THE PROFILE OF PATIENTS UNDERGOING URETHROCYSTOSCOPY, URETHROCYSTOSCOPIC FINDINGS, AND EARLY COMPLICATIONS OF CYSTOSCOPY AT MUHIMBILI NATIONAL HOSPITAL 2008. DAR ES SALAM - TANZANIA.

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A dissertation submitted in partial fulfillment of the requirement for the award of the degree of Masters of Medicine in General Surgery of the Muhimbili University of Health and Allied Sciences.

Muhimbili University of Health and Allied sciences

CERTIFICATION

The undersigned certify that he has read and hereby recommend for acceptance by the Muhimbili University of Health and Allied Sciences a dissertation titled - **The Profile of Patients Undergoing Urethrocystoscopy, Urethrocystoscopic findings, and Early Complications of Cystoscopy at Muhimbili National Hospital 2008 Dar es salam – Tanzania** in partial fulfilment of the requirements for the degree of Master of Medicine in General Surgery.

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(Supervisor)

Date: 17.04.2009

DECLARATION AND COPYRIGHT

I Masumbuko Yatembela Mwashambwa declare that, this dissertation is my own original work and that it has not been presented to any other University for a similar or any degree award.

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ABSTRACT

Back ground

Urethrocystoscopy is said to be one of the most precise diagnostic test in evaluation of lower urinary tract, and it is considered as the reference in diagnosis of the bladder tumors. At Muhimbili National Hospital, it is believed to be one of the most common procedures in the Urology Unit with various indications. The pattern of such indications is not well documented. On the other hand the literature on the common urethrocystoscopic findings and its complications is equally scarce.

Title

The profile of patients undergoing urethrocystoscopy, urethrocystoscopic findings, and early complications of urethrocystoscopy at Muhimbili National Hospital Dar es Salam Tanzania 2008.

Objective

To determine the profile of patients undergoing urethrocystoscopy, urethrocystoscopic findings and early complications of urethrocystoscopy at Muhimbili National Hospital Dar es Salam Tanzania 2008.

Material and Methods

All patients scheduled for urethrocystoscopy were recruited into the study, clinical indications from the patients' case notes, were recorded directly into the questionnaire. Urethrocystoscopy with or without biopsy and Bimanual examination were done accordingly, and after consultation with the Specialist the findings were recorded. The patients were followed for early post operative complications (duration of hemorrhage, pain intensity and fever).

Results

One hundred and ten patients were recruited during the study period. There were seventy male patients, giving male to female ratio of 2.3:1. The commonest age group was 41-60 years (37.3%). The most common clinical indication overall was hematuria in 37.3% of all patients. In males, Bladder outlet obstruction due to stricture was the commonest indication (31.2%). Majority of the patients who presented with hematuria (65.9%) had bladder tumor at cystoscopy, and most of them were anemic (73.1%). In this, 59.1%, 54.5% and 63.6% of

patients had urinalysis, renal function test and abdominal ultrasound done. In patients with bladder tumor, the ultrasound had sensitivity of 82.8% and specificity of 92.9%.The commonest urethral pathology was stricture (23.9%) and urethral hyperemia (7.3%). Bladder tumor was the most predominant pathology at cystoscopy (31.7%), the common locations were bladder neck, lateral and anterior wall in 74% of cases. Majority of these tumors were advanced (58.8%), and the common histologies were squamous cell carcinoma (48.2%) and transitional cell carcinoma (24.3%). About 18.5% of the tumors were non neoplastic (chronic non specific inflammation).

Complications included; pain 91.8%, urethral bleeding up to the first day 42.7%, transient fever 25.5% and urethral injury necessitating suprapubic cystostomy 1.8%.

Conclusion

Hematuria and bladder outlet obstruction due to stricture are the commonest indications. Urethral stricture and bladder tumor are the commonest urethrocystoscopic findings. Most patients who presented with hematuria had bladder tumor at cystoscopy, and hence the role of urethrocystoscopy in evaluation of these patients can not be over emphasized. Bimanual examination is valuable in staging bladder tumors. The commonest early complications includes; pain, fever and urethral bleeding. Pain management appears to be serious problem in post cystoscopy period despite the prescription of analgesics. It was also demonstrated that the ultrasound had an important role in the diagnosis of bladder tumors.

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ACRONYMS

BOO	Bladder outlet obstruction
BPH	Benign prostatic hypertrophy
CT	Computed tomography
CIS	Carcinoma in situ
DED	District Executive Director
EUA	Examination under anesthesia
Fr	French gauge
HIV	Human immunodeficient virus
IC	Intestitial cystitis
IFN-γ	Interferon gamma
IL-1	Interleukin one
IVU	Intravenous urogram
KUB	Plain abdominal X ray including Kidney, ureters and bladder
LUTS	Lower urinary tract symptoms
MD	Doctor of Medicine
MOHSW	Ministry of Health and Social Welfare
MMED	Masters of medicine
MUHAS	Muhimbili University of Health and Allied Sciences
PBS	Painful bladder syndrome
NPV	Negative predictive value
PPV	Positive predictive value
PSA	Prostate specific antigen
SCC	Squamous cell carcinoma
TCC	Transitional cell carcinoma

TUIP	Transurethral incision of the prostate
TURBT	Transurethral resection of the bladder tumor
TURP	Transurethral resection of the prostate
USS	Ultrasound
UTI	Urinary tract infection

CHAPTER ONE

1.0 INTRODUCTION

Urethrocystoscopy is an inspection of the urethra, prostate and inside of the bladder by passage of an instrument called cystoscope, through the urethra into the bladder.

There are two types of urethrocystoscopes in clinical use; the flexible and rigid urethrocystoscopes.

The flexible optic cystoscope can be passed with minimal discomfort in patients of either sex. The passage is under direct vision and excellent views of the urethra and bladder are obtained.

The advantages of flexible endoscopes for cystourethroscopy include;

(1) Greater comfort for the patient.

(2) The ability to perform the procedure with the patient in the supine position.

(3) The ease of passing the instrument over an elevated bladder neck.

(4) The ability to inspect at any angle with deflection of the tip of the instrument.

Working channels, however, are small and it is not a practical instrument through which to irrigate the bladder, or undertake any major endoscopic operation. It is therefore an instrument for diagnosis.

Modern rigid cystourethroscopes consist of a sheath, obturator, bridge, and telescopes. The telescopic lens is placed through the sheath by attaching a bridge to the sheath. The bridge allows both passage of the telescope and access to the working channel of the sheath for passage of accessory instruments. A deflector system (Abarran lever) can be placed through the sheath to allow passage and controlled deflection of catheters through the working channel. The irrigant fluid is connected to the sheath, and the fiberoptic light source connects directly to the telescope. Obturators can be placed through the sheath to provide a smooth, blunt tip for easy passage, and obturators through which a telescope can be passed (visual obturators) provide a method of easy direct visual passage of the endoscope.

The size of cystourethroscopes is usually given using the French scale and refers to the outside circumference of the instrument in millimeters. Instruments of different sizes are available to accommodate pediatric patients (No. 8 to 12 Fr) and adults (No. 16 to 25 Fr).

The rigid urethrocystoscope is best passed with a patient in lithotomy position, with patients hips flexed at less than 90°. It is easily passed in females. In males, however, the angulation of urethra demands regional or general anesthesia. Urethrocystoscopy is done under direct vision with a 0 degree or 30 degree telescope. Running irrigation fluid helps to open the urethra and therefore avoids trauma. Blind passage of cystoscope is associated with iatrogenic trauma, especially when urethral angulation is ignored.

The advantage of rigid cystoscope includes;

(1) It has better optics because of the use of a rod-lens system in rigid instruments in contrast to the fiberoptic system in flexible urethrocystoscope.

(2) It has a larger working channel that allows greater versatility in passage of accessory instruments.

(3) It also has a larger lumen for water flow, thus improving visualization.

(4) It is easy to manipulate and maintain orientation during inspection within the bladder.

Telescopes consist of illuminating and imaging systems. Modern telescopes use fiberoptic illumination and a rod-lens imaging system. The objective lens at the tip of the instrument collects the light of the image and transmits the image to the eye piece through the rod-lens system. Telescopes are available with different angles of view for urethra and bladder inspection; the zero degree telescope is the most appropriate for viewing the urethra. The thirty degree telescopes have a better view of the walls of the bladder, but 70 and 90 degree telescopes, may be required to see an area of the bladder behind a large prostatic indentation. In addition to telescope and irrigation channel, it is possible to pass forceps for biopsy or an instrument for grasping or crushing calculi (lithotripsy). The ureteric catheters or stents can be passed through the cystoscope into the ureters[1], [2]

1.1 Diagnostic uses of cystoscope

Complete endoscopy is among the most precise diagnostic tests in clinical use. Some of the common general indications include; (A) Direct inspection and visualization of the urethra and the bladder for such diseases as tumor, stones, and ulcers. The configuration and position of the ureteric orifices are of paramount importance when vesico - ureteric reflux is suspected. The cystoscope can also be used to obtain urine samples for bacteriological studies in urinary tract infection. (B) The cystoscope can also be used in radiographic studies of the ureters, in which the contrast is instilled into the ureters through ureteric orifices and then X-ray films taken. (C) In reflux studies; the bladder is filled up with sterile water or normal saline mixed with methyline blue dye, the patient is allowed to void, then the cystoscope is introduced to see if a blue fluid percolates through ureteric orifices, indicating the presence of reflux. (D) Therapeutic uses of cystoscope include; resection of tumors, that is transurethral resection of the bladder tumor (TURBT), and the transurethral resection of the prostate (TURP) in benign prostatic hyperplasia (BPH), it is also used in removal or extraction of both ureteric and bladder stones. And for urethral stricture management i.e. direct visual urethrotomy (DVU).

1.2 Specific indications for urethrocystoscopy

In evaluation of hematuria, chronic or recurrent urinary tract infections, unexplained urological symptoms (such as enuresis, frequency), and in evaluation of congenital malformations. Also it is indicated in clinical situations in which excretory urograms have suggested pathological changes, but has not furnished all the information necessary for definitive diagnosis.

1.3 Contraindications

Acute urinary tract infection in which the cystoscope can exacerbate infection, in patients with severe symptoms of prostatic obstruction, since trauma can cause severe edema on the bladder neck and hence cause complete obstruction and urine retention.

