

CONTENTS:

. TITLi 0)

DECLARATIONS. (ii)

SUMMARY. (Hi)

.

PAGE

CHAPTER I: INTRODUCTION. 1

II: AIM OF STUDY. 4

III: MATERIALS AND METHODS.. 6

IV: RESULTS. 10

V: DISCUSSION OF RESULTS.. 32

VI: CONCLUSION. 57

ACKNOWLEDGEMENTS. 60

REFERENCES. 62

(i)

° STRICTURE OF THE URETHRA.

The disease as seen at the Kenyatta National
Hospital over a one year period, 1982 - 1983.⁷

By

JOHN ADIENG/ADWOK, MBBS (KHARTOUM)

A thesis submitted in part fulfilment for the degree
of MASTER OF MEDICINE (SURG.) IN THE UNIVERSITY OF
NAIROBI, 1984.

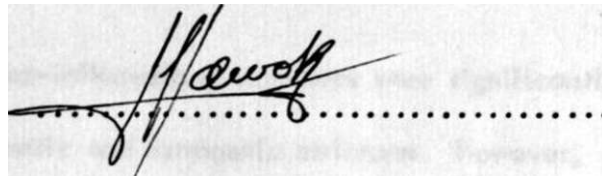
(ii)

DECLARATIONS:

CANDIDATE:

This thesis is my original work and has not been presented for a degree in an/ other University.

Signed:

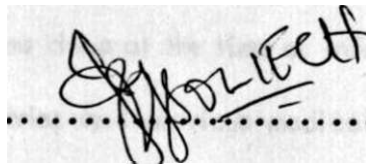
A handwritten signature in black ink, appearing to read 'J.A. Adwok', is written over a horizontal dotted line.

DR. J.A. ADWOK, MBBS., (KHARTOUM)

SUPERVISOR:

This thesis has been submitted for examination with my approval as University Supervisor.

Signed.....

A handwritten signature in black ink, appearing to read 'J.S. Oliech', is written over a horizontal dotted line.

MR. J.S. OLIECH, MBChB., (Makerere), FRCS (IRELAND),
DIP. UROLOGY (LONDON).

SUMMARY:

A prospective study of seventy seven patients with urethral strictures treated at the Kenyatta National Hospital over a period of twelve months (1982-1983) was done. The age, tribal, and aetiological incidencies were investigated. Various aspects of the clinical presentation, investigation and treatment were also looked at. .

Post-inflammatory strictures were significantly more than post-traumatic and iatrogenic strictures. However, post-prostatectomy strictures were not included with the later.

The lapse period following post-inflammatory strictures was about 5 years on the average. Omo-Dare quotes 18 years for a Nigerian study done two decades ago for post-gonococcal strictures. It was not possible to determine the initial cause of urethritis in this study due to the fact that most patients had no cultures for the organisms done at the time of infection. Some were treated at dispensaries and previous medical records were unobtainable.

Data on tribal incidence could not be critically analysed without bias due to the uneven distribution of the tribes around the Nairobi area. Others live a few kilometers away and others hundreds

(iv)

of kilometers.

Half of the urine cultures done were negative. The rest grew gram negative organisms, mainly E.coli. No gonococci were isolated. B.U.N, was elevated above normal in about one third of the patients. Intravenous pyelograms were normal in four-fifths of the patients investigated. Micturating urethrograrr* done in eleven patients showed the majority of strictures to be in the posterior urethra.

Seventy-three percent of the patients were managed with intermittent dilatations with good results. Urethroplasty was done in 23% and urethrotomy in 4% of the patients - urethroplasty was offered more to the younger age group.

The need for proper health education to the public about this disease and its causes is emphasized. Suggestions for better management of these patients are forwarded. Special stress on the benefits of urethrotomy under vision for suitable patients is made. A critical review of the various types of urethroplasty is also presented.

(1)

INTRODUCTION.

John Hunter wrote a lot about urethral strictures in his treatise on venereal disease. The disease in 18th Century England evidently provided problems similar in regard to aetiology, pathology and treatment to those found in many developing countries today. Hunter's observation on the pathology of urethral stricture accompanied by fistulae are as true today as they were written two centuries ago.

Treatment at that time consisted chiefly of dilatation, a method which had been in use since the sixth century B.C. and is still in use today. Sustra described in the Ayurveda the treatment of stricture by means of graduated dilators of wood or metal. About 200 B.C., Erastatus was dilating strictures with elongated S-shaped Catheters. In the tenth century A.D., Rhazes of Baghdad was reputed to have performed a perineal puncture to relieve retention of urine. Towards the end of the 17th Century, French Surgeons introduced a similar procedure in the form of La Boutonniere operation. By the later, a buttonhole puncture of the dilated urethra behind the stricture was performed with or without a staff in the urethral canal. In 1730, the French Surgeon Ledran performed the first successful external urethrotomy for a case of urethral stricture complicated by perineal fistulae. In the eighteenth

(2)

century internal urethrotomy was introduced, the urethrotome taking the form of a lanced catheter. Also during that century, the desire to speed up the results of treatment of urethral strictures forced surgeons to attempt many forms of dilatation. Dupuytren introduced the method of continuous dilatation by an indwelling catheter and Desault suggested the use of a fine guide to lead in a larger following instrument. The nineteenth century saw the development of various types of urethrotomes. By the beginning of the twentieth century, surgeons had begun to treat urethral strictures by actual excision; but this nearly always failed until Legueu added a preliminary suprapubic cystostomy.

During recent years excision of the stricture with immediate or later reconstruction of the urethra has been practised in which either penoscrotal skin, free skin graft, or a graft of the tunica vaginalis communis is used to repair the defect in the urethra following excision of the stricture. This has been made possible as a result of improvements in anaesthesia, advances in the techniques of plastic surgery, the advent of antibiotics, and pre-and postoperative care based on a clearer understanding of the implications of impaired renal function and of the effects of a poor state of nutrition on wound healing. In the more advanced countries,

(3)

where these methods have been developed, venereal disease clinics have greatly reduced the incidence of inflammatory stricture of the urethra. Indeed, traumatic stricture due to fractured pelvis or perineal injury, and especially to passage of large endoscopic instruments and rubber catheters along the urethra, is becoming more frequent as compared with inflammatory stricture (Marshall, 1958). In the less well developed countries however, such as East and West Africa, inflammation of the urethra remains a great problem, and it is in these places that excisional methods of treatment will have their greatest application.

Kenya is a tropical country of nearly eighteen million people, subsisting mainly on an agricultural economy. Communications are poor and hospitals and clinics are widely scattered and understaffed. Venereal disease and non-specific urethritis are inadequately treated even in the City of Nairobi. People are not aware or they hold different views as regards the relationship between urethral strictures and gonococcal infections. It is not surprising, therefore, that in Kenya today, as in Europe a century or more ago, the disease is met with in its most advanced and often fatal form.

(4)

AIM OF STUDY

Having worked In the urology and general surgical wards of the Kenyatta National Hospital, it was obvious that many cases of urethral strictures were admitted or seen in the clinics and casualty department in a short period of time. The most striking feature about many of these patients was the advanced stage of the condition before the patients decided to seek medical advice. One wonders how this could be true of a disease which produces such discomfort, if not pain.

The main purposes of this study were:-

- 1) To asses the frequency of inflammatory urethral strictures in comparison to all other strictures and the incidence in the various age groups and tribes.
- 2) To determine the major aetiological factors, the presentation of patients, diagnoses and the possible reasons for the delay in seeking medical attention.
- 3) To compare the effectiveness and success of the different forms of treatment used.
- 4) To provide suggestions for better management and prevention of this condition.

(5)

The study was done at the Kenyatta National Hospital over a twelve month period. It was possible to do a prospective study because of the available number of patients suffering from stricture of the urethra who come to the Surgical Clinics or are admitted to the Surgical wards.

(6)

MATERIALS AND METHODS:

This is a prospective study done at Kenyatta National Hospital over a period of one year; from the month of February, 1982 to the month of February, 1983. A total number of seventy seven male patients were studied. These included all the patients who reported or were referred to Kenyatta National Hospital in that period. Direct interviewing of patients plus a study of their medical records were done whenever possible. It was not possible to interview and examine all the patients treated during the period of study and the author had to resort to getting the required information from the patient's hospital notes; taking care to make sure the patient was treated during the period of study.

