

The role of intermittent self-dilatation
in recurrent urethral stricture at
the University Teaching Hospital in Lusaka.

By

THESIS
M. MED
ZUL
2003
C.1

Robert Zulu, B.Sc. (HB) MB ChB (UNZA).

A dissertation submitted in partial fulfilment of the requirements
for the award of master of medicine (Surgery) degree of the
University of Zambia

University of Zambia
School of medicine

June 2003

APPROVAL FOR EXAMINATION

This Dissertation is ready for examination.

Date: 3/9/04

Supervisor: 

Dr Mohamed Labib

SUPERVISORS PAGE

The Dissertation of Dr Robert Zulu is ready for examination.

Signed (Supervisor).....

Signature

Dr Mohamed Labib

Senior Lecturer in Surgery
School of medicine
University of Zambia

Signed (Co-supervisor)

Signature

Dr John Sivah Kachimba

Consultant surgeon
University Teaching Hospital
Department of Surgery
Lusaka

Approval

This disertation by Dr Robert Zulu is approved as fulfilling part of requirements for the award of the degree of Master of Medicine in Surgery by the University of Zambia, subject to the Examiners report.

00203001

Signature


Date

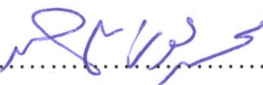
 Prof. G. Sesana

6/9/04

Declaration

I hereby declare that this dissertation herein presented for the degree of master of medicine (Surgery) has not been previously submitted wholly or in part for the any other degree at this or any other university nor is it being currently submitted for any other degree.

Signed  (Candidate)

Signed  (Supervisor)

Signed..... (Co-supervisor)

Acknowledgement

This project was born from an incidental discussion with Mr Derrick Rosario FRCS (Urology) during the Association of Surgeons of East and Central Africa conference in Lusaka, which took place in December 2001. It was further refined after a discussion with Ms Christine Evans Consultant urologist at the same meeting. Dr Mohammed Labib, Senior Lecturer in urology and Mr Francis Manda Consultant urologist at the University Teaching Hospital, Lusaka, performed the technique of optic urethrotomy. Dr John Kachimba, Consultant, did part of data collection when I was doing district posting at St Francis Hospital in Katete. Lastly but not the least, the staff of the urology clinic who helped to organise patients for the stricture clinic. To all these men and women of outstanding distinction and merit I owe this work. If there is any failing, it is mine. If anything good, it is the result of the support and keen interest of these senior colleagues.

Declaration and Mention

I would like to mention with gratitude the following people without whose assistance this work would not have been completed. My wife Prisca, our daughters Tomaida, Mayase and our son ZewelANJI who persevered the trial of my constant studying, Dr Mohamed Labib and Dr John Kachimba who scrutinized and advised me in this project. I should not forget to thank both Dr Labib and Mr Manda whose patients these are. I should also thank staff of the medical illustration department who helped in preparing the research material in print. Above all, I would like to thank God who has taught me to persevere to bring this work to completion.

ABBREVIATIONS

Abbreviations

AIDS _____ Acquired immune deficiency syndrome

CIC _____ Clean intermittent catheterisation

ISD _____ Intermittent self-dilatation

FIG _____ Figure

HIV _____ Human immune deficiency virus

LUTS _____ Lower urinary tract symptoms

No. _____ Number

OU _____ Optical urethrotomy

PT _____ Patient

UD _____ Urethral dilatation

UTH _____ University Teaching Hospital

WHO _____ World Health Organisation

TERMINOLOGIES

- 1 **Urethral stricture-** a long-term result of urethral injury or infection resulting into healing with circumferential contraction.
- 2 **Intermittent self-dilatation-** This refers to frequent passage of a catheter of the same gauge by the patient into his urethra. This is also called intermittent self-catheterisation.
- 3 **Consent rate-** the total number of patients who agreed to a procedure over the total number of patients in the study.
- 4 **Positivity rate-** Number of positive results over the total number in the study expressed as percentage.
- 5 **Optic urethrotome-** an optical instrument used for incision of a urethral stricture.
- 6 **Uroflowmeter** – An apparatus used to measure the flow of urine as it is passed per minute.
- 7 **Recurrence rate** – the number of patients who develop a urethral stricture after previous treatment over the total number of patients.
- 8 **Internal urethrotomy-** A procedure that opens the urethra over the stricture by incising or ablating it through the urethra.
- 9 **Urethral stent-** A metallic or plastic mesh like short tube which expands in the urethra upon insertion endoscopically

TABLE OF FIGURES

FIGURE		PAGE
Figure 1	Bar graph showing common urological conditions treated between 1998 and 2002.	23
Figure 2	Bar graph comparing stricture disease to other urological conditions between 1998 and 2001	25
Figure 3	Bar graph showing age distribution	26
Figure 4	Bar graph showing yearly urethral dilatations	28
Table 1	Table showing aetiology of stricture	27
Table 2	Complications of ISD	29
Table 3	HIV test results	30
Table 4	Distribution of patients on ISD	31
Table 5	Final outcome	32
Photography set 1	Anatomy of Urethral stricture	43
Photography set 2	Urethrogram showing urethral stricture	44
Photography set 3	Nelaton catheter	45

TABLE OF CONTENTS

Subject	Page
1. Abstract	1
2. Objectives	2
3. Rationale	3
4. Literature Review	4
-The male urethra	6
- Pathogenesis	7
5. Patients and methods	16
6. Results	21
7. Graphs and tables	23
8. Discussion	31
9. Conclusions	36
10. Recommendations	37
11. Photographs	38
12. References	41
13. Appendix	46
-Protocol	
-Patients' instruction	
-Informed consent	

ABSTRACT

This study was carried out to evaluate the role of intermittent self-dilatation (ISD) in patients with recurrent urethral stricture disease at the University Teaching Hospital in Lusaka. The study was carried out over a period of 18 months starting in January 2002. The details of the technique used and patient selection are described. Two groups were compared. The first group 36 clients performed ISD while the other group 45 clients did not. Both groups were compared in everything except for ISD. They all had either undergone urethral dilatation or optic urethrotomy. The age range was 19-75years (mean 47years). The causes were post infective (29 clients 80.6%), post traumatic (3 clients 8.3%) or unknown (4 clients 11.1%). One client from the first group (ISD) had clinical evidence of recurrence at the end of the study. There were 15 (33.3%) recurrences from the second group (those who did not perform ISD) had recurrent stricture during the same period of time. One defaulter developed a stricture at six months. The study shows that intermittent self-dilatation is effective reducing the rate of stricture recurrence following urethral dilatation or optic urethrotomy. We highly recommend that this procedure be done for clients with post infective urethral stricture after intermittent urethral dilatation or optic urethrotomy.

OBJECTIVES

- (a) To make recommendations on the value of intermittent self-dilatation in the treatment of urethral stricture.

RATIONALE

Urethral stricture disease is a common condition seen in Lusaka, ranking amongst the top five diseases treated by the urologist. This is evident in Figure-1 representing the prevalence of various urological diseases seen at the UTH between 1998 and 2002.

Intermittent self-dilatation following urethrotomy is a simple procedure. If taught to patients it can be cost-effective and prevent frequent surgery. In Zambia, most strictures are treated by urethral dilatation. This technique usually needs to be repeated on more than a single occasion with the attendant risk of infection, perforation and others (1) With inadequate resources and funding, like many third world countries, these operations drain the hospital time and resources. The usefulness of intermittent self-dilatation for urethral stricture at UTH has never been studied hence the relevance of this study to the University Teaching Hospital in particular and Zambia in general.

LITERATURE REVIEW

Urethral stricture disease predominantly affects males. It is termed stricture disease because of the different ways it presents and the various complications it may present with. There are also different ways of treating urethral stricture with different rates of success.

In Tanzania, urethral stricture disease was among the three commonest urological conditions and accounted for 7.8% of the urological admissions (1). Sexually transmitted diseases, in particular Gonococcal urethritis is the commonest cause of urethral stricture in male patients. This is according to a World Health Organisation report (2). Another Tanzanian study showed that 28% of asymptomatic men, on a random survey, had urethral infection with Neisseria gonorrhoeae or Chlamydia trachomatis, which eventually are responsible for urethral strictures (3).