1.4 Common complications

Bleeding is to be expected in men, increased urinary frequency may be due to trauma to the mucus membrane, acute urine retention in patients with moderate prostatism, as a result of injury of bladder neck and edema, exacerbation of urinary tract infection, epididymo-orchitis if patient has prostato- cystitis, urethral chills due to bacteremia from an infected prostate traumatized by an instrument or due to vesico-ureteric reflux and urethral injury and subsequent development of stricture[3].

1.5.0 The anatomy of urinary bladder and urethra

Urinary bladder is situated immediately behind the pubic bone within the pelvis it is a receptacle for the storage of urine. When filled, the bladder has a capacity of approximately 500 ml and assumes an ovoid shape. The empty bladder is tetrahedral and is described as having a superior surface with an apex at the urachus, two inferolateral surfaces, and a posteroinferior surface or base with the bladder neck at the lowest point.

The urachus anchors the bladder to the anterior abdominal wall. There is a relative paucity of bladder wall muscle at the point of attachment of the urachus, predisposing to diverticula formation. An epithelium-lined lumen usually persists throughout life and uncommonly gives rise to aggressive urachal adenocarcinomas[4]. In rare instances, luminal continuity with the bladder serves as a bacterial reservoir or results in an umbilical urinary fistula.

The superior surface of the bladder is covered by peritoneum. Anteriorly, the peritoneum sweeps gently onto the anterior abdominal wall. With distention, the bladder rises out of the true pelvis and separates the peritoneum from the anterior abdominal wall. It is therefore possible to perform a suprapubic cystostomy without risking entry into the peritoneal cavity. Posteriorly, the peritoneum passes to the level of the seminal vesicles and meets the peritoneum on the anterior rectum to form the rectovesical space.

Anteroinferiorly and laterally, the bladder is cushioned from the pelvic side wall by retropubic and perivesical fat and loose connective tissue. This potential space (of Retzius) may be entered anteriorly by dividing the transversalis fascia and provides access to the pelvic viscera as far posteriorly as the iliac vessels and ureters. The bladder base is related to the seminal vesicles, ampullae of the vas deferentia, and terminal ureter. The bladder neck, located at the internal urethral meatus, rests 3 to 4 cm behind the midpoint of the symphysis pubis. It is firmly fixed by the pelvic fasciae and by its continuity with the prostate; its position changes little with varying conditions of the bladder and rectum.

In the female, the peritoneum on the superior surface of the bladder is reflected over the uterus to form the vesicouterine pouch and then continues posteriorly over the uterus as the rectouterine pouch. The vagina and uterus intervene between the bladder and the rectum, so that the base of the bladder and urethra rest on the anterior vaginal wall. Because the anterior vaginal wall is firmly attached laterally to the levator ani, contraction of the pelvic diaphragm (e.g., during increases in intra-abdominal pressure) elevates the bladder neck and draws it anteriorly. In many women with stress incontinence, the bladder neck drops below the pubic symphysis. In infants, the true pelvis is shallow and the bladder neck is level with the upper border of the symphysis. The bladder is a true intra-abdominal organ that can project above the umbilicus when full. By puberty, the bladder has migrated to the confines of the deepened true pelvis.

The internal surface of the bladder is lined with transitional epithelium, which appears smooth when the bladder is full but contracts into numerous folds when the bladder empties. This urothelium is usually six cells thick and rests on a thin basement membrane. Deep to this, the lamina propria forms a relatively thick layer of fibroelastic connective tissue that allows considerable distention. This layer is traversed by numerous blood vessels and contains smooth muscle fibers collected into a poorly defined muscularis mucosa. Beneath this layer lies the smooth muscle of the bladder wall. The relatively large muscle fibers form branching, interlacing bundles loosely arranged into inner longitudinal, middle circular, and outer

longitudinal layers. However, in the upper aspect of the bladder, these layers are clearly not separable, and any one fiber can travel between each of the layers, change orientation, and branch into longitudinal and circular fibers. This meshwork of detrusor muscle is ideally suited for emptying the spherical bladder.

Near the bladder neck, the detrusor muscle is clearly separable into the three layers described earlier. Here, the smooth muscle is morphologically and pharmacologically distinct from the remainder of the bladder, for the large-diameter muscle fascicles are replaced by much finer fibers. The structure of the bladder neck appears to differ between men and women. In men, radially oriented inner longitudinal fibers pass through the internal meatus to become continuous with the inner longitudinal layer of smooth muscle in the urethra.

The middle layer forms a circular preprostatic sphincter that is responsible for continence at the level of the bladder neck. The bladder wall posterior to the internal urethral meatus and the anterior fibromuscular stroma of the prostate form a continuous ringlike structure at the bladder neck[5]. The fact that perfect continence can be maintained in men in whom the striated urethral sphincter is destroyed proves the efficacy of this sphincter[6]. This muscle is richly innervated by adrenergic fibers, which, when stimulated, produce closure of the bladder neck[7]. Damage to the sympathetic nerves to the bladder, as a result of diabetes mellitus or retroperitoneal lymph node dissection for testis cancer, can cause retrograde ejaculation.

The outer longitudinal fibers are thickest posteriorly at the bladder base. In the midline, they insert into the apex of the trigone and intermix with the smooth muscle of the prostate to provide a strong trigonal backing. Laterally, the fibers from this posterior sheet pass anteriorly and fuse to form a loop around the bladder neck. This loop is thought to participate in continence at the bladder neck. On the lateral and anterior surfaces of the bladder, the longitudinal fibers are not as well developed. Some anterior fibers course forward to join the puboprostatic ligaments in men and the pubourethral ligaments in women. These fibers contribute smooth muscle to these supports and are speculated to contribute to bladder neck opening during micturition[8].

At the female bladder neck, the inner longitudinal fibers converge radially to pass downward as the inner longitudinal layer of the urethra, as described earlier. The middle circular layer does not appear to be as robust as that of the male, and several authors have denied its existence altogether[9, 10]. Whereas several other investigators have noted an anterior loop of external longitudinal muscle, the authors just cited deny the existence of this structure as well. They maintain instead that the external fibers pass obliquely and longitudinally down the urethra to participate in forming the inner longitudinal layer of smooth muscle. Regardless, the female bladder neck differs strikingly from the male in possessing little adrenergic innervation. In addition, its sphincteric function is limited; in 50% of continent women, urine enters the proximal urethra during a cough[11].

1.5.1 Ureteral vesical junction and trigone

As the ureter approaches the bladder, its spirally oriented mural smooth muscle fibers become longitudinal. Two to 3 cm from the bladder, a fibromuscular sheath (of Waldeyer) extends longitudinally over the ureter and follows it to the trigone[12]. The ureter pierces the bladder wall obliquely, travels 1.5 to 2 cm, and terminates at the ureteral orifice. As it passes through a hiatus in the detrusor (intramural ureter), it is compressed and narrows considerably. This is a common site in which ureteral stones become impacted. The intravesical portion of the ureter lies immediately beneath the bladder urothelium and therefore is quite pliant; it is backed by a strong plate of detrusor muscle. With bladder filling, this arrangement is thought to result in passive occlusion of the ureter, like a flap valve. Indeed, reflux does not occur in fresh cadavers when the bladder is filled[13]. Vesicoureteral reflux is thought to result from insufficient submucosal ureteral length and poor detrusor backing. Chronic increase in intravesical pressure resulting from bladder outlet obstruction can cause herniation of the bladder mucosa through the weakest point of the hiatus above the ureter and produce a "Hutch diverticulum" and reflux[14].

The triangle of smooth urothelium between the two ureteral orifices and the internal urethral meatus is referred to as the trigone of the bladder. The fine longitudinal smooth muscle fibers

from the vesical side of the ureters pass to either side of their respective orifices to join the lateral and posterior ureteral wall fibers and fan out over the base of the bladder. Fibers from each ureter meet to form a triangular sheet of muscle that extends from the two ureteral orifices to the internal urethral meatus. The edges of this muscular sheet are thickened between the ureteral orifices (the interureteric crest or Mercier's bar) and between the ureters and the internal urethral meatus (Bell's muscle).

The muscle of trigone forms three distinct layers: (1) a superficial layer, derived from the longitudinal muscle of the ureter, which extends down the urethra to insert at the verumontanum; (2) a deep layer, which continues from Waldeyer's sheath and inserts at the bladder neck; and (3) a detrusor layer, formed by the outer longitudinal and middle circular smooth muscle layers of the bladder wall. Through its continuity with the ureter, the superficial trigonal muscle anchors the ureter to the bladder. In a ureteral reimplantation, this muscle is tented up and divided in order to gain access to the space between Waldeyer's sheath and the ureter. In this space, only loose fibrous and muscular connections are found. This anatomic arrangement helps prevent reflux during bladder filling by fixing and applying tension to the ureteral orifice. As the bladder fills, its lateral wall telescopes outward on the ureter, thereby increasing intravesical ureteral length [14].

The urothelium overlying the muscular trigone is usually only three cells thick and adheres strongly to the underlying muscle by a dense lamina propria. During filling and emptying of the bladder, this mucosal surface remains smooth

1.5.2 The blood supply

In addition to the vesical branches, the bladder may be supplied by any adjacent artery arising from the internal iliac artery. For convenience, surgeons refer to the vesical blood supply as the lateral and posterior pedicles, which, when the bladder is approached from the rectovesical space, are lateral and posteromedial to the ureters, respectively. These pedicles are the lateral and posterior vesical ligaments in the male and part of cardinal and uterosacral ligaments in

the female. The veins of the bladder coalesce into the vesicle plexus and drain into the internal iliac vein. Lymphatics from the lamina propria and muscularis drain to channels on the bladder surface, which run with the superficial vessels within the thin visceral fascia. Small paravesical lymph nodes can be found along the superficial channels. The bulk of the lymphatic drainage passes to the external iliac lymph nodes. Some anterior and lateral drainage may go through the obturator and internal iliac nodes, whereas portions of the bladder base and trigone may drain into the internal and common iliac groups.