The various sources for the study included:-

1. The urology and general surgical wards where direct interviewing of patients and physical examination was done.
2. Theatre registration books for patients operated on for urethral strictures during the period of study. Their medical notes were subsequently traced using the hospital numbers.
3. The minor theatre in the surgical out-patient clinic where most of the passage of sounds were done. Patients were interviewed and their notes subsequently traced in the medical records to supplement the information obtained from the patient.

(7)

- 4) The medical records department helped to trace the records of patients treated during the period of study and missed from the above sources.

The study was conducted by drawing up a protocol, which included all the information to fulfil the aims of the study.

STRICTURES OF THE URETHRA.

CASE NO

AGE

TRIBE

A. TYPICAL HISTORY:

1. URETHRITIS

- a) Infective
 - i) Gonococcal.
 - ii) Non-Gonococcal
- b) Single attack or repeated .-,
- c) Treatment

2. TRAUMA

- a) Mode R.T.A FALL ASSAULT

OTHER

- b) Haematuria
- c) Fracture Pelvis____

(8)

3. IATROGENIC

- a) Indwelling catheter...rubber... .plastic.
silicone. Duration
- b) Cystoscopy.Other instrumentation
(metal sounds)
- c) Perineal operation

B. DIAGNOSIS

1. CLINICAL:

- a) Weak stream
- b) Retention. Acute.Chronic....
- c) Overflow incontinence.
- d) Lapse period from trauma or
Urethritis

2. INVESTIGATION

- a) Urinalysis
- b) B.U.N
- c) I.V.P.Hydroureter or/and
Hydronephrosis...
- d) Micturating or Retrograde Cystourethrograms.
- e) Urethrocystoscopy...

(10)

R E S U L T S

Seventy seven patients who presented or were followed up with urethral strictures from February 1982 to February 1983 at Kenyatta National Hospital were studied.

AETIOLOGY (TABLE 1)

The most common cause of urethral stricture in this series was found to be a previous infective urethritis, accounting for 71.4% of all patients.

Strictures following some previous form of trauma accounted for 27.3% of all patients in this series. Road traffic accidents with associated fracture pelvis being the commonest trauma. The remaining 9 patients in this group included falls, assaults and other forms of trauma.

Iatrogenic strictures were found in 1.3% of all cases. These did not include post-prostatectomy bladder neck contraction, but urethral instrumentation for other conditions which resulted in stricture formation, were included.

(11)

TABLE: 1

AETIOLOGY OF STRICTURES.

CAUSE	NO. OF PATIENTS	PER CENT TOTAL
1. INFECTION	55	71.4%
2. TRAUMA	21	27.3%
R T A .. 12		
Fall 4		
Assault 4		
Other 1		
3. IATROGENIC	1	1.3%
TOTAL	77	100%

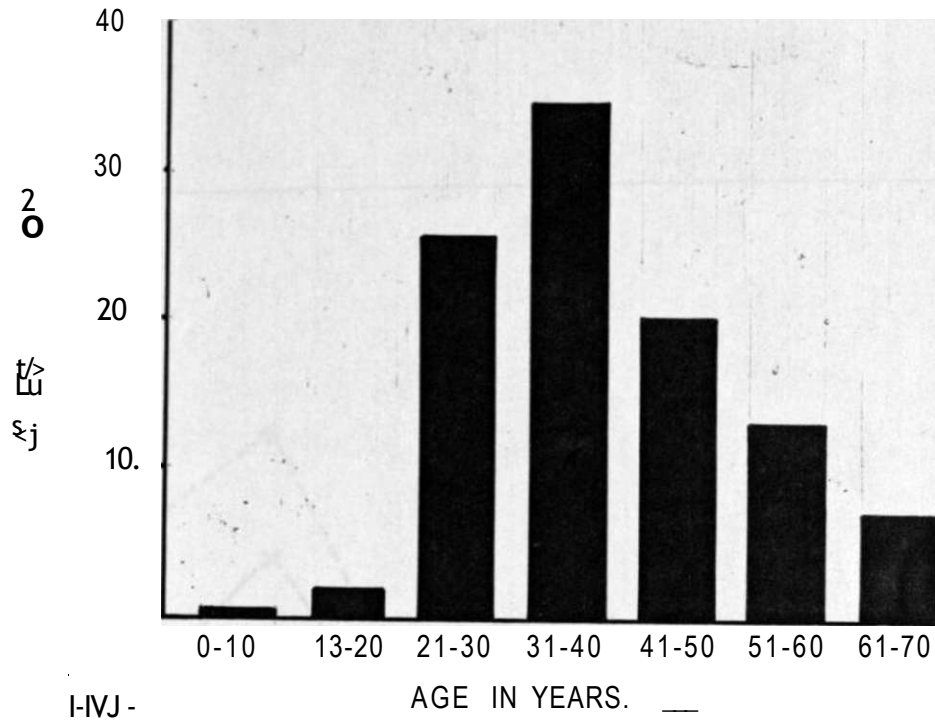
(12)

AGE INCIDENCE⁵

Post inflammatory stricture was found to be commonest between the ages of twenty years and forty years (FIG.1), with a peak between thirty and forty accounting for 34.5% per cent of all post-inflammatory strictures. In contrast, post-traumatic strictures had the highest incidence between twenty and thirty years (FIG.2). The highest incidence of all urethral strictures occurred between the ages of twenty and fifty years.

The relationship between the overall age incidence of urethral strictures versus post-traumatic and post-inflammatory causes is shown in FIG.3. Only 4 percent of all patient* with urethral strictures were above the age of 60 years. Also a very low incidence is noted below the age of twenty years.

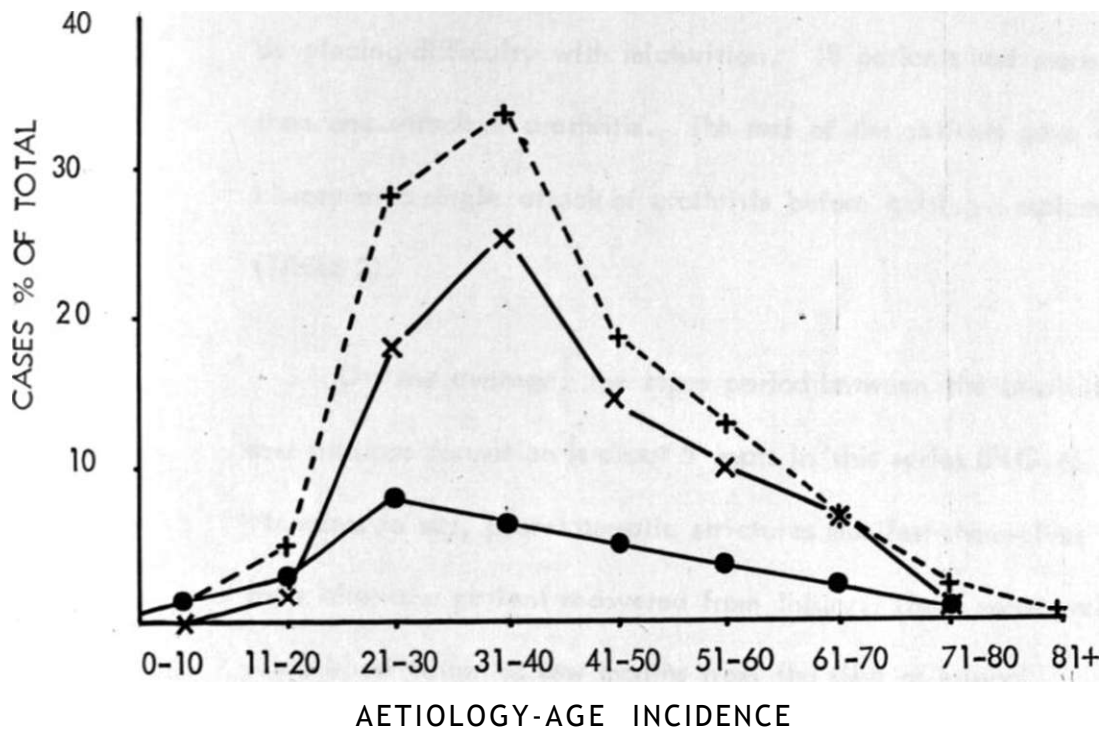
FIG.1 AGE INCIDENCE OF POST-INFLAMMATORY URETHRAL STRICTURES.