Studies have shown the importance of optic urethrotomy for single and short strictures and that intermittent self-dilatation delays recurrences (4).

Correct selection of patients for optic urethrotomy and or dilatation will avoid the selection of unsuitable patients who end up with failed procedures (5). Intermittent self-dilatation has been shown to reduce the recurrence rate and is highly recommended for patients who have had urethrotomy for urethral stricture. This should be a community-based approach, where the patient actively participates in the management of his disease (3,6,7). However Abdel and Saleh showed in experimental animals that urinary tract infection, local trauma and creation of false passages were common complications of intermittent self-dilatation (18). This should be understood in its context. The animals in the study had the spinal cord transected. The complications should thus not be wholly

blamed on intermittent catheterisation. A clean, well-lubricated catheter like the Nelaton catheter inserted gently through the urethra will easily pass through without difficulty. If the catheter is not passed through the stricture into the bladder, it will obviously not dilate the stricture and hence be of no use. This was shown by Matanhelia and others (6). This contributed to their poor results. The only way one can be certain about reaching these strictures is by passing the catheter into the bladder and allowing the urine to drain before removing it. Ogbonna in Nigeria refuted the findings of Matanhelia and showed that ISD significantly increased the time before recurrence and the duration of follow-up after urethrotomy. He further showed that urethrotomy was ten times cheaper than urethroplasty (5). Strictures should be treated properly the first time they present.

The Male Urethra

The male urethra consists of four parts; *prostatic, membranous, bulbous* and *penile*. The total length in adult male is about 20cm. It commences from the bladder neck and terminates at the external urethral meatus. The urethra may be divided into anterior and posterior urethra. The anterior urethra consists of the penile and bulbous portions of the urethra while the posterior urethra has the prostatic and membranous portions. Infective and idiopathic urethral strictures affect mainly the bulbous part of the urethra because of the urethral glands that are more concentrated in this part of the urethra. Posterior strictures are usually traumatic (membranous apart).

The penile urethra is about 15cm long and lies within the corpus spongiosum. Most of the urethra is lined by transitional epithelium, except from the navicular fossa, which lies just

proximal to the external urethral meatus and forms a small dilatation, lined by stratified squamous epithelium. The urethral mucosa displays small blind pockets called lacunae and has numerous urethral glands of Littre. The blood supply is derived from adjacent blood vessels as it passes through the prostate, sphincter urethrae and corpus spongiosum. The mucous membrane of the penile part receives a branch from the perineal nerve (8, Diagram 1).

The main function of the urethra is to act as a conduit for urine and seminal fluids. The walls are normally collapsed opening during micturation and ejaculation to aid passage of the respective fluids.

Pathogenesis

Urethral stricture is a scar contraction causing reduction in the urethral lumen diameter. In other words, fibrosis of the smooth muscles around the urethra (9). The narrowing may only involve the epithelium, but usually extends to the corpus spongiosum. Once initiated, fibrosis within the corpus spongiosum can cause constriction of the urethral lumen and with the presence of infection, leads to the formation of micro-abscesses within the urethral glands, which makes fibrosis worse. This results in marked voiding symptoms (10). Infective strictures, which result from infection, occur most frequently in the bulbous urethra because of the urethral glands, which are concentrated in this part of the urethra (11)

Infective Urethral stricture

Neisseria gonorrhoeae is an anaerobic diplococcus, which is transmitted by sexual intercourse. It causes gonococcal urethritis, which eventually leads to urethral stricture as

a long-term complication. The role of Chlamydia trachomatis and other agents in causing urethral stricture is unclear. Most literature is silent on this issue. Furthermore literature does not seem to advocate antibiotic treatment for patients who develop strictures.

Andrich and Mundy in their article ('western context') on surgical treatment of urethral stricture (9), argue that most strictures are not gonococcal in origin. When there was evidence of gonococcal infection, the stricture did not follow an attack of gonorrhoea and when it did the time lag was considerable. What is obvious in the pathology, irrespective the cause, is the change of the epithelium from pseudo-stratified columnar epithelium to columnar epithelium, which is not waterproof, causes extravasation of urine leading to fibrosis (9). Infective strictures are common at the bulbar part of the urethra because urethral glands are at this site and are directly involved with subsequent extension into the spongiosum.

Epidemiology

Urethral stricture is a disease that predominately affects males. The short female urethra seems to be immune to inflammatory scarring from gonococcal infection. The disease is seen in sexually active males exposed to the infection and there is a wide variation from time of infection to the time of stricture formation. In the Tanzanian study, the age ranged from 15 to 54years (3).

Aetiology

Gonorrhoea accounts for the bulk of infective urethral strictures. The organism is a gram-positive diplococci that is transmitted through sexual intercourse. Men usually present with purulent urethral discharge while women may present with pelvic inflammatory disease. The role of Chlamydia trachomatis and Ureaplasma urealyticum (Non-specific urethritis) in the formation of urethral stricture is not clear (10). It is simply taken that Chlamydia trachomatis is one of the organisms responsible for urethral strictures because it causes of urethritis.

The question of whether to treat asymptomatic client for gonococcal infection based on previous infection is debatable. Current WHO algorithms recommend that treatment should only be started if there is demonstrable evidence of urethral discharge.

Full-length urethral strictures are not well understood, but it is speculated that the inflammatory process involve Littre's glands causing micro-abscesses which extend into the corpus spongiosum. (10).

Clinical presentation

Urethral stricture in our region is a complication of urethritis, which may be mild with unnoticed symptoms or severe. In severe cases, it presents with severe inflammation with necrosis of the mucosa, producing uncompromising stricture disease (12), and with urethral discharge during the acute phase.

Symptoms of urethral stricture come after the acute phase has resolved and the urethritis is healing by formation of scar tissue. This may be as early as a week after urethral

discharge or months later. Even then, the symptoms of urethral stricture are mild. These are; poor stream of urine, dribbling and feeling of incomplete emptying of bladder. These are what are generally termed as Lower urinary tract symptoms (LUTS). They are not specific to urethral stricture. Benign prostate enlargement, bladder stone, bladder diverticulum and many other urinary tract pathologies may cause the same symptoms.

The above symptoms may be ignored until there is complete obstruction with symptoms of acute retention of urine. Neglected strictures may present with the urethral fistulae- 'watering can perineum' (30). This is usually seen where the patient has no access to hospital facilities. This sequence is; complete obstruction, extravasation of urine into the perineum, abscess formation that eventually burst spontaneously into multiple fistulae draining pus and urine. When passing urine, the patient passes through multiple fistulae like the watering can hence the term, "watering can perineum"(30).

Investigations

Investigations will depend on the presentation of the patients. Before complete obstruction of the urethral lumen, urine should be taken for urinalysis to rule out associated urinary tract infection. In the clinic uroflowmetry should be done if the facility is available. In the presence of a stricture, there will be an initial lag, on the graph followed by a sustained spike and finally prolonged isolated small spikes. This is a typical graph in early stricture.

A retrograde urethrogram should be performed. This is a radiological confirmation of presence of stricture in the urethra. A micturating urethrogram could as well be done if a suprapubic catheter is present and this is a more reliable evidence of presence of urethra stricture especially for posterior urethral stricture. This will show the length, the site, and the number of the strictures present. There may be extravasation of contrast showing a penile venogram.

Urethral stricture surgery

Treatment of urethral stricture dates back to the foundation of urology and much progress has taken place. A success rate of 75%-80% was previously regarded as reasonable but nowadays, a failure of even 10% should call into question either the selection of the procedure or the technique used.

Three basic principles are available for the restoration of an epithelialized urethral lumen.

- a) **Regeneration procedures:** The aim of these procedures is to regenerate the uroepithelium to complete part of the circumference of the urethral lining. Success here depends on whether this can happen before scarring takes place. Urethral dilatation, stenting and internal urethrotomy utilises this principle.
- b) **Anastomotic procedures:** These consist excision of the scarred tissue and end-to-end anastomosis as a circumferential one-stage procedure or as a staged procedure. The success rate approaches 100%. Unfortunately very few strictures are suitable for these techniques (9).