1.5.3 Inervation

Autonomic efferent fibers from the anterior portion of the pelvic plexus (the vesical plexus) pass up the lateral and posterior ligaments to innervate the bladder. The bladder wall is richly supplied with parasympathetic cholinergic nerve endings and has abundant postganglionic cell bodies. Sparse sympathetic innervation of the bladder has been proposed to mediate detrusor relaxation but probably lacks functional significance. A separate nonadrenergic, noncholinergic (NANC) component of the autonomic nervous system participates in activating the detrusor, although the neurotransmitter has not been identified[15]. As mentioned, the male bladder neck receives abundant sympathetic innervation and expresses α_1-adrenergic receptors. The female bladder neck has little adrenergic innervation. Nitric oxide synthase–containing neurons have been identified in the detrusor, particularly at the bladder neck, where they may facilitate relaxation during micturition. The trigonal muscle is innervated by adrenergic and nitric oxide synthase–containing neurons. Like the bladder neck, it relaxes during micturition. Afferent innervation from the bladder travels with both sympathetic (via the hypogastric nerves) and parasympathetic nerves to reach cell bodies in the dorsal root ganglia located at thoracolumbar and sacral levels. As a consequence, presacral neurectomy (division of the hypogastric nerves) is ineffective in relieving bladder pain.

1.5.4 Male urethra

At about 8-9 inches (200 mm) long, the adult male urethra is longer than the adult female urethra (of approx. 1.5 inches 35 mm). It has three portions (the prostatic urethra, the membranous urethra, and the spongy urethra) and extends from the neck of the bladder to the meatus urinarius at the end of the male penis/urethra.

The general shape of the urethra varies along it's length: The prostatic section of the male urethra is somewhat arched. Except during passage of urine or semen through the urethra, it is a transverse slit along it's length, the upper and lower surfaces of the transverse slit being in contact when fluid is not passing along the urethra. However, at exit from the body at the meatus urinarius (external orifice of urethra) the slit is vertical.

The three regions/sections of the male urethra are:

1. Prostatic Urethra

   The prostatic urethra begins at the neck of the bladder and includes all of the section that passes through the prostrate gland. It is the widest and most dilatable part of the male urethral canal.

2. Membranous Urethra

   The membranous urethra is the shortest and narrowest part of the male urethra. This section measures approx. 0.5 - 0.75 inches (12 - 19 mm) in length and is the section of the urethra that passes through the male urogenital diaphragm.

   The external urethral sphincter (muscle) is located in the urogenital diaphragm (as for the female urethra). This muscle is referred to as the "compressor urethrae muscle" in some older textbooks.

   The passage of urine along the urethra through the urogenital diaphragm is controlled by the external urethral sphincter, which is a circular muscle under voluntary control (that is, it is innervated by the somatic nervous system, SNS).

3. Spongy Urethra

The spongy urethra is the longest of the three sections. It is approximately 6 inches (150 mm) in length and is contained in the corpus spongiosum that extends from the end of the membranous portion, passes through the penis, and terminates at the external orifice of the urethra - which is the point at which the urine leaves the body.

Structure of the Male Urethra

The structure of the urethra (tube) itself is a continuous mucous membrane supported by submucous tissue connecting it to the other structures through which it passes.

- The mucous coat is continuous with the mucous membrane of the bladder, ureters and kidney. In the membranous and spongy sections, the mucous membrane is arranged in longitudinal folds when the tube is empty.
- The submucous tissue consists of a vascular (i.e. containing many blood vessels) erectile layer surrounded by a layer of smooth (involuntary) muscle fibres. These muscle fibres are arranged in a circular configuration that separates the mucous membrane and submucous tissue from the surrounding structure - which is the tissue of the corpus spongiosum.

Unlike the female urethra, the male urethra has a reproductive function in addition to its urinary function - it conveys semen out of the body at ejaculation.

1.5.5 Female urethra

On average, the female urethra traverses 4 cm from the bladder neck to the vaginal vestibule. Its lining changes gradually from transitional to nonkeratinized stratified squamous epithelium. Many small mucous glands open into the urethra and can give rise to urethral diverticula. Distally, these glands group together on either side of the urethra (Skene's glands) and empty through two small ducts to either side of the external urethral meatus.

A thick, richly vascular submucosa supports the urethral epithelium and glands. Together, the mucosa and submucosa form a cushion that contributes significantly to urethral closure pressure[16]. These layers are estrogen dependent; at menopause they may atrophy, resulting in stress incontinence. A relatively thick layer of inner longitudinal smooth muscle continues from the bladder to the external meatus to insert into periurethral fatty and fibrous tissue. In contrast to the male proximal urethra, no circular smooth muscle sphincter can be identified. A rather thin layer of circular smooth muscle envelops the longitudinal fibers throughout the length of the urethra. It is thought that the longitudinal smooth muscle of the urethra contracts coordinately with the detrusor during micturition to shorten and widen the urethra[9].

The striated urethral sphincter invests the distal two thirds of the female urethra[17]. It is composed exclusively of delicate type I (slow-twitch) fibers surrounded by abundant collagen. Proximally, it forms a complete ring around the urethra that corresponds to the zone of highest urethral closure pressure. Farther down the urethra, the fibers do not meet posteriorly but continue off the lateral sides of the urethra onto the anterior and lateral wall of the vagina. Contraction of these fibers (the compressor urethrae) closes the urethra against the fixed anterior vaginal wall. Near the vestibule, the fibers completely surround the urethra and vagina to form a urethrovaginal sphincter. Contraction of this muscle group, along with bulbospongiosus, tightens the urogenital hiatus. The suspensory ligament of the clitoris (anterior urethral ligament) and the pubourethral ligaments (posterior urethral ligaments) form a sling that suspends the urethra beneath the pubis[18]. The striated urethral sphincter receives dual somatic innervation, like that in the male, from the pudendal and pelvic somatic nerves[19]. Little sympathetic innervation is found in the female urethra. Parasympathetic cholinergic fibers are found throughout the smooth muscle. Somatic and autonomic nerves to the urethra travel on the lateral walls of the vagina near the urethra. During transvaginal incontinence surgery, the anterior vaginal wall should be incised laterally to avoid these nerves and prevent type III urinary incontinence[20].

1.6 The technique of urethrocystoscopy.

Urethrocystoscopy is done under sterile conditions; the patient is anaesthetized, usually general anesthesia or spinal anesthesia, then positioned in lithotomy, with hip joint flexed to less than 90 degrees. Prepping with any antiseptice for example savlon, dettol or povidone iodine is done, depending on availability, then draping with sterile towels is accomplished.

The urethrocystoscope is assembled, the light cable is connected to the light source, and then to the cystoscope.

The running irrigation fluid is also connected from the reservoir tank placed at a height to facilitate free flow under the influence of gravity. The Flowing irrigation fluid current helps to open the urethra ahead of the cystoscope. Any urologic irrigant can be used for cystourethroscopy; most often, sterile water or saline solution is used. In cases where electrocoagulation is planned, the solutions containing electrolytes are avoided, except in situations where a bipolar courtery is used. In general, the choice of an urethrocystoscope sheath with respect to size, considers the smallest outer circumference that will accomplish the task. If the diagnostic urethrocystoscopy is being performed, a small instrument [Number 16 to 17 French Gauge (Fr)] is adequate. If a larger working channel is needed for accessory equipment (e.g. biopsy device), a larger endoscope sheath is chosen.

Systematic inspection of the entire urethra and bladder is performed during urethrocystoscopy. Prior to insertion of the instrument, the urethral meatus should be inspected, if this has not already been accomplished. If the meatal size appears inadequate to accept the endoscope, it can be dilated with metal sounds. After the sheath of the urethrocystoscope is generously lubricated with a water-soluble anesthetic-lubricant (which can also be instilled into the urethra), the endoscope can be passed preferably under direct vision with a 0- to 30-degree lens, remembering the urethral anatomy.

In the male, the penis is grasped and straightened so that it forms almost a right angle to the abdominal wall. The endoscope is passed through the fossa navicularis, and the anterior

urethra is inspected as the instrument is gently passed. Any mucosal abnormality is noted, and the diameter of the urethra is evaluated. If there is resistance to the passage of the endoscope, a smaller instrument is used or the urethra is dilated. As the instrument is advanced and enters the bulbar urethra with its greater diameter, the endoscope and penis are lowered while the instrument is passed until the penis is parallel with the floor. This allows passage of the instrument through the membranous urethra. The external sphincter is easily identifiable at the level of the membranous urethra by the mucosal folds radiating from a narrow lumen ahead of the endoscope.

Gentle pressure facilitates passage of the endoscope through this area. When the instrument passes into the prostatic urethra, the verumontanum is noted. The prostatic urethra is inspected, and the size of the prostatic lobes is evaluated together with the length of the prostatic urethra, which can be elongated with prostatic hyperplasia. At the level of the bladder neck, it may be necessary to depress the endoscope gently in order to pass the instrument into the bladder over the bladder neck. An alternative technique is to pass the rigid endoscope "blindly" into the bladder as one would pass a metal dilator, with inspection of the urethra on withdrawal of the endoscope.

Inspection of the female urethra is easily performed by inserting the endoscope under direct vision into the urethral meatus, and by directing the instrument cephalad toward the umbilicus. Once the endoscope is inside the bladder, a systematic evaluation of the entire bladder surface is performed. Using the 30-degree lens with the bladder only slightly filled, one can identify the interureteric ridge just inside the bladder neck along the trigone. Next, the ureteral orifices are visually located several centimeters lateral from the center of the interureteric ridge, and should be observed to efflux clear urine bilaterally. The floor of the bladder behind the trigone and posterior bladder wall are inspected. Using the 70- to 90-degree lens, one can systematically inspect the lateral walls of the bladder by moving the endoscope from anterior to posterior and back as the bladder fills slowly. Finally, the dome and anterior bladder wall are evaluated with the 70- to 90-degree lens, with the bladder air bubble instilled at the time of instrumentation as a landmark on the dome of the bladder. The anterior bladder wall just

behind the bladder neck is best seen with the bladder only partially filled and with one hand exerting suprapubic pressure to depress the anterior bladder wall. After complete inspection of the urethra and bladder has been accomplished, the bladder is drained and the instrument is gently removed. Then the patient is catheterized with Foley's catheter and secured [2].
In patients with bladder tumor, multiple biopsies should be taken and this includes also the adjacent mucosa. This is accomplished by use of a punch biopsy forcep, which is inserted and when the tumor is located it is biopsed. Then multiple mucosal biopsy is also done.

1.7 Transurethral resection of bladder tumor (TURBT)

In TURBT prophylactic intravenous antibiotics are administered. General anesthesia with paralytic agents is preferred to avoid obturator nerve spasms, which can lead to inadvertent injury during resection.