AGE INCIDENCE OF POST-TRAUMATIC URETHRAL STRICTURES.



FIG.3



Total Strictures

x _____ Post-inflammatory Strictures

o _____ Post-traumatic Strictures.

(15)

LAPSE PERIOD:

Out of fifty-five patients with post-inflammatory strictures, 40 patients could give a convincing history of the frequency of attacks of urethritis they experienced before developing difficulty with micturition. 18 patients had more than one attack of urethritis. The rest of the patients gave a history of a single attack of urethritis before getting symptoms (TABLE 2).

On the average, the lapse period between the urethritis and stricture formation is about 5 years in this series (FIG.4). Needless to say, post-traumatic strictures manifest themselves soon after the patient recovered from injury. These were well established within a few months from the time of injury.

(16)

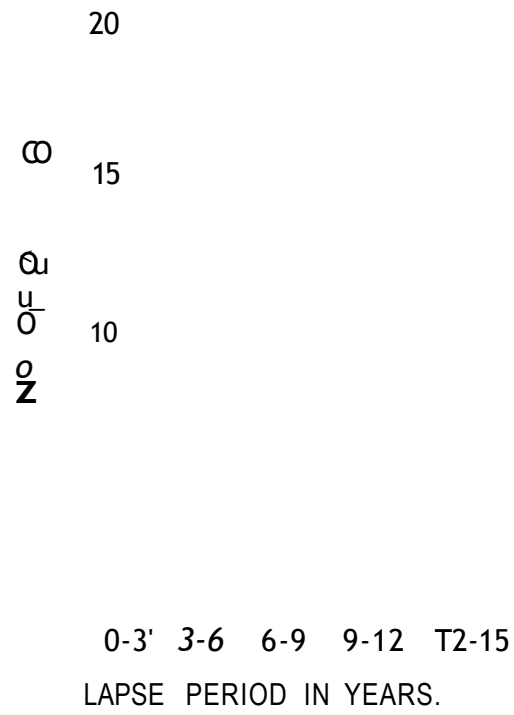
TABLE:2

FREQUENCY OF ATTACKS OF URETHRITIS IN 40 PATIENTS.

	NO. OF PATIENTS	PER CENT OF TOTAL
1. REPEATED ATTACKS OF URETHRITIS		
2 TIMES	8	
2 TIMES	5	
+3 TIMES	5	18
2. SINGLE ATTACK OF URETHRITIS	22	55%
	40	100

FIG.4

LAPSE PERIOD IN POST-INFLAMMATORY
URETHRAL STRICTURES.



TRIBAL INCIDENCE

The tribal incidence of all strictures (TABLE 3). shows the expected majority in the big tribes. However, the Kamba tribe surpasses the Luos and Luhyas in this case. This feature also manifests itself in the post-inflammatory strictures (FIG.5).

The four major tribes, the Kikuyu, Luos, Luhya and Kamba accounted for 88.4% of all patients. Out of the seventy seven patients there was only one non-Kenyan patient, a Ugandan who had a post-inflammatory stricture.

Although referrals come from all the provinces in the republic, the Kikuyu and Kamba are the tribes living in Nairobi neighbourhood.

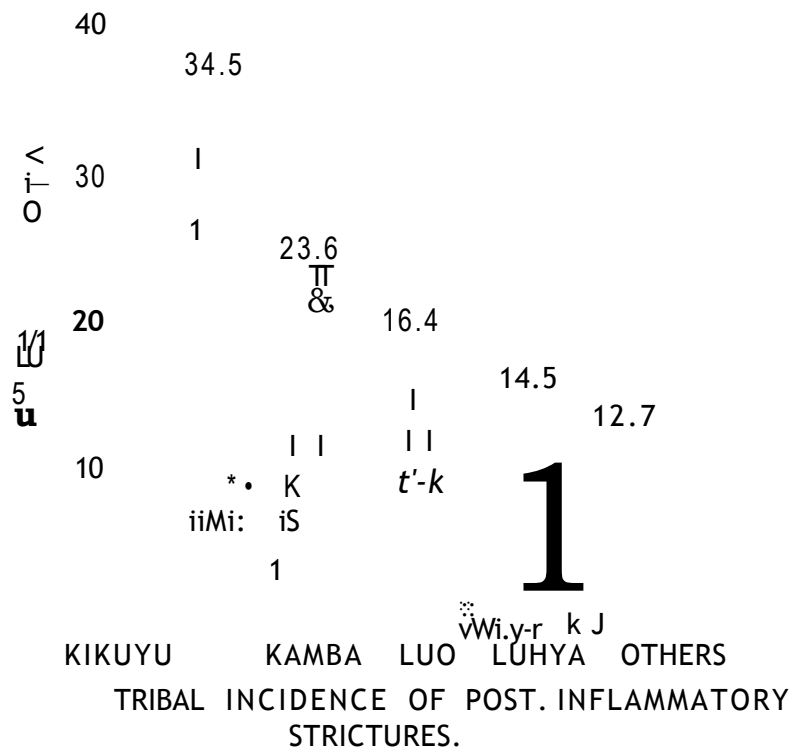
(19)

TABLE: 3

TRIBAL INCIDENCE OF ALL STRICTURES.

TRIBE	NO. OF PATIENTS	PERCENT OF TOTAL
KIKUYU	26	38.8
KAMBA....	17	22.1
LUO	13	16.9
LUHYA	12	15.6
OTHERS	9	11.6
KISII	2	
MERU	2	
SOMALI	1	
KALINJINE	1	
TURKANA	1	
TAITA	1	
UGANDAN	1	
TOTAL	77	100

FIG. 5



CLINICAL MANIFESTATIONS: (TABLE 4)

32.5% of the patients presented with a diminution in the urinary stream. Dribbling was also a common complaint in these patients. The later occurred a few minutes after micturition in the form of urine drops escaping into the patients clothes. Only three patients out of the total presented primarily with dribbling but were subsequently found to have a weak urinary stream. Three patients also presented primarily with frequency of micturition.

59.7% presented with retention of urine. 3% of the patients in this study suffered from multiple fistulae in the perineum (water-can perineum).

TABLE: 4

PRESENTATION OF PATIENTS WITH STRICTURE OF URETHRA TO
HOSPITAL, KENYATTA NATIONAL HOSPITAL

	NO.OF PATIENTS	PER CENT OF TOTAL
1. ^A WEEK STREAM OF URINE,	25	32.5%
2. RETENTION	46	59.7%
3. OTHERS	6	7.8%
. DRIBBLING	3	
. FREQUENCY OF MICURITION	3	
TOTAL	77	100

INVESTIGATIONS:

In 48 patients who had urinalysis and culture done, there was no organism grown in 38 patients (routine cultures). The remainder grew various organisms all of which were of the gram negative group (TABLE 5). No neisseria gonorrhoe were grown.

Blood urea nitrogen was estimated in 49 patients. 34 patients had values within the normal range. Fifteen of them had elevated values (TABLE 6).

Out of 18 patients who had intravenous pyelograms done in this study (TABLE 7) only 3 patients had evidence of hydronephrosis and hydroureters. This investigation was done pre-operatively for patients who were scheduled for urethroplasty or urethrotomy.

Specific diagnostic tests done in this study was instrumentation done in all the patients and urethrography done in 14% of the patients (11 patients). 6 of these patients had urethrocystoscopy. As shown in TABLE 8, 5 strictures were in the penile urethra, 3 posterior urethra and 3 were multiple strictures, (PHOTO I) illustrates the urethrography appearance of multiple urethral strictures. (Photo II) shows post-stricture urethral dilatation.

TABLE: 5

URINE CULTURES IN 48 PATIENTS WITH STRICTURE URETHRA.

ORGANISM	NO.OF PTS	% OF TOTAL
1. NEGATIVE CULTURE	38	49.2%
2. E.COLI	4	8.3%
3. KLEBSIELLA	3	6.3%
4. PSEUDOMONAS...	1	2.0%
5. MIXED CULTURE...	2	4.2%
TOTAL	48	-

TABLE: 6

BLOOD UREA NITROGEN IN 49 PATIENTS WITH STRICTURE URETHRA.

