Comparative Study between Percutaneous Approach and Transurethral Approach for Treatment of Urinary Bladder Stones

Thesis

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List of Abbreviations

Abb.	Full term
AUA	American Urological Association
BD	Bladder dysfunction
BNO	Bladder neck obstruction
BOO	Bladder outlet obstruction
BPH	Benign prostatic hyperplasia
CBC	Complete blood picture
CT	Computed tomography
DRE	Digital rectal examination
ESWL	Extracorporeal shock wave lithotripsy
NCSCT	Non contrast Spiral computed tomography
PCCL	Percutaneous cystolithotripsy
PSA	Prostatic specific antigen
TUCL	Transurethral Cystolithotripsy
US	Ultrasound
UTI	Urinary tract infection

INTRODUCTION

Urinary bladder stones account for 5% of all urinary stones; 95% of them are found in male patients ***(Ishtiaq et al., 2017)***.

They occur due to urinary stasis caused by bladder outlet obstruction**,** urethral strictures, neurogenic voiding dysfunction also occur with infection and stone migration from the upper urinary tract ***(Gupta et al., 2017).***

Early diagnosis and early treatment of urinary bladder stones are necessary to prevent long-term pyuria, recurrent infections, renal failure and urinary bladder carcinoma from chronic irritation ***(Tan et al., 2018).***

There are different modalities can be used for treatment of bladder stones. These modalities include extracorporeal shock wave lithotripsy (ESWL), transurethral cystolitholapaxy, percutaneous cystolitholapaxy, cystolithotomy and chemolysis of stones which can be used only in selected cases ***(Akmal et al., 2017).***

Holmium: YAG laser, pneumatic, ultrasound, shockwave energy devices and mechanical stone crusher can be used for fragmentation of bladder stones ***(Alken, 2018).***

Despite this variety of operative approaches and modalities of lithotripsy, the management of large bladder stones can

sometimes be challenging and time consuming specially with endo-urological techniques ***(Javanmard et al., 2018).***

Transurethral cystolitholapaxy is a common method used to treat urinary bladder stones. However, many complications appeared especially with large stones as bladder perforation, urethral injury and urethral stricture due to long urethral manipulation ***(Bansal et al., 2016)***.

Percutaneous cystolitholapaxy is another modality to treat urinary bladder stones. It has many advantages like it is absolutely non-traumatic to the urethra and the Amplatz sheath used allow easy removal of large stone fragments and drainage of irrigation fluid during operation ***(Joshi et al., 2018).***

So in this study we will investigate percutaneous cystolitholapaxy as a modality of management of large urinary bladder stone.

AIM OF THE WORK

The aim of this study is to compare outcome of percutaneous approach vs transurethral approach in treatment of bladder stones regarding stone fragmentation, operative time, clearance rate, complications and hospital stay.

Chapter 1

PATHOPHYSIOLOGY OF BLADDER STONES

i. Epidemiology:

The earliest identified case with bladder stone was described by Shattock In 1905 after excavation of Egyptian gravesites as 6.5-cm stone was found in the bladder of a 16 years old boy dating back to 4800 BC ***(Gupta et al., 2017).***

Bladder stones account for 5% of all urinary tract stones, they are responsible for 14% of hospital admissions and 8% of urolithiasis-related deaths in developed nations, this percentage is higher in developing countries ***(Kum et al., 2016).***

Bladder stones primarily affect males after their fifth decade of life, with a reported male:female ratio between 10:1 ***(Halstead, 2016)***

ii. Etiology:

According to the etiology, urinary bladder stones can be classified into primary (endemic), migrant, and secondary stones ***(Jung et al., 2018).***

A. **Primary (endemic) bladder stones**:

Incidence:

Primary or endemic bladder stones occur in the absence of other urinary tract pathology, typically seen in children younger than 10 years old. This type of bladder stones is more predominant in boys than in girls with ratio of 6: 1. The primary stones are usually solitary and rarely recur after its removal. Ammonium acid urate, calcium oxalate, uric acid, and calcium phosphate are the most common components of primary bladder stones ***(Lal et al., 2015).***

Precipitating factors:

The risk of endemic bladder stones increases when animal protein intake is lower than 40 g/day. So children with endemic bladder stones were found to consume a cereal rich diet which is deficient in animal protein and phosphate ***(Halstead, 2015).***

The other precipitating factors for stone formation in children include low water intake, decreased urine output due to chronic diarrhea and increased uric acid excretion due to rapid tissue turn over ***(Lal et al., 2015).***

All these factors lead to supersaturation of urine with ammonium acid urate with the risk of crystalluria. These

crystals aggregate in the urinary bladder where urinary stasis occurs for some time to form ammonium acid urate stones. Calcium deficient diet such as rice with little or no milk may cause hypocalciuria, and precipitation of ammonium acid urate stones ***(Soliman et al., 2016).***

Clinical picture:

Children firstly suffering from passage of sandy urine. Also they often complain of vague abdominal discomfort, dysuria, frequency, hematuria and may be urine retention. Pulling of the penis is considered to be pathognomonic, because it indicates that the child is suffering from stranguria and LUTS ***(Lal et al., 2015).***

Prevention:

Prevention of endemic bladder stones is done mostly by dietary modification. phosphate supplementation was found to significantly reduce oxalate crystalluria, even without concomitant reduction in oxalate intake. Also, a mixed cereal diet with milk supplementation is the most practicable solution for bladder stone prevention in childern. ***(Soliman, N et al., 2016)***

B. Migrant stones:

The migrant bladder stones develop in the upper urinary tract and migrate to the bladder where they retained and then