If the bladder lesion is small, then it may be amenable to cold-cup biopsy and fulguration. These have the advantage of tissue procurement without coagulation defects from the resectoscope. Random bladder biopsies should be performed in the bladder as well as in the prostatic fossa. This aids in determining the presence of Carcinoma insitu (CIN) or other factors important to the patient's eventual treatment.

Three types of electrical current are used in TURBT: cutting, coagulation, and blended. The best current for cutting is the undamped current generated by a tube oscillator circuit. Coagulation is accomplished with a highly damped spark-gap current generated from a spark-gap oscillator circuit[21]. A blended current is an adjustable combination of cutting and coagulation currents; it is useful in improving hemostasis when resecting vascular tissues by adding the coagulating effect of a spark-gap current to the tube oscillator cutting current. The current density varies with the surface area of the loop. Loops are made in five diameter sizes: 10, 12, 15, 18, and 20 thousandths of an inch. Finer-diameter loops project a more concentrated current and therefore cut more easily. Larger-diameter loops produce better hemostasis. The zone of tissue destruction with a cutting current is negligible[21].

The bladder should be sufficiently distended so as to not fold up on itself, but overdistention should be avoided. It is usually best to begin resection of the most exophytic region of the tumor first, beginning at the most anterior or superior portion. If it is necessary to decrease bleeding and improve visibility, the tumor vessels feeding the lesion can be coagulated before resection. The resection should proceed in an orderly fashion from one side of the tumor to the other. Tumor fragments can be evacuated using the Ellik evacuator. Additional resection of the base of the tumor can then provide a separate specimen to aid in determining depth of invasion. The muscle fibers of the detrusor should be readily visible in place of the granular appearance of tumor at the completion of the resection.

One-piece resection of superficial bladder tumors using a curved needle electrode can also be done, by making a circular incision around the tumor[22].

For smaller papillary lesions, fulguration alone may be preferable. If larger lesions are present, it may be advisable to begin resecting at the dome of the bladder first and then to proceed more posteriorly. This is helpful because of the relative inaccessibility of the dome of the anterior bladder. If these lesions are not resected initially, later visualization can be compromised owing to excessive bleeding. Resection at the dome of the bladder can be facilitated by suprapubic pressure and avoidance of overdistention of the bladder. Bleeding should be controlled at each site of tumor resection before moving to another lesion. This is to ensure adequate visibility.

1.8 Bimanual examination

After urethrocystoscopy is accomplished and the urethral catheter is inserted, bimanual palpation is done while the patient is still in lithotomy position to assess the pathology in question (usually bladder tumor to assess the extent). The index and middle fingers of one hand are inserted into the rectum or vagina, and a counter pressure is exerted by the opposite hand applied on the supra pubic area. Accurate assessment is made for the presence of induration, or mass. If mass is present, its mobility is checked. It is important for staging of the tumor [23]. A tumor that is immobile and fixed to the pelvic wall, or involves adjacent organs such as rectum, vagina is considered is as advanced.

CHAPTER TWO

2. LITERATURE REVIEW

Cystoscopy is one of the important investigations in patients with bladder cancer, which is a common urologic cancer. It is currently the reference examination for diagnosis and surveillance of bladder tumor [24]. All patients suspected of having bladder cancer should have a careful cystoscopy and bimanual examination. About 80-90% of patients with bladder tumor, presents with painless hematuria particularly in transitional cell carcinoma (TCC) [25]. Patients with squamous cell carcinoma (SCC), usually present with features of cystitis and painful micturition, and hematuria is said to be a late symptom [23].

However in patients suspected of bladder tumors, this important procedure may be preceded by other investigations such as; transabdominal ultrasound, and urine cytology and currently urinary biomarkers. Intravenous urogram (IVU) helps to evaluate upper urinary tract and can show a filling defect in bladder in case of tumor. Different studies have assessed the diagnostic correlation of transabdominal ultrasound and cystoscopy in diagnosis of bladder tumors. In Italy one study found that; the sonography and cystoscopy agreed as to the size and number of the bladder wall abnormalities in 81.3%, and 78.7% of cases respectively. The sensitivity, specificity, positive predictive value and negative predictive value of the ultrasound in the same study were 91.4%, 79.3%, 91.4% and 79.3% respectively [26]. Abu-Yousef and colleagues found that, the ultrasound detected 16 of the 17 cases of bladder tumors (i.e. 94%), but they also found factors such as; size and location of the tumor, bladder distension, obesity of the patient and the operator's skill may affect the efficacy of the ultrasound [27]. Cariou and colleagues found the vesical ultrasonography to have a sensitivity of 50%, and the combination of ultrasonography and urine cytology had an overall sensitivity of 80% [24].

Cystoscopic biopsy allows histological examination of the tumor. Usually the abnormal areas are biopsed, and random or selected sites of mucosa biopsy can also be obtained. The configuration, number and site of the tumor may be important in planning surgical

intervention [2]. However, these parameters may be difficult to assess in schistosomal related tumors because often the bladder has a large, necrotic and infected tumors [23].

On other hand transitional cell tumors are typically papillary or sessile. Carcinoma in situ (CIS) may appear as an erythematous, velvety lesion. In TCC the entire uretherium is at risk, and therefore apart from bladder cancer, urethrocystoscopy is also indicated in patients with renal collecting system tumors, to rule out synchronous tumor in the bladder [3].

Concerning the different histological types of bladder tumors; the prevalence differs from place to place. The most common bladder tumors in western world, is transitional cell carcinoma in about 90% of cases, 10% of are squamous cell carcinoma, and it has been reported that, adenocarcinoma may account for about 1-2%. In developing countries 75% of the bladder cancers are SCC [28-30]. It is reported that SCC is the most common bladder cancer in Egypt, and this is related to the high prevelance of schistosomiasis in the area [31, 32]. A study in Kwazulu Natal in South Africa, found that; transitional cell carcinoma constituted about 95% of the cancers in Caucasians, compared with only 30% in Africans. Squamous cell carcinoma occurred in 53% of the African patients, but in only 2% of the Caucasians. In Asian patients, 75% of the tumours were transitional cell and 18% were squamous cell carcinoma, whereas in Coloureds 82% were transitional cell and 9% squamous cell carcinoma, suggesting racial predilection. The same study also found that; in African patients with squamous cell carcinoma, 90% had stage T3 or T4 disease at presentation, whereas in Caucasian patients with transitional cell carcinoma 76% had stage T1 or T2 disease at presentation [33].

In Nigeria, two studies found different results; in Kano, squamous cell carcinoma (53%) and transitional cell carcinoma (35%) carcinomas were the most common histological types, with a males to female ratio of 5.2: 1 [34]. In Benin City the finding was different, the predominant histological type was transitional cell carcinoma (67.2%) of the cases, and Squamous cell carcinoma was relatively rare accounting for 15%[35]. In Tanzania a study by Kitinya et al in Northern parts of the country, found that of 172 cases of bladder cancer recorded in 9 years, 72% were squamous cell carcinomas [36].

Bimanual examination under anesthesia (EUA) is an important tool for staging of the disease. It determines whether the disease is localized to the bladder, involves the adjacent structures, or it is fixed to the pelvic wall, in which case it is inoperable disease. It has been suggested that Standardization and refinement of this procedure, may be needed[37].

Cystoscopy is also an important procedure for diagnostic evaluation of patients who present with gross hematuria. It is stated that; one of the most common indications for urethrocystoscopy is in the evaluation of microscopic and gross hematuria. By combining radiographic and endoscopic techniques, one can usually determine the source of bleeding in the upper or lower urinary tract. Cystoscopy is performed as soon as possible to identify the source of bleeding. The cystoscopy will determine whether hematuria is coming from the urethra, bladder or ureters/kidneys. A jet of red urine can be seen coming from the involved ureteric orifice. Other indications for this procedure include; evaluation of voiding symptoms (obstructive and irritative), which may be the result of neurologic, inflammatory, neoplastic, or congenital abnormalities [2].

In the study assessing the correlation of transabdominal ultrasound and cystoscopic findings in the diagnosis of focal abnormalities of the urinary bladder; hematuria was the second commonest indication in 39% of the cases. In the same study, surveillance after transurethral resection was the commonest indication[26]. In a study in a tertiary hosptital in Nigeria, the commonest indication for an endourological procedure was bladder outlet obstruction. In this study, it was also found that the commonest procedure performed was urethrocystoscopy[38]. Assessing the role of flexible cystoscopy in district hospitals in United Kingdom, in which indications other than hematuria and surveillance after resection were considered; one study found that, 46.14% of these cystoscopies had positive findings. Cancer detection rate was 6.1%. Cystoscopy altered the management in 14.08% of patients and was supportive to diagnosis and management in 32.06%[39].

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In patients with benign prostatic enlargement, cytoscopy is indicated in those scheduled for open retropubic, transvesical or transperineal prostatectomy, to exclude other pathology in the bladder. It is not recommended to determine the need for treatment [40]. In Japan, the incidence of bladder cancer discovered by urethrocystoscopy at prostatic biopsy was found to be 2.5% in patients without prostatic cancer [41]. The test is also recommended in men with lower urinary tract symptoms, who have microscopic or gross haematuria, urethral stricture disease (or risk factors such as history of urethritis or injury), bladder cancer or prior to urinary tract surgery especially TURP [2]. It may also be considered in men with moderate to severe urinary tract symptoms, who have chosen, or require surgical or other invasive therapy to help the surgeon to determine the most appropriate surgical approach.

Historically many urologists believed that visualization of lower urinary tract defines the severity of the BPH, or predicts the outcome of the treatment. However, this common urologic procedure has been poorly studied. No data are available on the sensitivity, specificity or predictive value of the test. Some of the potential benefits include; ability to demonstrate prostatic enlargement, visualization of obstruction of the urethra and bladder neck, identification of specific abnormalities that alter clinical decision making e.g. identification of bladder stones, trabecullae, cellulae, diverticular, measurement of post void urine volume and ruling out unrelated urethral and bladder pathology. The linkage between endoscopic appearance of lower urinary tract and the treatment outcome are poorly documented, however available data suggest that the relation is minimal. Urethrocystoscopy, however, may determine the technical feasibility of the specific therapy, for example in large median lobe, transurethral incision of prostate (TUIP) is unlikely to be successful. Therefore urethrocystoscopy in BPH is meant to select or exclude specific techniques, not to determine the need for treatment [2].