	NO.OF PATIENTS	% OF TOTAL
NORMAL VALVES		
2.5,-3.5	10	
3.5-4.5	10	
4.5- 5.5	9	
5.5-6.5	5	34
ELEVATED B.U.N.		
6.5 - 7.5	3	
7.5 - 8.5	4	
8.5 - 9.5	3	
9.5-10.5	2	
10.5-	3	.15
TOTAL	49	69.2% 30.8%

(26)

TABLE: 7

INTRAVENOUS PYELOGRAMS IN 18 PATIENTS

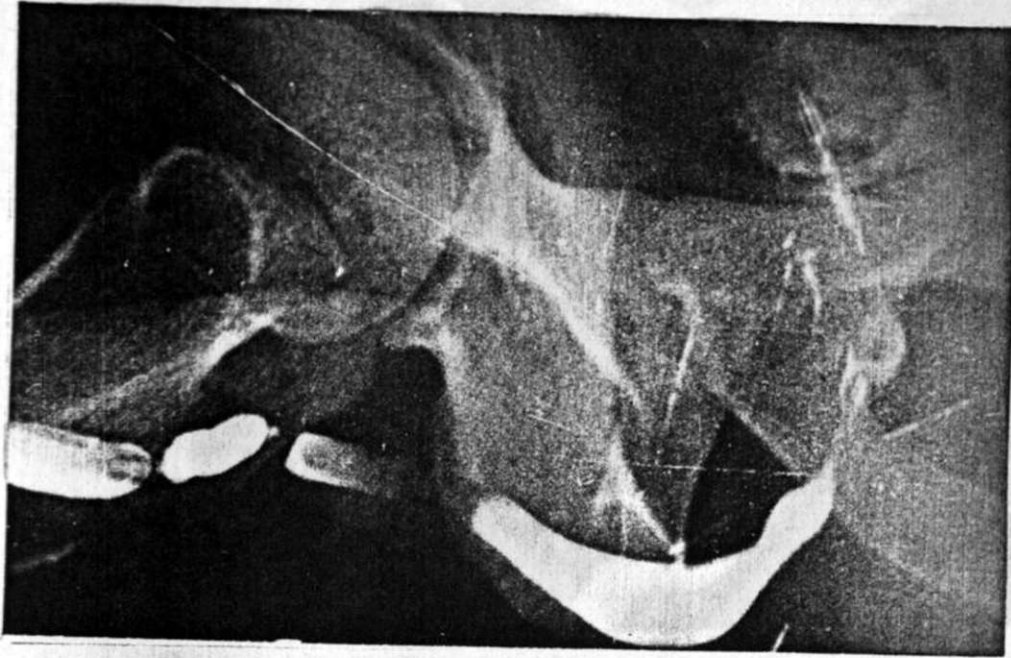
	NO;OF PATIENTS	% OF TOTAL
NORMAL VALVES	15	83.3%
HYDRONEPHROSIS AND/ OR HYDROURETERS	3	16.7%
TOTAL	18	100

(27)

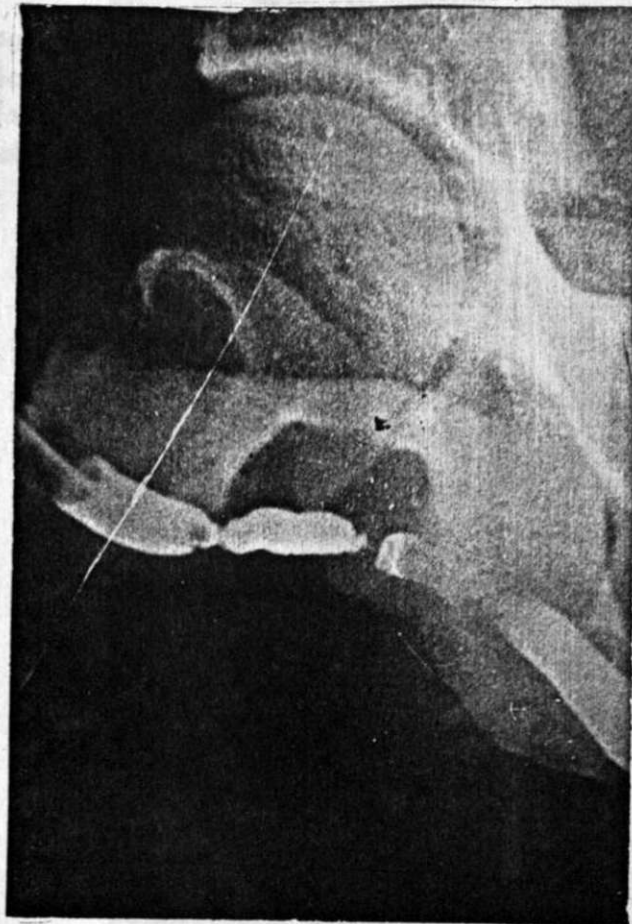
TABLES: 8

SITES OF URETHRAL STRICTURES IN 11 PATIENTS
(URETHROGRAMS)

SITE	NO.OF PATIENTS
PENILE	5
POSTERIOR URETHRA (BULBOUS + MEMBRANOUS)....	3
MULTIPLE	3
TOTAL	11



(a)



(b)

PHOTO I (a & b)

Multiple post-inflammatory strictures of the urethra.

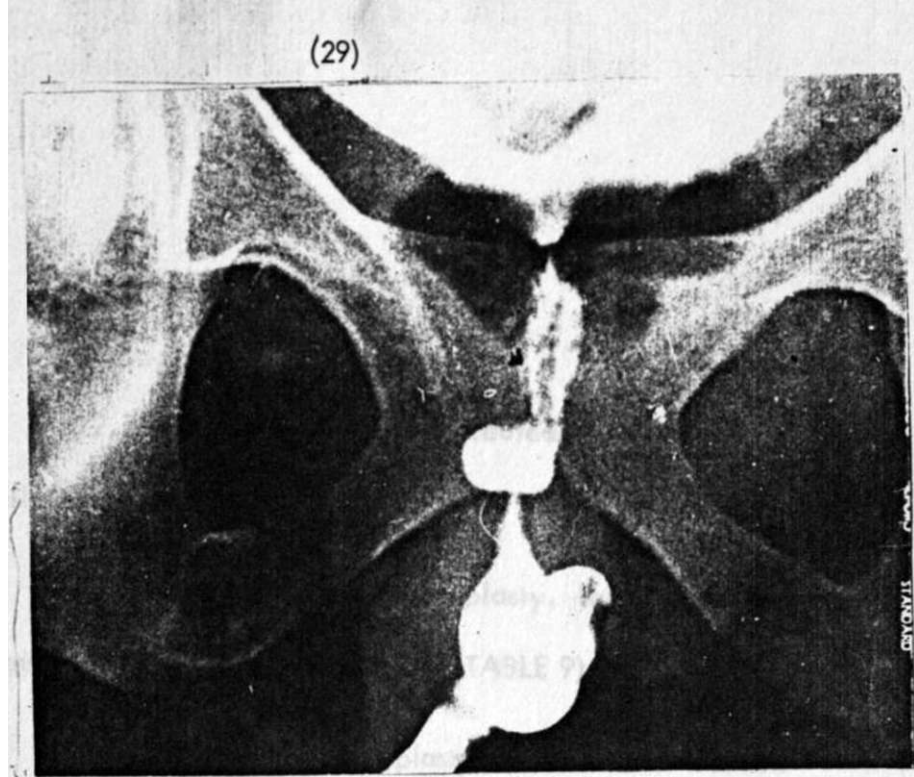


PHOTO 11 (a 3db)

False passage
and diverticulum
formation following
dilatation of the
urethra.



(30)

MANAGEMENT:

72.7% of the patients were treated by repeated dilatation alone.

23.3.% were offered urethroplasty. Internal urethrotomy was done in the remaining 4%. (TABLE 9).

Fig.6 shows that urethroplasty was done more for the younger patients. No urethroplasty was performed to any patient in the 40-60 years age group. The technique was the two-stage urethroplasty of the Johanson type.

RECURRENCE:

Out of the 56 patients who had regular urethral dilatations in this series, no other form of treatment was required. "

Out of 18 urethroplasties done; there was a recurrence in 11 patients. However, these responded to subsequent intermittent dilatations.

The three urethrotomies were followed up with intermittent dilatations with good results.

