kidney in 8.0% of cases.

Renal stone disease is not related to any age group with the male predominance. Loin pain, haematuria and fever are common mode of presentation. Plain X-ray and ultrasonography of KUB region are main diagnostic tools for renal stone; while intavenous urography is to see the excretory function of the kidney. Single renal stone is common. Pyelolithotomy with DJ stent is the most common open surgery for stone removal. Haematuria, wound infection and urinary leakage are the postoperative complications. In this study, we can conclude that open surgery is a safe and effective procedure for the treatment of large, complex and multiple renal stones with a low risk of post operative complication.

CONCLUSIONS

Renal stone disease is not related to any age group with the male predominance. Loin pain, haematuria and fever are common mode of presentation. Plain X-ray and ultrasonography of KUB region are main diagnostic tools for renal stone; while intavenous urography is to see the excretory function of the kidney. Single renal stone is common. Pyelolithotomy with DJ stent is the most common open surgery for stone removal. Haematuria, wound infection and urinary leakage are the postoperative complications. In this study, according to figure 3.6 and table 3.3 open surgery is a safe and effective procedure for the treatment of large, complex and multiple renal stones with a low risk of post operative complication.

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