Urethrocystoscopy was used in the past to evaluate urinary schistosomiasis, it has characteristic findings/appearances, which includes; Bilharzia pseudo tubercles, which are the earliest specific appearance, usually large, more prominent, numerous more yellow and more

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distinctly grouped than those of Tuberculosis. Bilharzia nodules are due to fusion of tubercles in the presence of secondary infection, they are larger and grey. Granulomas are bilharzial masses caused by aggregation of nodules; they are usually sessile and soft and bleed easily when touched. Bilharzia sandy patches are due to calcified dead ova with degeneration of overlying epithelium. Usually around one or both ureteric orifices and can be visualized radiologically. Ulceration is a result of sloughing of mucus membrane containing dead ova or more commonly sloughing of Bilharzia papilloma, forms a shallow ulcer which bleeds easily, commonly on posterior wall of the bladder. Fibrosis is mainly due to secondary infection, the capacity of the bladder becomes reduced and contracture of bladder neck may be found and may cause bladder outlet obstruction. Papillomas are more pedunculated, they are of variable sizes, and can appear singly or multiply. Carcinoma is a common end result in grossly infected patients, in which infection has been neglected for years. Cystoscopy allows biopsy to be taken at the same time[29]. The recommended investigations for bilhalzia of the bladder includes, plain abdominal X-ray, which shows calcified bladder with "fetal head in pelvis" appearance which is "pathognomonic". Seminal vesicles, ureter, prostate and colon may be calcified. Other investigations include; IVU which may show, ureteral stenosis, hydronephrosis, ureteral or bladder filling defect or non functioning kidneys [42]. Ultra sound is highly useful and shows focal thickening of bladder wall and/or polypoid lesion or heavily calcific sandy patches. It can also show hydroureter, or hydronephrosis. Computed tomography may be useful in planning of management [43].

Concerning the value of urethrocystoscopy in incontinency, Ludovicksson in his paper "The value of clinical examination of female incontinent patients" wrote; although the indications of urethrocystoscopy are controversial, there doesn't appear any controversy about the need for cystoscopy in patients with persistent symptoms of urgency and frequency, recurrent urinary tract infection, hematuria or voiding difficulty or the need to evaluate voiding dysfunction after incontinence surgery. And he recommended the use of urethrocystoscopy as a routine diagnostic tool for urinary incontinence[44, 45]. Cundiff and Bent in USA studied 84 incontinent women by both urodynamics and urethrocystoscopy.

All patients presented with urinary incontinence and none had hematuria nor pain. Cystourethroscopic findings changed diagnosis and management in 7% of patients and these included two patients with cystitis glandularis, intravesicle suture and urethral diverticulum. Two patients had transitional cell carcinoma. They concluded that urethrocystoscopy and urodynamics complement each other[46].

Others, however, recommend urethrocystoscopy in selected patients[2]. Payne stated that; the initial evaluation of urinary incontinence should include thorough medical history, physical examination, post void residual urine testing, and urinalysis. Further evaluation includes urodynamics, cystoscopy, urinary tract imaging and neurological testing in minority of patients[47]. At Muhimbili National Hospital, the instruments for urodymics are not available, and hence we mainly rely on clinical assessment and other investigations as suggested by the author above.

Urethrocystoscopy has a role in evaluation of de novo lesions of the bladder. The pathological interpretation and diagnosis of non papillary, non invasive abnormalities of vesical mucosa, generally referred to as flat lesions, has been a source of considerable confusion [2]. And this is related to whether the lesions are non neoplastic (dysplastic atypia, hyperplasia, and or hyperplastic atypia) or neoplastic. The former includes Brunn's nests, papillary hyperplasia, cystitis grandularis and squamous hyperplasia. These flat lesions can be encountered in either a patient with clinical carcinoma simultaneously or subsequently, or less frequently de novo. Melicow was the first to call attention to the existence of abnormal mucosa adjacent to frank carcinoma [48]. Eisenberg in his study found that, proliferative lesions (Brunn's nests, glands, atypical hyperplasia, papillary hyperplasia and carcinoma in situ) were found in 20% patients with papillary carcinoma, and 60% with infiltrating tumors [49]. Schede and Sweney reported atypia of various types, such as cystitis glandularis with atypia, cystitis glandularis with carcinoma in situ, atypical epithelium with carcinoma) in about 86% of 100 patients with papillary carcinoma of the bladder[50].

De novo flat lesions can be encountered in 3 settings; one, in patients with irritative symptoms or gross hematuria. Two, in asymptomatic patients with hematuria or positive cytology at screening. Three in examination of individuals exposed to carcinogens. The Cystoscopy in all the three groups above may show, an erythematous swollen mucosa, but without any discernible tumor, most often located in the trigone and near the ureteral orifices. Lesions may be focal, but often diffuse involving up to 85% of bladder mucosa. In some patients cystoscopy may be normal [(2)].

Cystoscopy is also important in evaluation of patients with interstitial cystitis. Interstitial cystitis is a chronic bladder disease, characterized by symptoms of cystitis. These are pain in or around the hypogastrium, urgency and need to urinate, and frequent urination both in the day and at night. The pain usually increases as the bladder fills. However, no urinary tract infection or other cause is found. Currently it is considered as part of painful bladder syndrome (PBS). PBS is defined as the complaint of supra pubic pain related to bladder filling, accompanied by other symptoms such as an increased day-time and night-time frequency, in the absence of identifiable infection or other pathology [(51)].

Interstitial cystitis is a symptom complex in which the diagnosis is made without reasonable doubt if the following criteria are met; a). Moderate urinary urgency. b).Voiding more than 12 times per day. b) An average voided bladder capacity of less than 150mls. c) negative urine culture. d) Presence of symptoms consistent with cystitis such as; bloody effluent after hydro distension of the bladder, glomerulation, bladder capacity less than 850 milliliters with continuous presence of symptoms for more than one year[(2)].

In a study by Lamale et al, to examine the relationships between symptoms and cystoscopic findings in women newly diagnosed with interstitial cystitis who had not previously received treatment; Pain symptoms had consistent positive correlations with the cystoscopic findings. In which an increase in pain with bladder filling was associated with inflammation, ulceration, and smaller bladder capacity. Pain relief after voiding correlated with smaller bladder

capacity, hematuria, and total cystoscopic score. Pain intensity in the urethra was related to ulceration and hematuria, and pain in the lower abdomen was related to a smaller bladder capacity, glomerulations, and a larger total cystoscopic score. Daytime frequency correlated negatively with most cystoscopic findings, and nocturnal frequency had a positive relationship with most cystoscopic findings and was significantly associated with a smaller bladder capacity. Urgency showed no strong associations with any cystoscopic findings [52].

CHAPTER THREE

3. PROBLEM STATEMENT

Urethrocystoscopy is one of the most common procedures at MNH. A pilot study indicated that, on average five patients per operating day undergo urethrocystoscopy. The commonest indications included; urethral stricture, hematuria, chronic cystitis and incontinence. In literature however, some of the most common mentioned indications include; diagnostic evaluation of hematuria and post resection surveillance of bladder tumors [26]. In bladder tumors it is the reference investigation, and allows cystoscopic biopsy and therefore histological diagnosis[24], but also determining the size, site, number and the configuration of tumors (whether papillary, solid or both) which can assist in planning surgical intervention. Bimanual examination stages the tumor [2]. The prevalence of the different histological types of the bladder tumors differs between developed and developing countries [25, 28, 34-36].

There are various other indications such as; urinary incontinence [44, 46], Bladder outflow obstruction [2, 38], and irritative symptoms (Urgency, dysuria, and frequency) [52]. It has been indicated that the positive findings in indications other than hematuria and surveillance of bladder tumors, may be as high as 46% [39].

The diagnostic value of an ultrasound in bladder wall abnormalities has been documented in literature [26]. Although others has indicated that it has a limited role when used alone [24].

The above cited literature has shown the various urethrocystoscopy indications in various settings of the study. No collective study was found indicating the pattern of clinical indications, cystoscopic findings, and early complications associated with the procedure. This kind of study has not been done in this country and probably in the region.

4. RATIONALE OF THE STUDY

The aim of this study was therefore to determine, the patient profile in terms of identifying particulars such as common clinical indications for urethrocystoscopy, and common urethrocystoscopy findings. It also documented some of the common early complications, and final histological diagnosis to those patients whom biopsy was taken.

In view of the lack of literature, this study is expected to provide baseline information for any other subsequent study in the Country or in the region. It is also part of the partial fulfillment of the Masters of medicine in surgery.

5. RESEARCH QUESTIONS

1. What are the clinical indications for urethrocystoscopy.

2. What are the common urethrocystoscopic findings.

3. What are the common early complications associated with urethrocystoscopy.

CHAPTER FOUR

6. OBJECTIVES

Broad objective

To determine the profile of patients, urethrocystoscopice findings, and early complications of patients undergoing urethrocystoscopy at MNH

Specific objectives

I. To determine common indications for urethrocystoscopy at MNH.
II. To determine the other common relevant investigations in patients undergoing cystoscopy.
III. To document urethrocystoscopic findings.
IV. To determine the correlation between indications and cystoscopic findings.
V. To determine the correlation between ultrasound findings and cystoscopic findings.
VI. To document early complications following urethrocystoscopy.
VII. To determine the final diagnosis in patients undergoing urethrocystoscopic biopsy.



CHAPTER FIVE

7.0 MATERIAL AND METHODOLOGY

7.1 Study design

This was a prospective hospital based descriptive cross sectional study, which included all patients scheduled for urethrocystoscopy at MNH 2008.

7.2 Study period

Six month duration commencing from March 2008 to September 2008, the author participated in evaluation of the patients, in the procedure, and the post operative assessment of patients to determine early complications.

7.3 Study area

The study was conducted at MNH located in Dar es Salaam city which has a population of about three and half million. It is the main referral hospital for the whole country. It receives patients country wide and it also serves as a teaching hospital for The Muhimbili University of Health and Allied Sciences (MUHAS). Urethrocystoscopy is a common procedure at MNH; this study was conducted in general surgical wards admitting urology patients, and in urological wards after creation of the Urological Unit, and in the main operating theater.

7.4 Study population

All patients scheduled for urethrocystoscopy were entered in the study, and the data was analyzed in all the patients using Epi Info statistical package.

7.5 Exclusion criteria

Refusal to participate in the study.