TABLE: 9

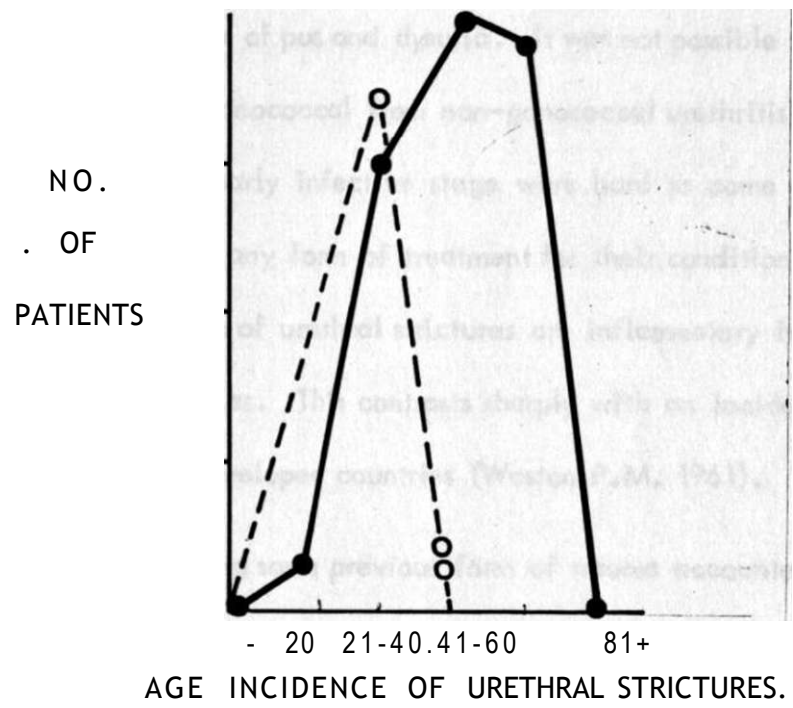
MANAGEMENT OF PATIENTS WITH URETHRAL STRICTURES

TREATMENT	NO.OF PATIENTS	% OF TOTAL
1. INTERMITTENT DILATATION	56	72.7%
2. URETHROPLASTY	18	23.3%
3. URETHROTOMY	3	4%
TOTAL	77	

(32)

(

FIG. 6



DISCUSSION OF RESULTS.

Seventy seven patients who presented or were followed up with urethral strictures at the Kenyatta National Hospital, from the month of February 1982 to the month of February, 1983 are discussed.

AETIOLOGY:

71.4% of all patients studied gave a history of previous infective urethritis with discharge of pus and dysuria. It was not possible to differentiate previous gonococcal from non-gonococcal urethritis as previous medical records of the early infective stage were hard to come by or the patients had not sought any form of treatment for their condition. It is reported that about 95% of urethral strictures are inflammatory in origin in many tropical countries. This contrasts sharply with an incidence of 50% or less in more developed countries (Weston, P.M. 1961).

Strictures following some previous form of trauma accounted for 27.3% of patients in this series in contrast to 5% estimated for many tropical countries (Weston, P.M. 1961). Road traffic accidents with associated fracture pelvis were the cause of strictures in 60% of the trauma patients. It is the opinion of the author that the rise in incidence of post-traumatic strictures and fall in post-infective causes is due to, firstly, the improvement in medical services during the last two decades. This resulted in the early treatment of patients suffering from urethritis. Also the public awareness for diseases has improved with better health education programmes. Secondly,

the rapid industrialisation and development, especially in the urban areas resulted in the use of more vehicles and other machinery with subsequent increase in road traffic accidents and industrial catastrophes. All patients admitted suffering from pelvic fractures must be assumed to have sustained a urinary tract injury until proved otherwise. There exists, however, a correlation between the degree of such injury and the expectation of urethral damage, patients sustaining fractures of both pubic rami having a significantly higher incidence of urethral damage than those patients suffering from only a single fracture, and wide symphyseal separation is also particularly significant. This type of injury is virtually limited to the male because the shortness and relative mobility of the female urethra renders it a more mobile structure. Such injuries are always associated with ecchymosis and bruising of the perineum, together with extravasation of urine into the extraperitoneal perivesicle space. Regardless of the primary treatment a severe stricture nearly always follows this type of injury.

Iatrogenic strictures, found in 1.3% of all patients studied did not include post-prostatectomy bladder neck contraction. In one large reported series the incidence of stricture following transurethral prostatic resection was approximately 6 per cent, (Smiddy, FG in *Tutorials in Surgery* 2). This omission might explain the low incidence of iatrogenic strictures which are becoming commoner in the Western world, especially

(35)

.with the increasing use of endoscopic Instruments in the urinary passages. Blandy (1976), in a retrospective study of all types of strictures seen at the London Hospital and one clinic at St.Peter's Hospital from 1965 through 1975, found that about 35% (135 patients) of 357 patients had iatrogenic stricture, more than road traffic accidents which accounted for 75 patients only. Catheterisation and endoscopic manoeuvres are the commonest causes of iatrogenic strictures. This is becoming an increasing problem at the Kenyatta National Hospital (Oliech, 1982).

It is worth mentioning at this stage that the vast majority of inflammatory urethral strictures are due to gonorrhoea, but a few are caused by Schistosomiasis or tuberculosis (Symes, 1973). It has been suggested that the more severe strictures with fistulae and lymphoedema of the scrotum are caused by lymphogranuloma venerium, but there is no convincing evidence in support of this. It has not been possible, for example, to find any record of a patient with untreated lymphogranuloma venerium who had no evidence of having had gonorrhoea and who yet developed a stricture of the urethra. In the chronic stage the aetiology is obscured by secondary infection and histology is therefore of little value. (Weston, 1961).

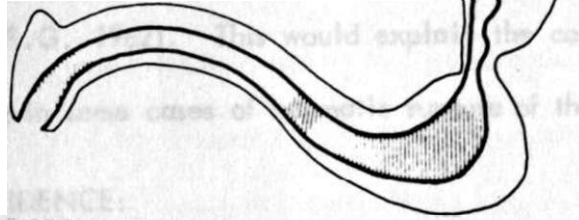
Singh and Blandy (1976) reported the results of a classic study " they had done on the pathology of post-gonococcal urethral strictures.

They found that such strictures vary in length from mere diaphragms to strictures which involve the greater part of the bulbous and, occasionally, the penile urethra. The disposition of such strictures is related to the distribution of the para-urethral glands which are greatest in number in the proximal parts of the urethra where they extend into the corpus spongiosum, whereas in the penile urethra they are relatively infrequent except in the area proximal to the meatus. During an acute attack of gonorrhoea, urethroscopy reveals pus issuing from the orifices of these glands and at the height of infection the microabscesses that form in the glands rupture into the corpus spongiosum, thus permitting urinary extravasation to occur during micturition (FIG. 7).

The above workers have also advanced an hypothesis that squamous metaplasia of the urethra occurs in gonococcal infection which renders the mucosal lining relatively inelastic. As a result, because the mucosa is unsupported it is liable to rupture during micturition, thus permitting urinary extravasation, which causes submucosal inflammation. This then heals with accompanying fibrosis, and as this increases in degree the lumen eventually becomes encircled and a stricture is created. (Singh, M and Blandy J.P. 1976).

The urinary drainage system have several points in common, such as a transitional cell epithelium, well defined submucosa, smooth muscle,

SITES OF INFLAMMATORY
STRICTURES



DISTRIBUTION OF
PARAURETHRAL GLANDS

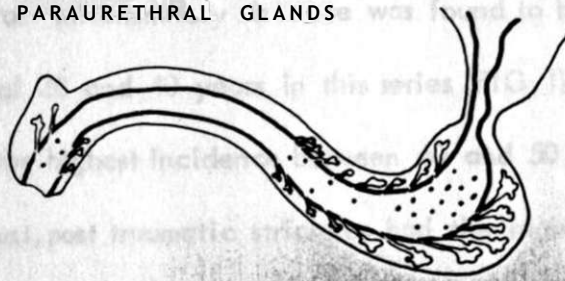


FIG. 7.. Sites of post-gonococcal urethral stricture and **map of**
distribution of paraurethral glands.