- c) Substitution procedures: Since no urethra substitute is as good as the urethra itself, all techniques with their substitute have an inherent failure rate. This is reduced by combination techniques; anastomosis, free patch grafts and pedicle inlays in paired combination. Buccal mucosa is the current substitute of choice. The success rate approaches 95%, 7 years stricture free. (9,10,19,31).

We will discuss urethral dilatation and optic urethrotomy, which are both regeneration procedures. These used in combination with ISD should allow the lumen to epithelialise by the time the programme is complete.

Urethral dilatation

This is the oldest and simplest method for treating urethral stricture. The purpose of this form of treatment is to stretch the scar without producing more scars. If bleeding occurs, further injury has occurred (10). The likelihood of recurrence is high and the chances of creating false passages are even more since the procedure is done blindly. This makes the stricture heal with more fibrosis since the epithelium is denuded. These are strictures which are resistant to treatment. There is an increase in morbidity and mortality with more dilatations. This is one disadvantage of this procedure, which is often overlooked.

Optic Urethrotomy

This procedure opens the stricture incising it or ablating it transurethrally. It involves incising scar tissue together with normal tissues to allow the scar to expand and the

lumen to heal expanded. The complication of this procedure is, bleeding, recurrence of stricture and erectile dysfunction when the knife goes too deep into corpus cavernosum (10). There is a risk of perforation into the rectum if the incision is made at 06: 00clock.

Urethral stents

A metallic urethral stent is an option. This is a mesh like wire, which is inserted endoscopically and located at the site of stricture immediately after incision. This technique has the advantage of being "minimally invasive". However, this procedure is only suited to short strictures with minimal scarring. The outcomes are said to be inferior to open surgery, and the long-term results are unknown (23).

The common complication is overgrowth of tissues through the stent and this problem may be more difficult to overcome. The use of biodegradable stents aims at overcoming this problem, but the long-term results are unknown. The cost of this procedure is undoubtedly beyond the reach of many patients in developing countries like Zambia.

Combination anastomosis/urethroplasty

Recent literature claims that anastomotic urethroplasty gives >90% ten year stricture free. The basis of this procedure lies in the elasticity of the bulbar urethra and straightening of the natural curvature. Stretching the bulbar urethra produces 2-4cm extra length and this may be enough to perform an anastomosis over a strictured portion. Unfortunately, this is usually not enough and straightening of the urethra over its natural curvature may have to be done which involves dividing the crura and pubectomy both of which produce the natural curve of the urethra (13). If primary anastomosis is not possible because of the

length of the stricture, buccal mucosal may be used to bridge or a split thickness skin graft may be applied as a staged operation.

Smith (4) in his study emphasised that urethroplasty should be reserved for strictures which are resistant to urethrotomy or those that are long, with or without fistula. That is to say, complicated strictures. This operation for urethral stricture is expensive and usually done in stages (15). The aim should be to prevent strictures becoming complicated.

Intermittent self-dilatation

Intermittent urethral dilatation is the passage of catheters of the same size through the urethra at regular intervals to maintain a patent urethra after incision or dilatation of a urethral stricture. This is also called clean intermittent catheterisation. It is a well-established method of treatment for neurogenic bladder dysfunction, postoperative retention of urine and idiopathic urinary retention. The treatment lessens the frequency of urinary infections and markedly reduces the morbidity (21,26,28).

Bodker reported it as a new therapy in recurrent urethral stricture disease in 1992 (21).

Lawrence and Mac Donagh in 1988 reported the use of a catheter to dilate urethral stricture. This was in 42 elderly clients who maintained good urinary flow rates postoperatively (22).

Matanhelia at the university of Wales in Cardiff refuted the advantages of this form of treatment in that there was no advantage of performing the procedure after urethrotomy. He randomised two groups after urethrotomy for urethral stricture. In one group clients

were given 16F catheters to pass them through the stricture but not into the bladder (6). The fact that the catheters were not passed into the bladder gives doubt whether they actually passed through the stricture to dilate it. Catheters should pass through the stricture into the bladder and urine observed to come out to be sure that the stricture has been dilated. This is where Matanhelia's study was weak.

The complications for ISD are sepsis and bleeding and are usually due to the use of plastic catheters. Nelaton catheters are low friction catheters, which reduce these complications (24,25). These can easily be avoided when aseptic technique are emphasised to the clients.

Many studies have shown that this form of treatment for recurrent stricture is acceptable (7,18,21). There is however no study published to recommend how long this should be done. It may be that the procedure should be done for life. The reported longest study has only done a one-year follow-up (25). Large studies may be able to answer this question.

The use of low friction catheters at the University teaching hospital would thus be of great help in prevention of recurrent urethral stricture after optic urethrotomy or urethral dilatation. What is missing is a local study to prove their use in our environment with the limited resources at hand. However, its usefulness has never been studied at UTH, hence this study.

The Nelaton catheter

ISD programmes should use low friction catheters such as Nelaton catheters. Size 16 or 18 French gauge may be used (21,22). The advantages of these catheters over other catheters are that they are firm and become slippery after soaking in water for at least 30

seconds i.e. hydrophilic. They do not need lubrication since they have lubricant. They are low friction catheters and thus cause less urethral irritation. Vapnek compared the Nelaton catheter to the ordinary plastic catheters for intermittent self- catheterisation and found that their use was associated with less haematuria and urinary tract infection. He recommended the use of these catheters for intermittent catheterisation (25).

PATIENTS AND METHODS

Patients

A special outpatient clinic was set up at the University Teaching Hospital in the urology clinic for the study. Two selected consultant urologists referred patients to the clinic. The author followed-up all the clients.

Two groups were compared at the end of the study. Those who were referred to the stricture clinic and those who were 'missed' who acted as a control group. The only difference was that those who were missed did not perform ISD.

The inclusion criteria in the study were: -

- a) Stricture length of 1cm or less
- b) Location within the bulbous urethra
- c) Strictures managed by urethrotomy or urethral dilatation.

Exclusion criteria were: -

- a) Clients with urethral strictures more than 1cm
- b) Clients with complicated strictures

Informed consent (Appendix-2) was obtained from each client before including him or her in the study. In the clinic, clients were supplied Nelaton catheters and a leaflet of written instructions on how and when to use the catheters. They were also trained on how to perform ISD. Those clients who did not want to use the catheters were simply followed up in the clinic. Reviews were done at six weekly intervals or earlier if indicated. A research protocol was used to record events at each review

(Appendix1). HIV and or syphilis antibodies were tested if the client gave consent.

The study started in January 2002 and ended in May 2003.

Technique

a) Urethral dilatation

This procedure was done either under general anaesthesia or local analgesia (using lignocaine gel) and procedure is performed in theatre with the patient lying supine and positioned in lithotomy. The perineum was cleaned with an antiseptic solution and draped with sterile drapes. Lubricated dilators were introduced through the urethra starting with the smallest to the largest. After urethral dilatation, the patient was discharged home the same day with a catheter in place and advised to take plenty of oral fluids.

b) Optic urethrotomy

All patients who had urethrotomy either were admitted to the surgical ward a day before the operation or came in as day cases for surgery. The operation was explained to them. Pre-operative urethrograms were reviewed and all patients were starved for not less than six hours prior to the operation.

The operation was done under general anaesthesia in all our patients although it can also be done under spinal or caudal block (14). The patient lay in lithotomy position. The perineum was cleaned and draped with sterile drapes. The irrigation fluid was connected to the urethroscope and which was introduced gently in the urethra, inspecting the urethra as the scope was going distally. We used the Olympus urethroscope.

When the stricture was reached, there was obvious resistance and the stricture could be visualised. A guide wire was then used to aid passage of the knife through the stricture. The stricture was then incised at 12:00clock along its entire length avoiding the 06:00 clock position because of the danger of making an incision into the rectum. As the stricture was incised, it was seen as it opened, hence the term optic urethrotomy.

After the procedure, a Foleys catheter was left in-situ and removed at the next visit to the clinic. At this visit, the patient was recruited to the study, if agreeable, taught how to use catheters and sent home with catheters. Relevant investigations were done.

c) Intermittent self-dilatation

Intermittent urethral dilatation involves the use of clean catheters, passed once, twice, or thrice a week through the urethra into the bladder. The frequency of dilatation depends on the programme. The programme in this study (appendix 2) involved passage of the catheters three times a week for six weeks, then reduced to twice a week for six weeks and then once a week for six weeks three months.