Recystoscopy within the study period.

7.6 Participation

The author participated in the procedure and he discussed the findings with the urologist available in theater. The author also participated in the assessment of patients postoperatively for the possible early complications.

Follow up included histology results and other subsequent requested investigations or treatments

7.7 Ethical issues

This is a Human study that needed ethical clearance.

Unnecessary delay of discharge of the patient, for evaluation of early post operative complications, especially those admitted from the outpatient department. This could have costed them more money, particularly those admitted in IPPM (intramural private practice) wards.

7.8 Ethical clearance

The study protocols were approved by MUHAS Ethical committee, written informed consent was obtained from each patient. Those not capable of providing informed consents, their guardians provided the consent on their behalf.

7.9 Sample size

Minimum sample size was estimated from the formula:

$$N = \frac{Z^2 P(1-P)}{D^2}$$

Where

N = sample size

Z = standard normal deviation of 1.96 corresponding to 95% confidence interval

P = proportion of people with significant finding at urethrocystoscopy (estimated to be 7% from one of the study (46).

D = degree of accuracy of 5%

The estimate gives 100 cases. 110 were recruited in this study.

7.10 Sampling method

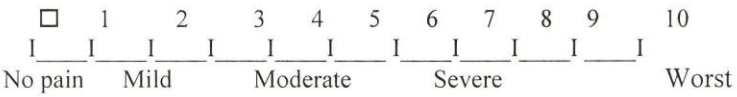
Convenient sampling method was used, in which all patients with scheduled for urethrocystoscopy were recruited into the study.

7.11 Research tools

Plain paper, flat files for keeping data sheets, pens, pencils, scientific calculators, manila cards, A4 papers, computer with Epi Info data analysis programme, and printer tones (printing ink).

Visual Analogue Scale (VAS)

VAS = 10cm horizontal line from "worst pain imaginable – no pain"



Mild pain represents a sense of discomfort that can be ignored and does not prevent the patient from sleeping. Moderate pain is the pain that may disturb the patient sleep altogether. Severe pain is the pain that prevent the patient from sleeping. Worst pain is the pain that makes the patient not to withstand the pain.

7.12 Data collection

The data was collected from all patients' files and including their investigation forms, urethrocystoscopic findings, early complications and final histological diagnosis were filled in the already constructed questionnaire. After the procedure these patients were assessed for urethral bleeding while in the recovery room, by observing the color of urine in the urine bags. This information was filled in the questionnaire. In the wards patients were monitored by observing color of urine, temperature measurement by using a digital thermometer available in

the wards and pain assessment using visual scale. These were done in first, second and third day postoperatively. To avoid unnessary delay of the patients, those who needed no further admission were discharged in third day and they were seen in the 7th day postoperative in the wards. The parameters above were recorded according to the questionnaire. Those patients whom biopsy was taken, histological results were followed up and the results were also recorded.

7.13 Data analysis

These data were entered into a special computer statistical soft ware package (Epi Info version six) for data analysis. Statistical significance was determined when necessary, using chi square but none was significant due to small number. The cut-off point used for the p-value was 5%.

7.14 Sources of errors

Observer's errors

The ultrasound examination was done by different technicians whom may have different technical skills and experience.

There were multiple observers during urethrocystoscopy, who may have different experiences.

Selection bias

This was a hospital based study and all patients scheduled for urethrocystoscopy were recruited into the study. The study population may therefore be different from other hospitals.

CHAPTER SIX

8. RESULTS

There were 110 patients who underwent urethrocystoscopy with various indications. About seventy percent of these patients were males, and 30% were females. The most common age group was 41-60 years, accounting for about 37.3% of all patients. Put together those aged above 40 years constituted about 64%. Fewer patients were aged below 20 years 11.8%. Most patients were peasants 49.1% (N=54) in both sexes [TABLE 1(a) and (b)].

Regarding the clinical indications; the most common clinical indication overall was hematuria in about 37.3% (N=41) of all patients. In females hematuria was the leading reason for urethrocystoscopy (54.5%), while in males stricture was the commonest indication accounting for about 31.2% of all males, followed by hematuria 29.9% [TABLE 2].

Assessment was also done regarding different types of investigations in these patients. Urinalysis was done in 65 patients (59.1%), renal function tests were done in 54.5%, while abdominal pelvic ultrasound was done in 70 patients (63.6%). Plane abdominal X rays that include kidneys, ureters and bladder (KUB) and the intravenous urogram (IVU) were done in 5.5% and 3.6% of all patients respectively [TABLE 3].

The hemoglobin (Hb) levels were determined in all patients pre operatively; only those with history of hematuria were assessed for degree of anemia. Majority of these patients were anemic (73.1%). Most of them had mild to moderate anemia. And only one patient had severe anemia [TABLE 4].

Of those who underwent ultrasonographic examination pre operatively (N=71); 70% had some form of sonographic pathology. Twenty eight of the ultrasound examinations (39.4%) showed bladder mass, in nine patients (12.7%) the ultrasound showed bladder wall thickening or calcification. Five patients had hydronephrosis and in two patients the ultrasound suggested

presence of bladder calculi. And 22 patients (31%) had normal ultrasound findings [TABLE 5].

Urethral visualization was done in 109 patients, 8 patients (7.3%) had urethral hyperemia, twenty six of these patients (23.9%) had strictures, of which five patients had complete urethral obliteration and hence the bladder could not be visualized [TABLE 6]. Among 71 male patients whom prostate was assessed, 13 patients (18.3 %%) had enlarged median lobes or lateral lobes. Only one patient was found to have pus pocket on the prostate suggestive of prostitis, and fifty six patients had normal prostate [TABLE 7].

Cystoscopy was successful in 104 patients (94.5%). The commonest cystoscopic pathological findings were; bladder tumors and bladder mucosal hyperemia in 31.7% and 13.5% respectively. In 43.3% of the patients, the cystoscopy revealed normal bladder findings. One patient was found to have a gauze left on the anterior wall of the bladder after prostatectomy, he presented with discharging sinus for more than a month post operatively [TABLE 8].

Regarding the distribution of these tumors; the commonest tumor locations were; bladder neck, lateral walls and anterior wall in 30.3%, 30.3% and 27.2% respectively. This means bladder neck and lateral walls were the commonest sites in about two third of the patients. The uncommon sites include the posterior wall and fundus of the bladder in 9.1% and 2.9% of the patients respectively [TABLES 10]. Majority of tumors were advanced 58.8% (involving adjacent structure or fixing to the pelvic wall), 41.2% patients had mobile operable tumors [TABLE 13].

The state of the ureteric orifice was reported in all patients whom cystoscopy was successful, and most of patients had normal ureteric orifices. Only 6 patients (5.8%) had distorted ureteric orifices [TABLE 9].

When clinical indications were compared to cystoscopic findings; majority of patients (65.9%) who presented with hematuria, were found to have bladder tumors at cystoscopy. Six patients (5.6%) who had clinical indication other than hematuria, that is lower abdominal pain three patients, stricture two patients and others one patient, were found to have bladder tumors [TABLE 11].

Ultrasonographic findings were also compared with cystoscopic findings. Majority of the patients (82.7%) who had ultrasonographic bladder mass, were found to have bladder tumors at cystoscopy. The ultrasound missed 5 bladder tumors [TABLE 12]. The sensitivity of the ultrasound in detecting bladder tumor was therefore 82.8% and the specificity was 92.9%. While the positive predictive value was 88.9% and the negative predictive value was 88.6% [TABLE 12(b)].

With regard to complications of urethrocystoscopy; 2 patients got urethral injury that necessitated suprapubic cystostomy to drain urine following direct visual urethrotomy (DVU). About 25.5% of the patients had transient fever post cystoscopy. Only one patient had fever beyond 72 hours. Almost all patients had some degree of pain post operatively (91.8%). However, only 9% of them described their pain intensity as severe on verbal rating scale. Eighty percent of these patients had mild to moderate pain. Majority of patients 79.9% had urethral bleeding of varying duration, however only 42.7% had bleeding up to the first day postoperatively [TABLES15, 16 & 17].

The commonest histological diagnosis was squamous cell carcinoma in 48.5%%, followed by transitional cell carcinoma in 24.2%. Adenocarcinoma accounted for about 9.1%. Six patients (18.2%) had non neoplastic conditions, i.e. nonspecific chronic inflammation in 5 patients and a polyp in one patient. [TABLE 18].

CHAPTER SEVEN

9. DISCUSSION

Cystoscopy is one of the most precise diagnostic tests in clinical practice, and is currently the reference examination for diagnosis and surveillance of bladder tumors [3, 24]. In this study there were various indicatons for urethrocystoscopy; hematuria was the leading reason for urethrocystoscopy in both sexes in 37.3%, it was the second most common in males after stricture. This pattern is similar to that of Fransica and collegues in Italy, in which 39% of the patients presented with hematuria [26]. The findings also concurs with that of Nigeria, in which the commonest indication for endourology was found to be bladder outlet obstruction (BOO) [38]. Such common indication in western world as surveillance of bladder tumors after endoscopic resection of bladder tumors [26], was not found to be an indication in this study. This is related to fact that most of bladder tumors in developing countries, are schistosomal related squamous cell carcinoma and most of these patients present late with an advanced disease[25, 28, 29]. These tumors (i.e. squamous cell carcinoma) are treated by cystectomy than endoscopic resection [2, 23]. One of the possible reasons for predominance of the two indications above may be due to the fact that MNH is one of the few centers in our country where cystoscopic biopsy and direct visual urethrotomy are done for histological diagnosis and treatment of urethral strictures respectively. Other indications are also common, especially when irritative lower urinary tract symptoms are considered together.

When the clinical indications were compared to the cystoscopic findings; of the 41 patients who presented with hematuria, almost two third were found to have bladder tumors at cystoscopy. In review of literature I could not find any study documenting the proportion of patients presenting with hematuria who actually have bladder tumors. However it is documented that cystoscopy is an important investigation in evaluation of etiology of hematuria, and it is the reference investigation in patients with bladder tumors [2, 24]. It should also be remembered many of the patients seen at our hospital which is a tertially center had referral diagnosis, and therefore prone to selection bias.

When indications other than hematuria (also considered as non standard indications by some outhors) [39]; cystoscopy had positive findings in 39.6% of the patients. This is similar to study done in United Kingdom district hospitals, in which 46.14% had positive findings [39].