(AFTER BLANDY)

- and an abundant blood supply. It is well known that the ureter can regenerate completely. Likewise, regeneration of the entire urethra is possible in 3 to 4 weeks when incomplete injury occurs to the wall with very little change from the normal urethra. No excessive fibrous tissue develops. However, the urethra does not bridge a gap of complete excision. Scar tissue with complete occlusion occurs, (Weaver, R.G. 1962). This would explain the complete recovery that occurs in some cases of traumatic rupture of the urethra.

AGE INCIDENCE:

Post inflammatory stricture was found to be commonest between the age of 30 and 40 years in this series (FIG. 1). A Nigerian study showed the highest incidence between 40 and 50 years (OMO-DARE, 1966). In contrast, post traumatic strictures had the highest incidence between twenty and thirty years (FIG.2). The fact that the overall highest incidence is between the ages of 20 and 50 years could be explained by the fact that this is the most active phase of life when most men are in their prime in physical and social activities.

Only 4% of urethral strictures were found above the age of 60 years. This figure would have been much higher if post-prostatectomy strictures were included in the study. The overall low incidence below the age of 20 years could be explained by the reason that inflammatory, urethritis which could occur during adolescence takes several years or

« more (lapse-period) before it could result in stricture formation, if it does at all. Also children are least exposed to the traumatic causes of urethral strictures in the first two decades of life.

Congenital urethral strictures, which are not included in this study are rare. The commonest are found at the meatus, but occasional strictures are met with at the proximal extremity of the fossa navicularis and -in the membranous urethra, (Leadbetter, 1962). A more frequent cause of urinary obstruction in the infant is narrowing of preputial orifice following recurrent attacks of ammoniacal dermatitis, a condition commoner in bottle-fed than breast-fed babies because of the slight alteration in the pH^O^ the stools of the former that favours the growth of an organism capable of splitting urea to ammonia. In such infants, if the prepuce is removed and the underlying condition is left untreated, an acquired meatal stricture may develop.

LAPSE PERIOD

Forty patients with post-inflammatory strictures gave a convincing history of the frequency of attacks of urethritis they experienced before developing difficulty with micturition (TABLE 2). Forty-five per cent of these patients had more than one attack of urethritis. This is higher than the Nigeria figure of 35% (Omo-Dare, 1966). The rest experienced a single attack of urethritis. In most of the later group, no adequate treatment of the urethritis had

been sought and the patients had experienced several weeks of urethral discharge and dysuria. Omo-Dare reported in 1966 that post-gonococcal strictures in Nigeria developed after an average period of 18 years. In this study the lapse period is about 5 years. There were no other detailed studies in the literature for purposes of comparison. Errors in the analysis of data cannot be excluded, It might be useful if a more detailed study of the lapse period from gonococcal urethritis, specifically, and the development of a stricture is done in East Africa in general and Kenya in particular.

Strictures which follow trauma to the urethra develop more rapidly than those which follow inflammation. These may be well established within a few months of the injury. Most of the recent Western Scientific literature on strictures focuses more on the traumatic aspect and rarely on the post-inflammatory. This state of affairs has developed due to the relative decrease of the later in recent years in developed societies. Thus, most
i
of the recent literature on post-inflammatory urethral strictures is found in medical journals which are poorly distributed to medical libraries. This compounds the difficulties of a serious study on this subject on a comparative basis with other developing countries where this problem is still commonly encountered.

TRIBAL INCIDENCE:

The tribal incidence of all strictures (TABLE 3), shows the expected majority occurring in the major tribes, except in the case of the Kamba who surpass the Luos and Luhyas. This feature also applies in the post-inflammatory strictures (FIG.5). This may be explained by the proximity of Kamba land to Nairobi or that they actually have a higher incidence of post inflammatory urethral strictures. Other factors like tribal moral attitudes and differences in culture have to be considered. This finding may need further studies as the small numbers of patients used in this study may not be statistically significant. The Baganda of Uganda, who have a very high incidence of post-gonococcal urethral strictures (Bennett, 1964) are reported to have a tribal custom which considers the acquisition of gonococcal urethritis as a manly achievement, with no associated social taboo. A retrospective study covering a number of years may provide reliable figures regarding the tribal distribution of the disease in Kenya.

CLINICAL MANIFESTATIONS (TABLE 4)

Diminution of the urinary stream is usually the first symptom of a urethral stricture. It is usually accompanied by dribbling due to the fact that the last few drops of urine which are within

the urethral canal under the influence of the tightening stricture later escape into the patient's clothing under the influence of gravity. 32.5% of the patients in this series presented with those complaints in the above order. Only 3 patients out of the total of seventy seven came with a complaint of dribbling primarily but were subsequently found to have a weak stream of urine. Frequency of micturition, both diurnal and nocturnal develop because of associated prostatitis (Blandy, 1976). A persistent urinary discharge or gleet, occasional haematuria, and the presence of burning pain on micturition all signify the presence of chronic urethritis. 59.7% of my patients presented with retention of urine. Acute congestion at the site of stricture or at the bladder neck may cause acute retention of urine. Sometimes the urinary obstruction leads to chronic retention with overflow incontinence. In the presence of an advanced stricture the obliteration of the meshes of the corpus spongiosum and corpora cavernosa by fibrous tissue may lead to impotence. This aspect of urethral stricture was not considered in this study.

On physical examination, a hard nodule maybe palpated along the course of the urethra. This is due to the fibrous tissue mass which involves the corpus spongiosum and Buck's fascia. Occasiona
/ a frank periurethral abscess maybe present. There maybe signs of epididimorchitis. Prostatic abnormal}tis are common, the gland being

either tender and enlarged from prostatitis or small and hard from fibrosis. The scrotum and perineum may be gangrenous from urinary extravasation, or hard and thick from lymphoedema (Weston, P.A.M. 1961). Multiple fistulous openings may be present in the perineum. 2 patients of the total of seventy seven in, this study suffered from multiple fistulae in the perineum (water-can perineum). The above important aspects of the physical examination were not considered fully in this study due to the difficulties encountered in the form of scanty clinical notes specially in out-patient clinics and my inability to meet many of the outpatients and examine them physically.

INVESTIGATIONS:

In 48 patients who had urinalysis and culture done. There was negative growth in 38 patients (79.2%). The remaining patients grew various organisms all gram negative (TABLE 5). No neisseria gonococci were grown. This is due to the fact that at the stage of stricture formation, the original gonococcal infection had already subsided spontaneously in most patients. Moreover, neisseria needs special culture techniques which are not routinely done except for acute cases of urethritis and if specifically requested by the Doctor. Most of these patients subsequently develop urinary tract infection from stasis of urine (residual urine) and repeated catheterizations and passage of sounds which may not be done under the best aseptic techniques.

- These procedures are usually done by busy Casualty Officers, Interns or even Clinical Officers who may be too busy or tired to adhere to the accepted methods of doing this procedure. The incidence of urinary infection is most probably higher than the 20.8 per cent found in this series, specially in patients who come for regular passage of sounds in the minor theatre at the surgical outpatient clinic.

Blood urea nitrogen was estimated in 49 patients. 34 patients (69.2%) had values within the normal range; fifteen patients (30.8%) had elevated values (TABLE 6). This is similar to the study done in Lagos University Teaching Hospital about a decade ago in which they found a blood urea of more than 50mc/100mls in one third of the patients. This state of affairs develops due to back pressure and infection producing injurious effects on the upper urinary tract with the development of hydronephrosis, pyonephritis and finally, renal failure. Out of 18 patients who had intravenous pyelograms done in this study, only 3 patients (16.7%) had evidence of hydronephrosis and hydroureters. This investigation was done only for patients who had a raised urea level and preoperatively for patients awaiting urethroplasty or urethrotomy.

Specific diagnostic tests used in this study was instrumentation, done in all the patients and urethrography which was done in 14 per

cent of the patients. Maximal Urine Flow Test is another very useful test which was not used in this study. It is used mainly when the diagnosis is in doubt. A firm diagnosis of stricture can be made only by demonstrating a narrowing of the urethral calibre. This is most commonly done by the passage of an instrument which is either blocked or tightly grasped by the scar surrounding the urethra at the site of stricture. A suitable instrument for such diagnostic bouginage is a medium-sized Lister's sound. Metal sounds are commonly used in the Kenyatta National Hospital theatres. Passage of sounds is one of the commonest operations the surgical Senior House Officers and Registrars do. By the end of the three year M.Med Course, each Senior House Officer had usually done at least fifty passage of sounds. If a stricture is diagnosed thus and it can be managed by dilatation, urethrography is not done and the patient is advised to report for regular dilatations. In fact all patients are managed thus initially. 74% of the patients in this study were managed by dilatations alone.