Patients were taught how to pass the Nelaton catheters into the bladder until urine completely drained from the bladder and then withdrawn, washed and kept clean awaiting next use.

All clients were given a copy of ISD programme (appendix2). It was emphasised to soak catheters for at least 30 seconds to make them slippery since these catheters are hydrophilic. It was important to pass the catheter into the bladder to be sure that the

catheter has passed through the stricture site and has thus dilated the stricture. This was the only guarantee available that the catheter had dilated the stricture.

In our study, we used the Nelaton catheter. The catheters are disposable and used for single client only but could be re-used for the same client. They were supplied freely to all clients who agreed to be recruited into the programme. The programme was tailored to taper gradually over the period of the study. Clients came every six weeks to collect new supply of catheters or earlier if they had complications. Details of each visit were recorded in the protocol form. Patient follow-up and record keeping was made easy by the establishment of a Stricture Clinic.

Investigations

All patients had a retrograde urethrogram to demonstrate the site, number and size of the stricture, (diagram 2). A micturating urethrogram was done for those who had a suprapubic catheter previously inserted.

Outcome Measurement

Success of intermittent self-dilatation was determined subjectively. Presence or absence of lower urinary tract symptoms was the determining factor. Presence of LUTS was graded as a poor outcome while absence of the same was graded as a good outcome. This evaluation was done for 25 of the 35 clients at the end of the ISD programme.

Ethical Considerations

The research project was approved by the Ethics and Research Committee of the University of Zambia. Consent for inclusion in the study was obtained from all patients. Those who did not give consent for HIV were simply followed up in the clinic like any other patient with urethral stricture. Even those who did consent to enter the study were free to withdraw at any time without notice though this was not encouraged.

RESULTS

Section -A: - Introduction

The results of this study are presented under three heads; Age, Stricture factors and Outcome. Two groups were followed up as stated earlier on. One group (A) was the group that was referred to stricture clinic while group (B) was the group that was ‘missed’ and not referred to the stricture clinic and is referred here as the Control. Group A had 37 clients while group B had 45 clients. Both groups were followed up for 18 months.

Section –B (Age)

Group A.

The age ranged from 19 to 67 years.

Average Age: $\frac{1300}{35} = 37$ years (+/- 2 SD).

The most frequently (mode) occurring age was 34 years

Figure 3 depicts the age distribution.

Group B

We did not establish the clients age distribution.

Section-C (Stricture factors)

- i) **Aetiology:** - Table 1 shows the various causes of urethral stricture in our study. Eighty (80) percent were infective, 8.3% were traumatic and 11.1 % were idiopathic.

- ii) **Complications:** - Table 2 shows complications encountered in our study using ISD. Most were infective (22.2% UTI, and 5.7% orchitis). Only one client presented with bleeding whilst using ISD. This represented 2.8%.
- iii) **Frequency of dilatations:** - Those who agreed to perform ISD followed the protocol laid down in appendix 2.
- iv) **HIV status:** - HIV serology was done on 14 clients. Four were reactive (11%), 11 non-reactive (31%) and 20 not tested (57%). This shown in table 3.

Section D (Outcome)

- i) **Refusal:** - Thirty clients agreed to perform ISD while five simply wanted to be followed up.
- ii) **Lost to follow-up:** - Fifteen clients completed the follow-up while 20 were lost to follow-up. This represented 43% follow-up rate. However none of those lost to follow came back with stricture during the study.
- iii) **Final outcome:** - Table 5 compares the outcome between the followed (A) 35 clients and those not intervened (B) 45 clients. Note that group B was not referred to stricture clinic but their strictures were treated by either OU or UD just like group A but without ISD.

Graphs and Tables

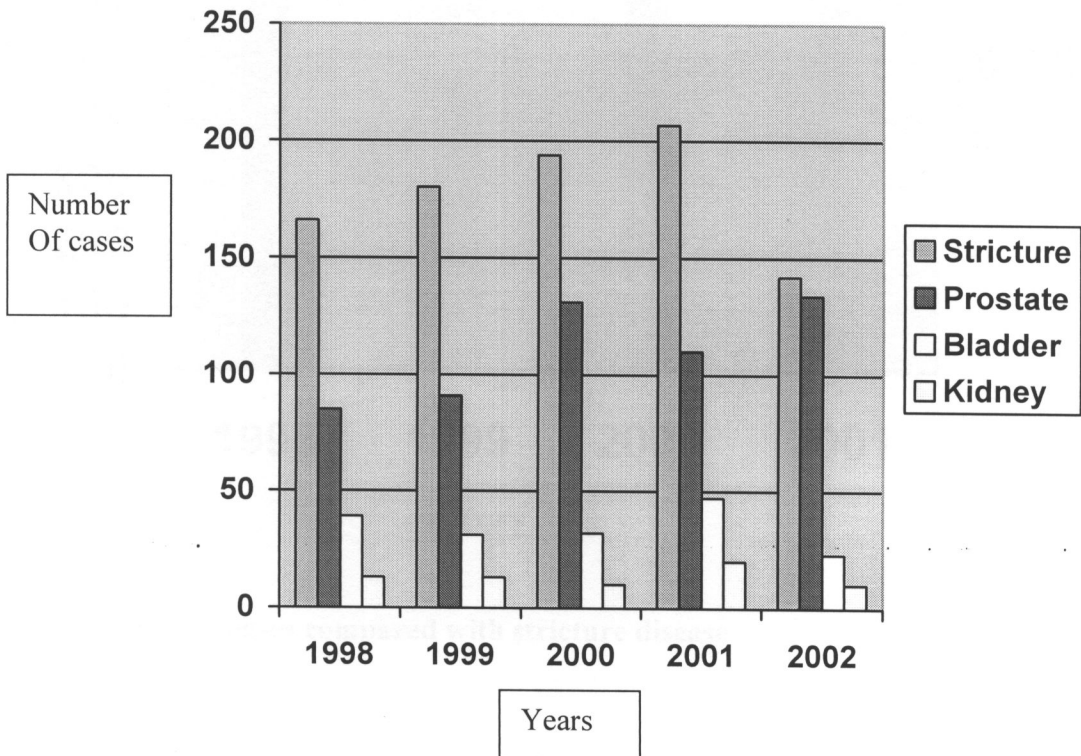


Figure 1-Prevalence of various diseases in Urology (UTH) between and 1998 and 2002