Majority of the patients who presented with hematuria in this study, were found to have some degree of anemia with hemoglobin between 6 and 11grams per deciliter (73.1%). This may be related to blood loss in urine or possibly due to malignant effect, as it is documented that tumor necrosis factor alpha, IL-1, INF- gamma produced by macrophages or the tumor cells may contribute to anemia in patients with cancer[53].

Considering the relevant investigations done, it has been observed that not all necessary investigations for patients with lower urinary tract symptoms are done. This may be due to different factors, such as costs, time since the patient is admitted and sent to theater, staff inadequacy and also lack or malfunctioning of machines necessary for the type of investigation.

Pre operative ultrasonographic findings were compared to the cystoscopic findings; 24 out of 29 patients (82.8%), who had an ultrasonographic finding of bladder tumors, were actually found to have tumors at cystoscopy. The sensitivity of the ultrasound in the diagnosis of the bladder tumors was therefore 82.8%, with the specificity of 92.9%. The positive predictive value (PPV) and the negative predictive value (NPV) of the ultrasound were 88.9% and 88.6% respectively. This finding concurs with the study done by Abu-Yousef and colleagues, in which the ultrasound detected 16 of the 17 cases of bladder tumors confirmed at cystoscopy [27]. The findings are also similar to another study in Italy which found the sensitivity, specificity, PPV and NPV to be 91.4%, 79.3%, 91.4% and 79.3% respectively [26]. However this finding is dissimilar to that of Cariou and colleagues, who found the sensitivity of the ultrasound to be 50% [24]. One of the possible explanations for the high detection rate in this study may be due to the fact that, most of our patients present very late with advanced tumors

that can easily be detected by an ultrasound. It is also known that hematuria is a late symptom in schistosomal related bladder tumors (SCC) [23], and most of them present late [33].

Regarding the urethroscopic findings; 23.9% of all patients had urethral stricture. In these patients urethrocystoscopy was done for therapeutic purposes i.e. direct visual urethretomy (DVU). However, after the procedure, the cystoscope was passed into the bladder for assessment of the bladder wall. Two of these patients were found to have bladder tumors. Urethral hyperemia was the second common pathology encountered. Finding the etiology of such lesions was not the scope of this study. In the review of literature I could not find a study documenting the proportion of patients with stricture among total patients undergoing urethrocystoscopy. However as discussed above BOO was the commonest indication in Nigeria [38].

On prostatic findings; nine patients had enlarged kissing lateral lobe or median lobe, only one had pus pockets on prostate suggestive of prostatitis or abscess. Majority of the prostates appeared normal. Almost all of these patients had other indications as discussed above. These findings were incidental, and in only one patient the indication was to assess the technical feasibility of TURP. This may be due to the fact that, other means such as digital examination and ultrasound are probably being used for assessment of the size of prostate and hence to determine the appropriate surgical approach.

In this study, the commonest bladder wall abnormality found was bladder tumor in 31.7%. Put together the non tumor findings constituted for about 25%. It was also found that; most of these tumors were located on the lateral wall, bladder neck and anterior wall in 30.3%, 30.3% and 27.2% respectively. Bladder dome and posterior wall were uncommon sites. In search of literature I couldn't find a study documenting on the pattern of tumor locations. Majority of these tumors were malignant 84.9%, squamous cell carcinoma was the most prevalent histological type (48.5%), followed by transitional cell carcinoma in 24.2%. This observation is comparable to a study in Kwazulu Natal, South Africa in which 53% and 30% were squamous cell carcinoma and transitional cell carcinoma respectively [33].

A study in Kano in Nigeria found similar results with 53% being squamous cell carcinoma and 35% were transitional cell carcinoma [34]. In this study it was found that, three (9.1%) patients had adenocarcinoma. This is higher than documented prevalence of 1-2%, however, small number precludes making any useful comparison. Also six of the patients (18.2%) had non malignant tumors; this figure was smaller than that found in Italy, in which 26.3% were non malignant [26]. The predominance of squamous cell carcinoma may be explained by the fact that most of the bladder malignancies in Africa, are due to schistosomal infection and Tanzania is not exclusive.

More than half (57.6%) of these tumors assessed by bimanual examination, were found to be beyond the bladder wall, that is either involving adjacent structures or fixed to the pelvic wall. This finding is less than the observation in Kwazulu Natal in which 90% of African patients with squamous cell carcinoma had Tumor stage of T3 or T4 according to TNM (primary tumor size, regional lymphnode status and distant metastasis) staging [33]. This indicates that majority of our patients present late with an already advanced disease. Mucosal hyperemia was the second common abnormal bladder wall finding. The ureteric orifices distortion found in this study may be related to primary pathology in bladder walls discussed above.

Regarding the complications; majority of patients (79.9%), had urethral bleeding of varying duration. However, only 42.7% of these had bleeding that persisted up to the first day post cystoscopy. The figures above represent the whole spectrum of indications and the different procedures done. When those patients who presented with symptoms other than hematuria were considered alone; 30.4% had urethral bleeding up to first day post cystoscopy. In review of literature I couldn't find a study documenting on the prevalence of urethral bleeding in the patients undergoing urethrocystoscopy. In those whom neither biopsy nor DVU were done; bleeding may be due to injury of the urethra during the procedure. Obviously in the other two categories; urethral bleeding is attributed directly to procedure or pre existing condition.

Also in this study about 26% of the patients had fever; in almost all patients, the fever was only transient. Only one patient had fever beyond seventy two hours. This patient was also HIV positive and had other systemic manifestation of the disease. The cause of fever in these patients may be explained by various factors; first, the tumors found in some of the patients may have been infected and therefore can be the source of bacteremia and fever. Second, it is documented that fever and chills can result from vesico-ureteric reflux during urethrocystoscopy or from infected prostate [3]. In review of the literature I couldn't find a study assessing prevalence of fever and chills post cystoscopy. On other hand most of the patients (80%), had mild to moderate pain on visual pain scale in the first and second day post cystoscopy. Only a small percentage of patients complained of severe pain (8.2%). This may be possibly explained by inadequate analgesic dispensation post operatively as all of them had analgesics prescribed. In search of literature I couldn't find a study to compare these findings.

CHAPTER EIGHT

10. CONCLUSION

This study has shown that, the most common indications for urethrocystoscopy at MNH were hematuria and urethral stricture. The commonest urethrocystoscopic findings were urethral stricture and bladder tumor, it has been demonstrated that, most patients presenting with hematuria, had bladder tumors at cystoscopy. The commonest early complications includes; pain, fever and urethral bleeding. It has been shown that pain management is a serious problem post cystoscopy despite analgesics prescription. This study has also revealed that, the squaqmous cell carcinoma is the commonest bladder tumor histology followed by transitional cell carcinoma similar to other African studies. Most of these tumors were advanced. The study has also highlighted the valuable role of an ultrasound in the diagnosis of the bladder tumors and in evaluation of patients with hematuria.

11. RECOMMENDATIONS

All the patients with LUTS should undergo all necessary investigation prior to urethrocystoscopy.

Urethrocystoscopy is indicated in all patients with hematuria.

Further controlled study should be undertaken to evaluate the role of an ultrasound in diagnosis of bladder wall abnormalities.

Proper post urethrocystoscopy pain management is required to alleviate pain in these patients.

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13. TABLES OF RESULTS.

TABLE 1 (a): Age and sex distribution among the study cases.

	SEX		
Age in years	**Female**	**Male**	**TOTAL**
<20	4(30.8%)	9 (69.2%)	13 (11.8%)
20-40	6 (22.2%)	21 (77.8%)	27 (24.5%)
41-60	18 (43.9%)	23 (56.1%)	41 (37.3%)
>60	5 (17.2%)	24 (82.8%)	29 (26.4%)
TOTAL	**33 (30.0%)**	**77 (70.0%)**	**110**

There are more male than female, with male female ratio of 2.3:1

The most common age group was 41-60 years 37.3% (N=41), while there are fewer under 20 year patients who are undergoing urethrocystoscopy.

TABLE 1 (b): Distribution of study cases according to Occupation and Sex.

	SEX		
Occupation	**M ale**	**Female**	**TOTAL**
Peasants	41 (53.2%)	13 (39.4%)	54 (49.1%)
Civil Servant	11 (14.3%)	2 (6.1%)	13 (11.8%)
Housewife	-	11 (33.3%)	11 (10.0%)
Students	10 (13%)	4 (12.1%)	14 (12.7%)
Business/self employed	12 (15.6%)	2 (6.1%)	14 (12.7%)
*Others	3 (3.9%)	2 (6.1%)	5 (4.5%)
TOTAL	**77 (70%)**	**33 (30%)**	**110 (100%)**

*Others include; prisoners, and retired officers.

Most of the study cases were peasants 49.1% (N=54).

TABLES 2: Showing Clinical Indications according to Sex.

Clinical Indication(s)	SEX		
	Male	**Female**	**TOTAL**
Hematuria	23 (29.9%)	18 (54.5%)	41
	56.1%	43.9%	37.3%
Stricture	24 (31.2%)	1 (3%)	25
	(96%)	(4%)	(22.7%)
Persistent dysuria	12 (15.6%)	3 (9.1%)	15
	(80%)	(20%)	(13.6%)
Persistent LAP	6 (7.8%)	2 (6.1%)	8
	(75%)	(25%)	(7.2%)
Incontinence	3 (3.9)	4 (12.1%)	7
	(42.9%)	(57.1%)	(6.4%)
*Other indications	9 (11.7%)	5 (15.2%)	14
	(64.3%)	(35.7%)	(12.7%)
TOTAL	**77 (70%)**	**33 (30%)**	**110**

Others include; loin pain, hydronephrosis, chronic renal failure, vesico-cutanous fistula, ureteric stent removal, BPH, and increased urinary frequency.

The most common clinical indication overall was hematuria in 37.3% of all patients (N=41). Among female patients, hematuria was the commonest indication in 54.5% (N=18), while the most common clinical indication among males was stricture in 31.2% (N=24), followed by hamaturia in 29.9% (N=23) of cases.

TABLE 3: Shows frequency of different types of investigations done.

Investigation	Done	Not done	Total
Urinalysis	65 (59.1%)	45 (40.9%)	110
Renal function tst	60 (54.5%)	50 (45.5%)	110
Ultrasound	71 (64.5%)	39 (35.5%)	110
Urethrogram	26 (23.6%)	84 (76.4%)	110
KUB	4 (3.6%)	106 (96.4%)	110
IVU	6 (5.5%)	104 (94.5%)	**110**

More than half of the patients had urinalysis (59.1%), renal function tests (54.2%) and abdominal ultrasound done.