Urethrography was done in 11 patients as mentioned above. 6 of them had urethrocystoscopy. As shown in TABLE 8, 5 strictures were in the penile urethra; 3 posterior urethra and 3 were multiple strictures. In the later, the posterior membranous urethra was

(46)

invariably affected. Making the posterior the commonest site for stricture formation. However, the numbers are too few to be statistically significant. Urethrography is especially valuable for gaining information concerning the length of a urethral stricture, of dilatation or diverticulum formation above a stricture, or of failure of the medium to pass a stricture. It also reveals dilated prostatic ducts in chronic prostatitis and especially in tuberculosis prostatic. It is valuable for determining the presence of contraction of the bladder neck. The one contraindication to its use is urethral haemorrhage. The medium employed is chosen with great care, for should there be a breach in the continuity of the lining membrane of the urethra, the medium will enter the circulation. For general purposes the most satisfactory medium is umbradil viscous V. This is a jelly which is squeezed from a tube into the butt end of a urethral syringe. It is injected easily and contains the local anaesthetic lignocaine. The injection is made most satisfactorily by employing the apparatus developed by Folke Knutten of Sweden.

. MANAGEMENT:

Most of us were trained to believe that "once a stricture always a stricture". Gentle dilatation of the urethra is the first practical lesson in dealing with urethral stricture, (Blandy, 1975).

All strictures should be dilated initially and those relieved require no further treatment, (Devine, 1978). However, recently the trend is to offer more patients urethroplasty than was previously the practice. Blandy argues that over the last two decades techniques of urethroplasty have been devised so diversely that almost any stricture can now be offered a permanent cure.

1) URETHRAL DILATATION: 72.7% of the patients in this study were offered dilatation alone. This procedure is also diagnostic so that both procedures were combined during the initial instrumentation of the patient to confirm the diagnosis. Actually it is during urethral dilatation that a decision is made as to whether the patient will need further management keeping in mind other factor like the age of the patient. Strictures in sites other than the membranous urethra are amendable to dilatation in most cases.' To summarise, the method of treating a particular stricture depends upon many factors including:-

- a) the age and general condition of the patient

(48)

- b) the aetiological factor
- c) the site
- d) the response to conservative therapy
(urethral dilatation).

Intermittent dilatation is usually performed by passing plastic bougies, with or without the use of a leading filiform, which may be passed

- a) by manipulation
- b) by the "faggot" method; or
- c) under direct vision, using a urethroscope.

The aim of dilatation should be to dilate the stricture with the minimum of trauma and discomfort. Most strictures dilated at the Kenyatta National Hospital often come at a late stage where the use of metal sounds is required. Local anaesthetic in the form of a jelly injected into the urethra is used when available; occasionally general anaesthesia is required with difficult strictures. The strictured area is in the bulb, help in passing a metal sound can be obtained by placing the patient in the lithotomy position and inserting the index finger of the left hand into the anus in order to guide the sound through the strictures into the bladder; an assistant holding the

(49)

• shaft of the penis over the sound. The major hazards following dilatation are:-

- a) the creation of false passages
- b) the occurrence of bacteraemic shock
- c) Haemorrhage
- d) post-dilatation retention of urine, occasionally.

Other long-term complications from intermittent dilatation like pyelonephritis, stone formation, diverticulae etc. were not considered in this study due to the incomplete investigations done for these patients in most cases.

2) INTERNAL URETHROTOMY

This form of treatment was first used by the french surgeon Ledran. It was introduced in the «lghteenth . century, the urethrotome taking the form of a lancellated catheter. This procedure is now having a resurgency of popularity due to the devleopment of a direct vision instrument, although, following urethrotomy, intermittent dilatation is still required. In the 1960s Sachse published his experience with the visual urethrotome (German literature). A variety of closed and open techniques now exist for treatment of urethral stricture disease. Blind urethrotomy has a failure rate of 30-40% (Katz, 1971). A success rate of 93% has been reported with direct vision internal urethrotomy

with a Cold knife (Walther, 1980). The later is a relatively new technique described in the European literature in the late sixties. Only 4% of my patients were offered internal urethrotomy and they are doing well with no recurrence although they attend for regular intermittent dilatation of the urethra. Sacknoff & Kerr (1980) have reported a success rate of 71% with the technique done under vision. Unsatisfactory results were noted in patients with multiple strictures more than 2cm long. The technique although precise and simple, may produce such serious complications as haemorrhage, extravasation, priapism, impotence and penile pain. When carefully performed the procedure is highly useful for the primary management of any urethral stricture. Direct vision cold knife urethrotomy should be exercised as a therapeutic trial before final decision to form definitive urethroplasty. If severe stricture formation recurs within 6 months, requiring repeated urethrotomy, reconstructive urethroplasty is recommended, (Sacknoff, 1980).

For best results, the incision must be done in the twelve O'clock position with division of full thickness of the stricture. This is then dilated to size 30F and an indwelling catheter of size 24F is left for 4-6 weeks.

Hospital costs continue to increase and doctors are under

(51)

relentless pressure to help reduce these costs. Direct vision urethrotomy which could be done under both local and general anaesthesia, would go a long way to help in this direction.

3. URETHROPLASTY

Before any surgical repair is done on the urethra, any infection in the perineum or abscess must be widely drained until infection and inflammation resolve. Meanwhile the urine is diverted by a suprapubic cystostomy. The use of plastic procedures is determined by:-

- a) Age of the patient
- b) The frequency with which dilatation is required
- c) The frequency of bacteremia and bacteraemic shock after dilatation.
- d) The presence of complications such as fistulae,
(Blandy et al 1968).

The results of reconstructive surgery can be expected to be better when the stricture has been caused by injury other than infection because in the former the remaining urethra is normal both in calibre and structure whereas the precise extent of post-inflammatory stricture maybe very difficult to determine. The surgeons who have made major contributions to reconstructive urethral

•surgery include Denis Browne, Turner-Warwick, Swinney, Johanson, and Blandy. Particularly with regard to the repair and reconstruction of strictures in and above the membranous urethra, the chief point of disagreement lies between the protagonists of one and two-stage reconstructive procedures.

At the time of this study, the method preferred by the urology surgeons at Kenyatta National Hospital was the two-stage procedure. 23.3% of my patients were subjected to this form of treatment. The disadvantages of this procedure is the inevitable delay between the two stages of several months, during the whole of which the patient must micturate sitting down through what is in reality a perineal urethrostomy. However, it has one significant advantage; i.e. after the first stage is completed and the scrotal flap has been sutured to the floor of the divided urethra, examination at intervals of two to three months enables the surgeon to determine that the whole of the strictured area has been excised and that the second stage will, therefore, be successful.

The one-stage island patch technique has been particularly advocated by Blandy (Blandy et al 1968, 1971, 1975, 1976, Symes and Blandy 1973). In this operation the floor of the strictured area is excised along its whole length upto the level of the venjmontanum

(53)

and immediately replaced by a patch of scrotal skin which is obtained from the tip of a scrotal flap that has been raised to expose the urethra. This ellipse of skin relies for its blood supply on its attachment to the dartos muscle, an attachment that is carefully maintained once the patch has been separated from the main flap. Since starting this type of operation Blandy has performed hundreds of urethroplasties with minor modifications. The main complications experienced from this technique are hair-ball formation in the redundant pouch of urethra, and it is sometimes necessary to trim away some of the surplus pouch at a second stage operation. Another symptom is a feeling of "wetness" in the scrotum. This seems to be related to preservation of the sensory supply of the patch of scrotal skin which, lying in the lumen of the urethra, is kept moist.

The Americans have used the one-stage procedure also in a different way. A free full thickness skin graft urethroplasty is done. After more than 20 years of success with this technique, the authors recommend its use strongly[^] (Devine et al, 1979). The authors obtained an autograft from the penile skin as a rule. They claim its accessibility, thinness, softness, pliability, toughness, hairlessness and abundance make it the ideal graft for urethroplasty.