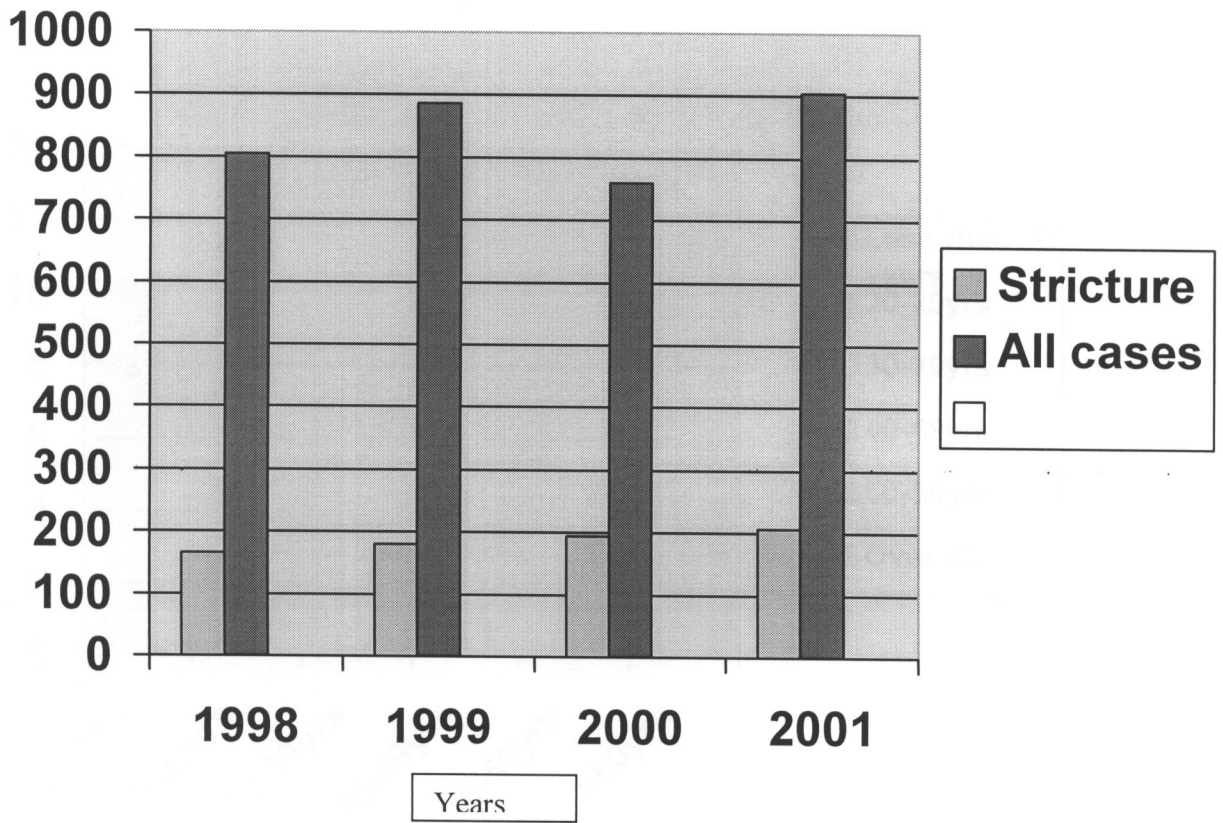


Figure 2- Urology cases compared with stricture disease

Age distribution

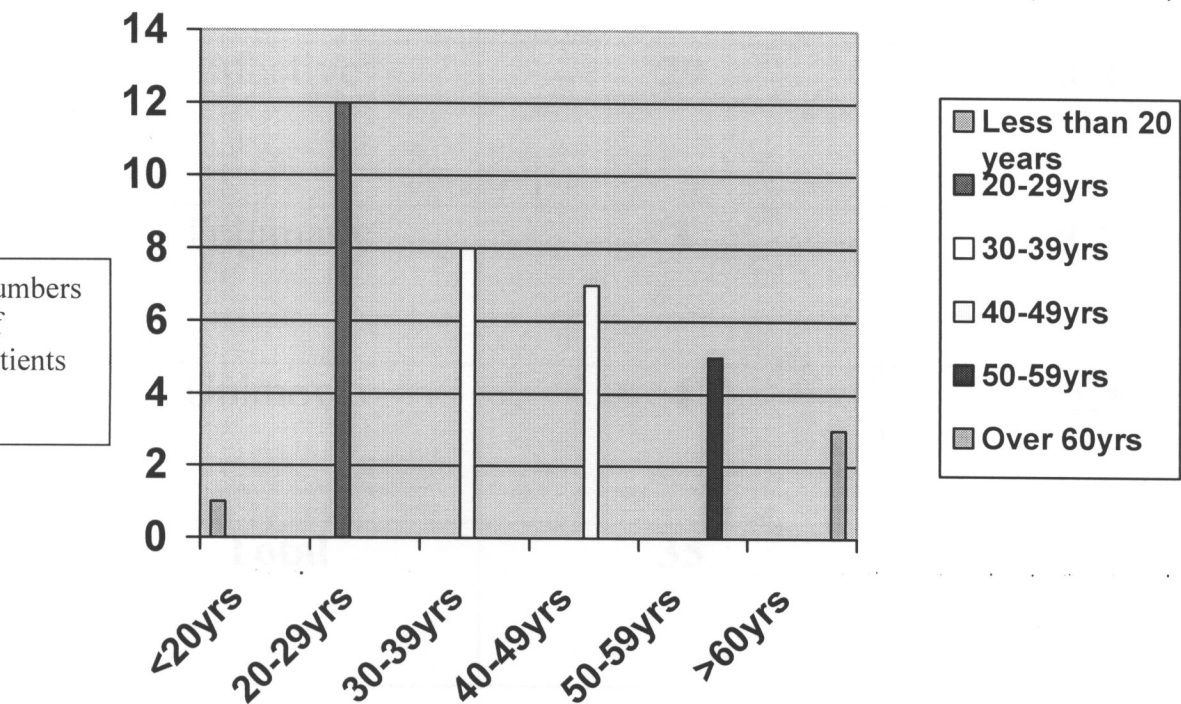


Figure 3- showing age distribution of the 35 clients in the study

Aetiology	No. of patients	%
Infective	29	80.6
Traumatic	3	8.3
Unknown	4	11.1
Total	35	100

Table 1: Aetiology of Stricture in the study

Complication	No. of patients	%
Bleeding	01	2.8
UTI	08	22.2
Orchitis	02	5.7

Table 2: Complications of ISD

HIV Results	No. of patients	%
Reactive	04	11.1
Non-reactive	11	30.6
Not done	21	58.3

Table 3 HIV test results

	No. of Pts	%
Agreed to ISD	31	88.5
Refused ISD	4	11.4

Table 4 Distribution of patients on ISD

	Bad Outcome (ISD-A)	Good outcome (ISD-A)	Bad Outcome (No ISD-B)	Good outcome (No ISD-B)
Re-stricture	1(+1*)	34	15	30
Percentage	2.8	97.2	33.3	66.7

Table 5: Comparison between ISD(A) and the none ISD (B)groups

Note* Refused to perform ISD but was followed in stricture clinic

DISCUSSION

Disease Pattern

Urethral stricture is a common condition in urology at the university teaching hospital as shown in figure 1 and figure 2. Between 150 and 200 cases of stricture disease were attended to in the urology clinic between 1998 and 2001 whilst only 140 cases were in 2002. The figures show the urethral stricture is endemic in Lusaka. Mkony in Tanzania reported that urethral stricture is endemic in East and Central Africa (17). This is consistent with our findings.

Figure 3 illustrates the age distribution of patients we followed up in the study. The peak age was between 20 and 29 years and this period represented 12 clients. Both extremes of life had few clients, 1 below 20 years and 3 above 60 years of age. This is in contrast to the findings of Sharma who had most of his clients between 50 and 59 years of age (14).

The stricture in our environment is mostly infective as illustrated by Table –2. Eighty percent of strictures were infective in origin while only 8% had a definite history of trauma. This is what is generally seen in East, Central and West African countries (1,2,3,14). In the ‘west’, their stricture not due to inflammation but either idiopathic or post instrumentation (9,29). We have a complete different stricture, which requires its own emphasis. Patients come in with “watering cane perineum” and Fournier’s gangrene, which are a rarity in the west (30).

Most of our patients presented because they could not pass urine, in complete retention of urine. Most of our patients with urethral stricture have difficulty getting medical due to

social and economic factors and when they do so, it is often delayed (17) and with complications already in play. Surgeons in developing countries are faced with neglected stricture disease

Optic urethrotomy

Optic urethrotomy also called Direct Vision Urethrotomy is best done for single short strictures. The stricture is incised under direct vision hence the term Direct Vision Urethrotomy (15,17). The advantage over urethral dilatation is that the stricture is visualised and incised directly.

Karimbaev (15) showed that direct vision urethrotomy was cheap and fast to perform. There is an obvious initial investment to acquire the equipment and expertise. This however cannot be compared to the immediate and long-term morbidity associated with urethral stricture disease (13). The immediate morbidity of optic urethrotomy are bleeding (~3%), sepsis (~10%) and extravasation of urine (2.2%) as seen in Uganda (15). These cannot be compared to the immediate and long-term complications of urethral stricture; recurrent urinary tract infections which may lead too pyelonephritis and renal failure, watering can perineum, acute retention urine, and impotence (10,11,12).

Intermittent Self-Dilatation

The question of the effectiveness of intermittent self-dilatation in treatment of recurrent urethral strictures is implied Figure 1 but difficult to prove due to few numbers in our study. Bodker (21) in his study showed that no patient had a new stricture during the procedure and Gnanaraj in India had similar results this in a similar study he undertook

(28). It was clear that as long as the client correctly performed the procedure, there was no recurrence and the procedure has minimal completion (5,6,7).