TABLE 4: Showing frequency of levels of hemoglobin in patients presented with hematuria.

HB Level	Frequency	Percent
Normal (>11.0 g/dl)	11	26.8%
Mild (8.5-11.0g/dl	15	36.6%
Moderate (6.0-8.5 g/dl)	14	34.1%
Severe (<6.0 g/dl)	1	2.4%
Total	**41**	**100.0%**

Majority of the patients 73.1%, who presented with hematuria, had some degree of anemia. Only one patient had severe anemia with hemoglobin less than 6g/dl.

TABLE 5: Showing different ultrasonographic findings.

Findings	Frequency	Percent
Normal	22	31.0%
Bladder mass	28	39.4%
Hydroureter/nephrosis	5	7.0%
Bladder calculi	2	2.8%
Thickening/Calcification	9	12.7%
*Others	5	7.0%
Total	**71**	**100.0%**

*Others imply any other reported findings e.g. BPH, cystitis, pelvic mass and right iliac mass. Of all patients who had an ultrasound done (N = 71), 39.4% (28) were found to have bladder mass, bladder wall thickening and/or calcification was the second most common pathological findings 12.7% (N=9). Added together, the abnormal ultrasound findings constituted about 70%.

TABLE 6: Showing frequency of different urethroscopic findings

Urethroscopic findings	Frequency	Percent
Hyperemia of the Urethra	8	7.3%
Normal	75	68.8%
Stricture	26	23.9%
Total	**109**	**100.0%**

Majority of patients had normal urethral findings (75%), urethral hyperemia was found in 8 patients (7.3%). 23.9% (26) had urethral stricture.

TABLE 7: Showing the state of prostate at urethroscopy.

State of the Prostate	Frequency	Percent
Evidence of BPH*	13	18.3%
Normal	56	78.9%
Prostitis (pus pockets)	1	1.4%
Others**	3	4.2%
Total	**71**	**100.0%**

* evidence of BPH – includes patients with enlarged median lobes or lateral lobes.

* * others include velumontanum growth 1, and fibrous tissues due to previous prostatectomy.

Of those patients whom the prostate was assessed, 13 (18.3%) had either kissing lateral lobes or enlarged obstructive median lobe. 1 patient had pus pockets and hyperemia suggestive of prostitis. Majority had normal prostate.

TABLE 8: Shows frequency of common Cystoscopic findings

Cystoscopic findings:-	Frequency	Percent
Foreign Body	1	1.0%
Hyperemia	14	13.5%
Mass	33	31.7%
Normal	45	43.3%
Ulceration	1	1%
Schistosomal findings	3	2.9%
Others*	7	6.7%
Total	**104**	**100.0%**

*Others include diverticulum, trabeculae, polyp, stone, trigonitis and vesicoureteric fistula. The commonest pathological cystoscopic finding was bladder mass in 31.7% (N=33), followed by mucosal hyperemia 13.5% (N=14), in one patient a foreign body (a gauze) was found after prostatectomy.

TABLE 9: Showing appearance of ureteric orifices at cystoscopy.

Appearance	Frequency	Percent
Normal	98	94.2%
Distorted	6	5.8%
Total	**104**	**100.0%**

0nly 5.8% had distorted ureteric appearance at cystoscopy, the rest were normal.

Distorted appearance includes; football stadium, horseshoe and golf hole appearances reflecting different degree of weakness of the incompetence. The normal orifice has volcanic cone appearance.

TABLE 10: Showing different sites of tumor locations.

If tumor found, location:-	Frequency	Percent
Anterior Bladder Wall	9	27.2%
Bladder Neck	10	30.3%
Fundal/Dome	1	2.9%
Lateral Bladder Wall	10	30.3%
Posterior Wall	3	9.1%
Total	**33**	**100.0%**

Most common sites for tumor location were bladder neck and lateral walls 60.6%, followed by anterior wall in 27.2%. Bladder base and posterior wall were less common sites.

TABLES 11: Cross tabulation between the Clinical Indications and Cystoscopic findings.

Indication	Cystoscopic bladder findings							
	Normal	Mass	Hyperemia	Foreign body	Schistosomiasis	Ulceration	Others	Total
Hematuria	7(17%	27(65.%	4(9.8%)	0	1 (2.4%)	1(2.4%)	1(2.4%)	41(39.4%)
Incontinence	6(85.7	0	0	0	0	0	1(14.3%	7 (6.7%)
Persistent dysuria	5(33.3%)	0	6 (40%)	0	1 (6.7%)	0	3 (20%)	15(14.4%)
Perstent LAP	4(50%	3(37.5%	0	0	1(12.5%)	0	0	8 (7.7%)
Stricture	15(78.9%)	2(10.5%)	0	0	0	0	2 (10.5%)	19(18.3%)
Others	6(42.%)	1 (7.1%)	4 (28.6	1(7.1%)	0	0	2 (14.%)	14(13.5%)
Total	**43(41.3%)**	**33(31.7%**	**14(13.5%)**	**1(0.96%)**	**3(2.9%)**	**1(0.96%)**	**9 (8.7%)**	**104**

Majority of patients who presented with hematuria (65.9%), were found to have bladder tumors at urethrocystoscopy. Six patients (5.6%) who had indications other than hematuria were found to have bladder tumors at cystoscopy. Statistical significance tests can not be calculated due to zero numbers.

TABLES 12 (a): Shows cross tabulation between ultrasound bladder findings and Cystoscopic findings.

Ultrasound findings	**Cystoscopic findings**					
	Normal	**Bladder mass**	**Hyperemia**	**Schistosomal Findings**	**Others**	**Total**
Normal	10 (%)	3 (10.3%)	6 (50%)	0	3 (75%)	22 (31%)
Bladder mass	3 (13.0%)	24 (82.7%)	1 (8.3%)	0	0	28 (39.4%)
Thickening/ Calcification	3 (13.0%)	1 (3.4%)	2 (16.7%)	3	0	9 (12.7%)
Bladder calculi	1 (4.3%)	0	0	0	1 (25%)	2 (2.8%)
Hydronephrosis	3 (13.0%)	1 (3.4%)	1 (8.3)	0	0	5 (7%)
Others	3 (13.0%)	0	2 (16.7%)	0	0	5 (7%)
Total	**23 (32.4%)**	**29 (40.8%)**	**12 (16.9%)**	**3 (4.2%)**	**4 (5.6%)**	**71**

Of all patients with cystoscopic bladder tumors (N=29), the ultrasound picked 24 of these lesions (82.8%). Ultrasonographic missed five patients with bladder tumors.

Table 12 (b): Shows the accuracy of ultrasound in the diagnosis of bladder tumor.

Ultrasound findings	**Cystoscopic findings**		**Total**
	Bladder tumor	**No bladder tumor**	
Bladder tumor	24 (true positive)	3 (false positives)	27
No bladder tumor	5 (false negative)	39 (true negatives)	44
Total	**29**	**42**	**71**

The Sensitivity of ultrasound in detection of bladder tumor

= ultrasound positive / total cystoscopic findings x 100

=24/29 x100 = 82.8%

This means the probability of an ultrasound to detect a bladder tumor when the patients truly have the tumor is 82.8%.

The specificity of the ultrasound is the probability that it will exclude patients without the bladder tumor.

Specifity = patients with no bladder tumor at ultrasound / patients without bladder tumot at cystoscopy

That is specificity = 39/42 x100 i.e 92.9%

The positive predictive value (PPV) is the proportion of patients with bladder tumor among all ultrasound detected tumors.

i.e. PPV = 24/27 = 88.9%.

The negative predictive value (NPV) is the proportion of without bladder tumor among normal bladder ultrasound.

i.e. NPV = 39/44 = 88.6%.

TABLE 13: Showing findings of bimanual palpation.

EUA finding	Frequency	Percent
Fixed to pelvic Wall	14	41.2%
Involving adjacent Structures (Rectum, Vagina)	6	17.6%
Mobile, Confined to Bladder	14	41.2%
Total	**34**	**100.0%**

Majority of tumors were advanced 58.8% (involving adjacent structure and fixity to pelvic wall), 41.2% patients had mobile tumors.

TABLE 14: Showing frequency of urethral injury.

Urethral injury	Frequency	Percent
Yes	2	1.8%
No	108	98.2%
Total	**110**	**100.0%**

Only 2 patients got urethral injury that needed suprapubic cystostomy.

Table 15: The frequency of Chills and Fever assessed postoperatively.

d) Chills and Fever	Frequency	Percent
Yes	28	25.5
None	82	74.5
Total	**110**	**100.0**

25.5% of patients who underwent urethrocystoscopy due to various indications had chills and fever in post operatively.

TABLE 16: Shows pain intensity assessed post operatively.

b) Pain Assessed Postoperatively	Frequency	Percent
None	13	11.8%
Mild	50	45.5%
Moderate	38	34.5%
Severe	9	8.2%
Total	**110**	**100.0%**

Almost all patients had some degree of pain post operative 91.8%, 45.5% had mild pain, 34.5% had moderate pain, and only 9% had severe on pain.

TABLE 17: Frequency of post operative urethral bleeding.

Haemorrhage	Frequency	Percent
Bleeding Intra operatively	17	15.5%
Bleeding extending to recovery room	25	22.7%
Bleeding up to 1st Day Post Op	47	42.7%
No Bleeding	21	19.1%
Total	110	100.0%

Majority of patients 79.9% who underwent urethrocystoscopy had post operative bleeding, in 42.7% of patients bleeding was up to the first day post operative.

TABLE 18: Showing frequency of the .histological Diagnoses.

Final Diagnosis (If any)	Frequency	Percent
Adenocarcinoma	3	9.1%
Non-Specific Chronic Inflammation	5	15.2%
Polyp	1	3.0%
Squamous Cell Carcinoma	16	48.5%
Transitional Cell Carcinoma	8	24.2%
Total	**33**	**100.0%**

Of those patients whom histological diagnosis was made, large proportion (48.5%) had squamous cell carcinoma. Transitional cell carcinoma and adenocarcinoma were found in 24.2% and 9.1% respectively. Non neoplastic abnormalities constituted about 18% of all bladder tumors.