For most patients with urethral stricture disease, urethral dilatation or urethrotomy are palliative management rather than curative treatment (19).

Not all patients accept intermittent self-dilatation, some like to have their disease treated by doctors rather than by themselves (7). This was evident in our study in which five (13.9%) refused to undertake self-dilatation. Studies to prove the effectiveness of the procedure (ISD) will help raise the acceptance rate.

Andrich and Mundy noted that even those who were prepared to try ISD tended to discontinue subsequent ISD programmes (9). This was attributed to the social inconvenience that is associated with the ISD programme. Unlike in our study, only 1 of the 30 clients who undertook ISD was not satisfied with the programme because he developed another stricture during the study. Further enquiry revealed that he did not follow the instructions hence the re-stricture. It should be emphasised that the catheter should be passed into the bladder and urine seen to drain completely before removing it. Our client overlooked this point and stopped upon meeting resistance until the stricture was allowed to reform.

It is also important to note that the strictures Andrich and Mundy were looking at were idiopathic in aetiology whereby our strictures are largely infective (Table 1). This stricture is different from the infective one because it tends to recur and is situated at the bulbous part of the urethra. Our entire strictures were at the bulbous portion.

Other studies recommend that ISD be done for at least one year (18), this in our view may not necessary if studies are carried out to establish the optimum period suitable. The use of ISD is however widely accepted and recommended by many studies (5,6,7,18, 24, 26).

The common complications are urinary tract infection, haematuria (urethral trauma) and orchitis (25). This was observed in our study where 22% of our clients on ISD had urinary tract whilst haematuria and orchitis had one and two clients respectively. Urinary tract infection and orchitis resolved on antibiotics.

There is no standard programme for ISD. Bodker (21) used a three months programme while Kjaergaard and others (7) did a one-year ISD programme. Ogbonna was able to follow-up his patients for up to three years probably because of this factor (5). In this study, we started with three times a week (Monday, Wednesday and Friday), then twice weekly (Monday and Friday) and finally weekly (Mondays).

Eighty-six percent of our clients agreed to perform ISD while 14% refused (Table 4) and simply wanted to be followed-up. The main problem we faced was to get client accept the procedure but as soon as they tried the procedure, they realised that it was easy to perform and acceptable. This was also shown by Ganararaj (28).

Wyndaele in Belgium showed that in spite of the many techniques available for ISD, This did not change the practical outcome of the procedure provided the basic principles of

good education and training, clean and atraumatic technique and good patient compliance (27).

When compared with the control, there were more re-strictures in the control group, which was not referred to stricture clinic than those, we followed up and this could be attributed to the use of ISD. This is shown in Table 5.

Urethral stricture and HIV disease

Four out of fourteen clients who consented for HIV test tested positive. Two of the four were lost to follow. Although their urinary symptoms improved on ISD, this cannot be wholly attributed to the programme, as the numbers were too few for comparative purposes. A further study should be undertaken to observe the behaviour of HIV patients with urethral stricture. Most studies emphasize the need to develop protocols for surgical intervention as the HIV/AIDS endemic sweeps the globe. New pathogens will be encountered and safer surgical procedures should be used in these days of HIV/AIDS epidemic (32,33).

CONCLUSIONS

Intermittent self-dilatation done weekly for 18 months was effective in the prevention of recurrent urethral stricture after urethral dilatation or optic urethrotomy. It significantly reduced the number of stricture recurrences.

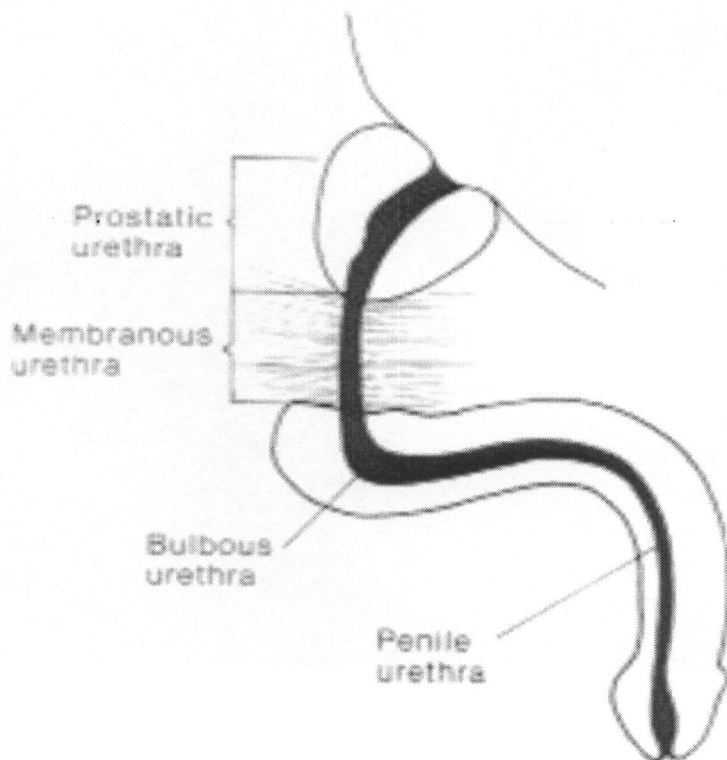
The use of Nelaton catheters was acceptable by the majority of clients for use in ISD programme. Twenty-two out of 36 clients in the study agreed to use Nelaton catheter for ISD.

Intermittent self-dilatation reduces stricture recurrence during the programme as was shown in our study. It is however unclear how long ISD should be done.

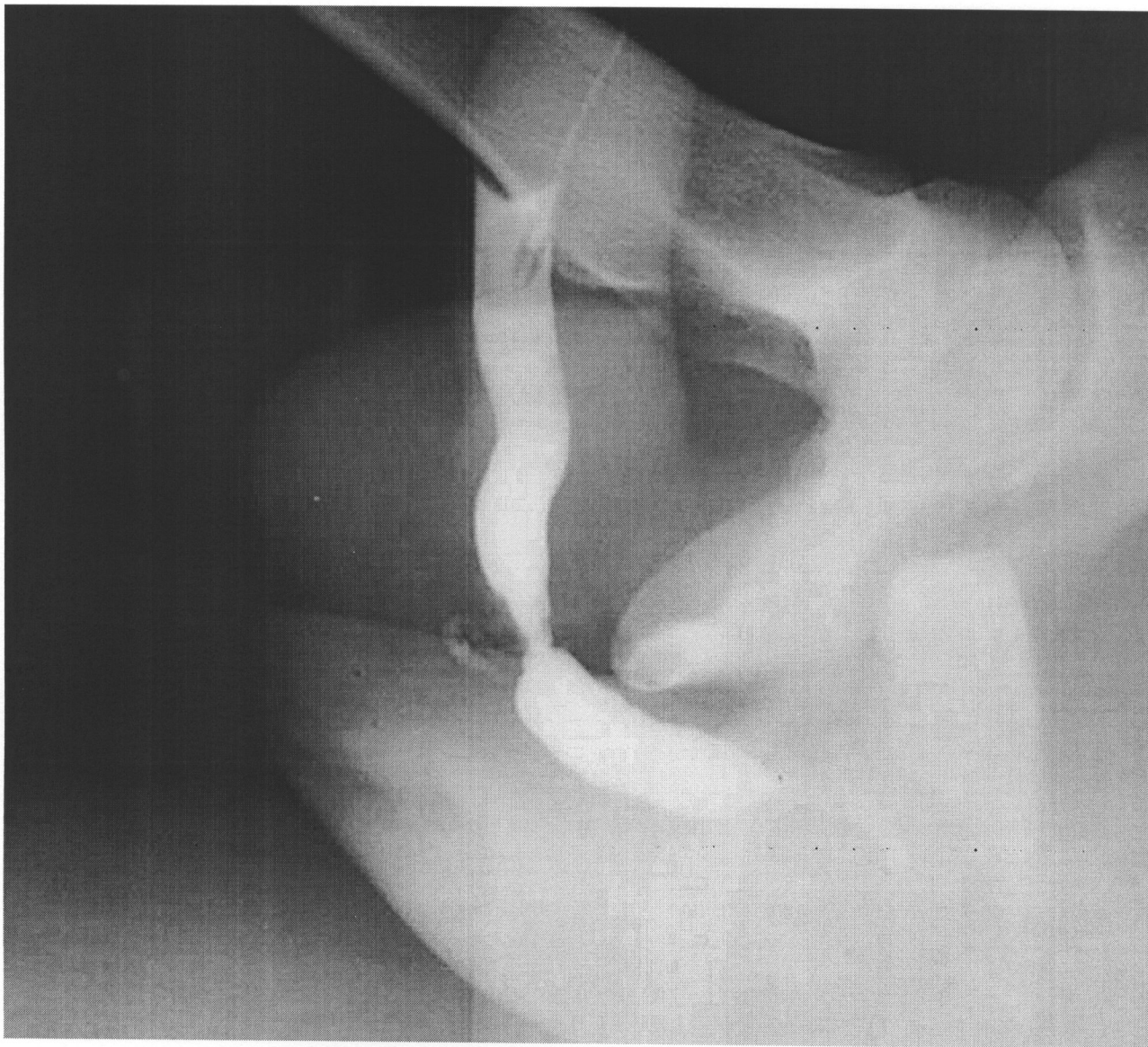
RECOMMENDATIONS

- 1) a) Patients who have undergone urethrotomy or urethral dilatation for urethral stricture should be taught and encouraged to do ISD. ISD is safe, cheap and if used properly will reduce the number of recurrent urethral stricture.
- b) ISD programme should be thrice a week for the first six weeks followed by twice weekly for the next six weeks and once weekly for the last six months. Frequent and prolonged use will only encourage poor compliance. If the client develops infection (UTI), he should be given antibiotic; co-trimoxazole two tablets (960mg) twice daily for a week.

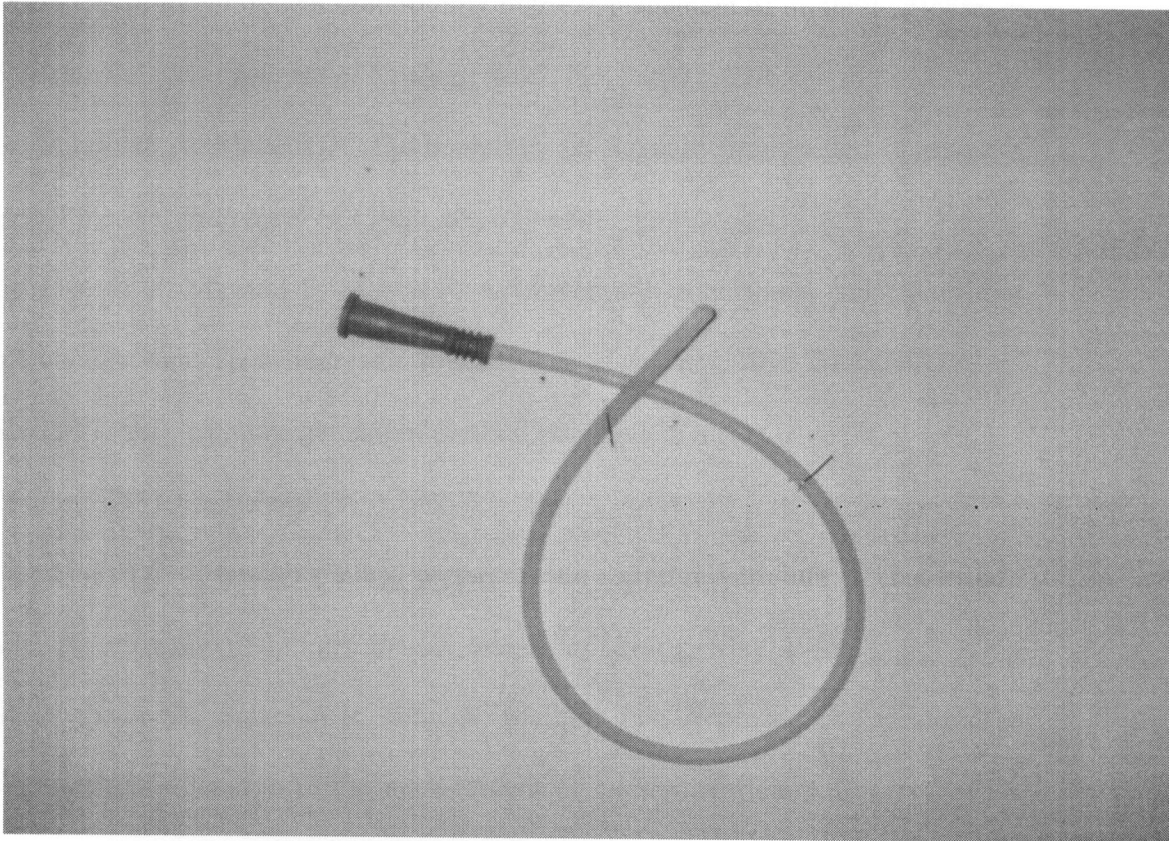
Photographs Sets



Photograph-1: Parts of the male urethra (8)



Photograph 2: Urethrogram showing urethral stricture



Photograph-3: Nelaton catheter

REFERENCES

1. Shittu OB, Internal optical urethrotomy in the management of urethral stricture in Nigerians. *African Journal of Urology*, vol.7, No. 2 2001; 62-65.
2. De Schryver A, Meheus A, Epidemiology of Sexually transmitted diseases: a global picture. *Bulletin WHO* 1990, 68; 639-654
3. Grosskurth H, Mayaud P, Mosha F. Asymptomatic gonorrhoea and chlamydial infection in rural Tanzanian men: *British Medical Journal*; 1996, 312; 277-280
4. Smith PJ, Surgical management of urethral strictures in males. *Urology* 1981, December 18(5), 582-7
5. Ogbonna B.C. Managing many patients with a urethral stricture: a cost-benefit analysis of treatment options. *British Journal of Urology* May, 1988.
6. Matnhehelia SS, Salaman R, John A, Mathew PN. A prospective randomised study of self-dilatation in the management of Urethral Stricture. *Journal of the Royal College of Surgeons of Edinburgh*. 1995, October 40(5), 295-7
7. Kjaergaard B, Walter S, Bartholin J, et al; Prevention of urethral stricture using clean intermittent self catheterisation *British Journal of Urology* 1994 June; 73(6) 692-5
8. Last RJ; The male urethra; In *Last's Anatomy. Regional and applied*, 10th edition. Edited by Sinnatamby CS; Churchill Livingstone 1999, 312
9. Andrich DE, Mundy AR, Urethral strictures and their treatment. *British Journal of Urology* 2000; 86; 571-580

18. Vinod K. Mishra, Panpur; Clean intermittent catheterisation after optical internal urethrotomy- how long? *The journal of urology*;2003(169) 4; 178
19. Bazo A., Rao K. Urethral stricture: “Once a stricture, always a stricture”, *Tropical Doctor* 2003(33); 69-71
20. Anonymous; *British medical journal*; 1994November 19(309); 1378-1379
21. Bodker A, Osti P, Rye-Andersen J, Edvarsen L Struckmann J: Treatment of urethral stricture by internal urethrotomy and intermittent self-catheterisation: A controlled study of a new therapy. *Journal of urology*: 1992(148) 308-310
22. Lawrence WT, MacDonagh RP; Treatment of urethral stricture by internal urethrotomy followed by ‘low friction’ self-catheterisation: preliminary communication; *Journal of the Royal society of medicine*: 1998March; 81(3): 136-9
23. Venn SN, Mundy AR; Reconstructive urology; In *Fast facts (Urology Highlights) edited by Julian Shah, (2000-2001)* 63-67
24. Abdel ME, Saleh RA; Effect of clean intermittent catheterisation on the lower urinary tract: an experimental study; *African Journal of urology*; (9) 1; 2003 18-23.
25. Vapnek JM, Maynard FM, Kim J; A prospective randomised trial of the Lofric coated catheter versus conventional plastic catheters for clean intermittent catheterisation; *Journal of urology*; 2003 (March) 169 (3): 994-8

26. Winder A; Intermittent self-catheterisation. *Nurses' Times*; 2002 (November) 2; 98(48); 50
27. Wyndaele JJ; Intermittent catheterisation: which is the optimal technique? ; *Spinal cord*; 2002 (September) 40(9); 432-437
28. Gnanaraj J, devasia A, Gnanaraj L, Pandey AP; Intermittent –self catheterisation versus regular outpatient dilatation in urethral stricture: a comparison. *Australian-New Zealand journal of surgery*; 1999 (January); 69(1); 41-3
29. Mc Millan A et al; Urethral stricture and urethritis in men in Scotland; *Genitourinary medicine*; 1994; 70(6); 403-405.
30. Pandhi D, Reddy BS; Watering can perineum; *Journal of European academy of dermatology Venereology*; 2002(September); 16(5): 486-7
31. Richard T, Turner-Warwick; Urethral stricture surgery in *Urologic surgery*; 3rd edition; edited by James Glenn; Lippincott company, philapdephia; 1983, 689-719
32. Boccon-Gibond L, Delmas V, Baron JC; Urological manifestations of AIDS; *Annals of urology (paris)*; 1989; 23(3): 173-7

33. Kaplan MS, Wechsler M, Benson MC; Urological manifestations of AIDS;
Urology; 1987 Nov; 30(5): 441-3

Appendix -1

PROTOCOL

PERSONAL DETAILS

NAME:..... HOSPITAL NUMBER:.....

DATE OF ADMISSION:.....

DIAGNOSIS

Type of stricture INFECTIVE TRAUMATIC

INFECTION a) Suspected from History.....
 b) Isolated.....

SYPHILIS.....HIV.....

VIRGIN STRICTURE----- OR RECURRENT STRICTURE-----

LENGTH OF STRICTURE.....

If recurrent stricture, how was it managed previously?

.....
.....

OPERATIVE DETAILS

DATE OF OPERATION.....

TYPE OF OPERATION:- A) OPTIC URETHROTOMY -----
 B) URETHRAL DILATATION -----

FINDINGS: -
.....
.....

OUTCOME

DATE OF DISCHARGE:.....

DATE CATHETER REMOVED.....

INTERMITTENT SELF-DILATATION

DATE COMMENCED:-----

TYPE /SIZE OF CATHETER -----

FOLLOW-UP

1st Month.....
.....
.....

3rd Month.....
.....
.....

6th Month.....
.....
.....

INCLUSION CRITERIA

The following patients will be entered into the study: -

1. Patients with single Urethral strictures clearly visible on a urethrogram
2. Patients with short strictures (less than or equal to 1cm in length).
3. Patients who consent to be entered into the study
4. Patient may or may not have history of urethral discharge or pelvic trauma leading to a urethral stricture.

Exclusion criteria were: -

- 1) Clients with urethral strictures more than 1cm
- 2) Clients with complicated strictures

Appendix-2

PATIENT'S INSTRUCTIONS ON STRICTURE THERAPY

(INTERMITTENT SELF-DILATATION)

ISD

You have been asked to pass the catheter into your bladder in order to keep your urethral stricture open. You will be supervised before discharge on how to do this.

The first step is to **SOAK THE CATHETER IN CLEAN WATER FOR 30 SECONDS.**

Then **WASH YOUR HANDS.**

Now **INSERT THE CATHETER INTO THE BLADDER THROUGH THE URETHRA UNTIL URINE DRAINS COMPLETELY**

REMOVE THE CATHETER

Store catheter in the packet until next use

*

PROGRAMME ON THE USE OF CATHETER

First six weeks **THREE TIMES A WEEK** (Monday-Wednesday-Friday)

Next six weeks **TWO TIMES A WEEK** (Monday-Friday)

Next six weeks once a week (Mondays)

Appendix -3

RESEARCH CONSENT FORM

THE ROLE OF INTERMITTENT SELF-DILATATION IN STRUCTURE MANAGEMENT

1. Why are we giving you this form?

We are giving you this form, telling you what it means and giving you the chance to ask questions about the study. Then you can decide if you want to take part in the study that is trying to investigate the role of intermittent self-dilatation in the management of urethral strictures.

2. Who is caring out this study?

Dr. Robert Zulu is the principal investigator in this study. He is being supervised by **Dr. Mohamed Labib** and **Dr. John Kachimba** who will be performing the surgery and helping him monitor the progress of patients.

The study is being done the urology section of the Department of Surgery at the University Teaching Hospital in Lusaka, Zambia.

The official name of the study is “**The role of intermittent self-dilatation in management of urethral stricture**”.

3. Background Information

You are being asked to take part in a research study because you have a urethral stricture. We are trying to see if having you perform intermittent self-dilatation will reduce recurrence of stricture after surgery and generally improve your long-term outcome. Some medical research suggests that intermittent self-dilatation prolongs the recurrence period and is recommended for patients undergoing this type of surgery for urethral stricture. We hope this study will show such a benefit in patients being treated similarly in the University Teaching Hospital, in Lusaka.

4. What happens in this research?

You will receive the standard treatment for your type of stricture. Several other things will also take place.

- a. A protocol form will be used to enter your personal details and results of your investigations.
- b. A series of blood and urine tests will be performed. Among these will be a test for the HIV, which will only be done with your consent.
- c. You will have a urethrogram performed on you prior to surgery.
- d. You will be reviewed at regular intervals as per schedule.

5. Possible Problems

We believe that if performed correctly intermittent self-dilatation is not harmful. However it does carry a risk of trauma or infection. These are manageable risks and the study will endeavour to avoid them. The study may have risks that are

not known now. Once you are in the study, we will tell you of anything that we think might make you want to change your mind about being part of the study.

6. Benefits

You may not benefit from participating in the study.

7. Your rights to participate, not participate, or to withdraw from the study

Taking part in this study is voluntary. You do not need to take part in this study – it is up to you.

You may choose to either participate or not. If you choose to take part in the study, you can later change your mind and withdraw from the study. You will still receive the standard management for urethral stricture but will not be compelled to perform intermittent self-dilatation.

You will suffer no penalty if you do not take part in the study. If you do not take part in this study you will not lose any benefits to which you are entitled as a patient of this hospital. Your present and future medical care at University Teaching Hospital; Lusaka will be the same whether or not you take part in this study.

If there are any new findings during the study that may affect whether you want to continue to take part in this study, you will be told about them as soon as possible.

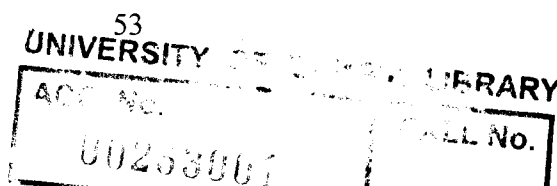
The investigators may decide to discontinue your participation without your permission because they may decide that staying in the study will be bad for you.

8. Confidentiality

Your name will never be made public by the investigators. The medical record of your care will be treated the same as all medical records at the University Teaching Hospital, Lusaka.

Information from this study and from your medical record may be reviewed and copied by the study investigators and examiners that may be appointed by the University of Zambia. A code number that makes it very difficult for anyone to identify you will identify the research information gathered by the study. All information will be stored in a secure place. Information from this study and from your medical record may be used for research purposes and may be published; however, your name will not be made public by the investigators. It is possible that, after the study is over we may want to look again at the laboratory and medical record data collected during the study to help us answer another question. If this happens, your name will not be made public by the investigators.

I.....(code) has been informed about the study on the role intermittent self-dilatation in the management of urethral strictures. I will



undertake intermittently self-dilatation with catheters provided, will provide blood and urine samples and undergo urethrography. I will receive the standard treatment the hospital offers in these cases. A copy of this form signed by me and one of the study investigators is being given to me.

Signature:..... Date:

I have explained this research study to the subject. I am available to answer any questions now or in the future regarding the study and the subject's rights.

The principal investigator Dr. Robert Zulu and his supervisors can be reached at the Department of Surgery, University Teaching Hospital, Lusaka, Zambia.

.....

Signature of Investigator and Printed Name