In circumcised patients, split thickness skin graft is used to cover the shaft of the penis. Their operative approach is perineal; but division of the pubic bone is done in difficult posterior strictures. Minor modifications to this technique depending on the nature of the stricture are used. Patch graft alone, excision approximation and patch graft (FIG. 8) and tube graft are in common use. The authors claim when they are properly prepared and handled, free full thickness skin grafts are promptly revascularized from the underlying tissues and, when mature, attach firmly to the surrounding normal urethra and grow normally with little contracture.

RECURRENCE:

It is very difficult to assess the occurrence rate in this study due to the shortness of the period of study (one year). However, all of the 56 patients followed up during that year with intermittent dilatations did not need any other form of treatment. Since 2-stage urethroplasty offers permanent cure in 90 per cent of cases, with arrest and reversal of obstructive complications and cessation of further instrumentation, any young patient requiring dilatation 3 or 4 times per annum should be offered this procedure (Devereux, 1970). Other indications of stopping dilatations and offering surgery are as listed by Blandy et al (1968), namely the presence of fistulae or

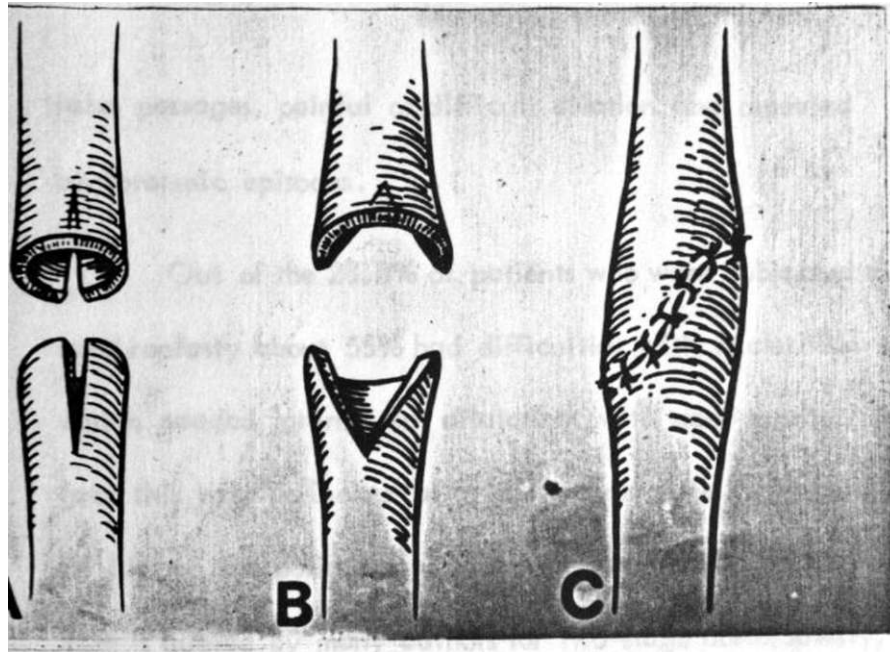


FIG.8a
EXCISION APPROXIMATION. OF.URETHRAL STRICTURE (AFTER DEVINE)

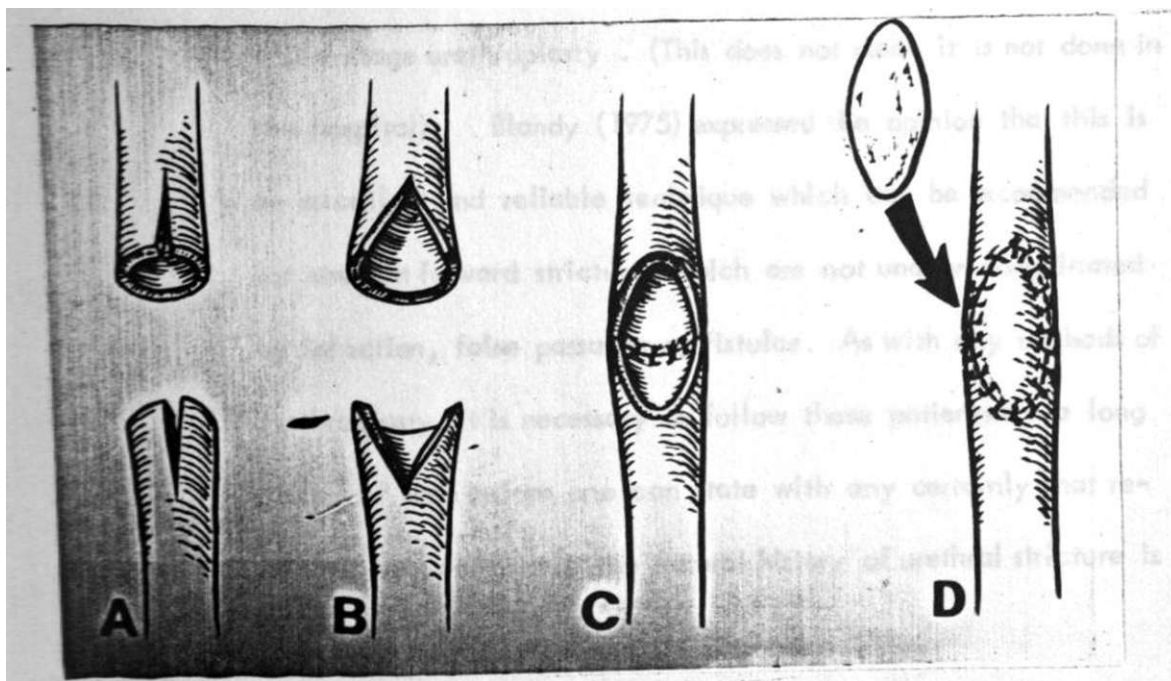


FIG.8b.
EXCISION APPROXIMATION AND PATCH GRAFT OF URETHRAL STRICTURE
(AFTER DEVINE)

false passages, painful or difficult dilation and repeated bacteraemic episodes.

Out of the 23.3% of patients who were subjected to urethroplasty about 55% had difficulties with micturition which needed intermittent dilatations with good results. In fact this may be looked at as a fair out-come as the quality of life of the patients was very much improved. A 90% success rate is quoted by many authors for two-stage urethroplasty, but this usually involves a large series of patients extending over many years. The 45% success rate in this series is not statistically significant due to the small number and the difficulties of data collection and follow up mentioned, earlier.

There are no patients in this series who were subjected to a one-stage urethroplasty. (This does not mean it is not done in this hospital). Blandy (1975) expressed the opinion that this is an excellent and reliable technique which can be recommended for straight forward strictures which are not unduly complicated by infection, false passages or fistulae. As with any methods of urethroplasty, it is necessary to follow these patients for a long period of time before one can state with any certainty that restenosis will not occur the natural history of urethral stricture is

measured in decades, not in months.

All the patients who had internal urethrotomies are still being followed up with intermittent urethral dilatations. The fact that this procedure could be done under topical anaesthesia (Walther, 1980) with excellent results raises the question: Would internal urethrotomy done in this way be better than dilatation?

As Weaver et al (1962) demonstrated in their fine experimental work, failure to maintain the urethral diameter during the healing stages in the form of stenting by urethral catheterization, will lead to recurrence of stricture. > It is recommended that patients wear an indwelling catheter for 4-6 weeks after deep internal urethrotomy of a dense stricture (Devine et al 1980) if recurrence is to be avoided or minimized.

CONCLUSIONS:

Post-inflammatory urethral strictures are still the commonest, in contrast to post-traumatic and iatrogenic strictures. However, there has been a significant decline in the former and an increase in the later during the last two decades. In fact this trend applies to most developing countries. In my opinion, this is a direct reflection on the improved health services and development in general.

Lapse-period in post-inflammatory strictures was found to be 5 years on the average. Omo- Dare (1966) reported a lapse period of 18 years in a Nigerian study. In spite of possible statistical errors and insignificance, a geographical or regional difference in the pathogenesis of the disease cannot be dismissed at this stage. A retrospective study in Kenya covering a number of years would clarify this matter.

The majority of the patients (60%) presented with retention of urine. Proper health Education will go a long way in making patients to present to Hospital in the early stages of weak urinary flow, if not, the treatment of the infective condition itself. Patients with previous trauma to the urethra need careful follow-up with intermittent instrumentation,if required.

With the increasing numbers of resistant gonoccal infections these days, the possibility of a patient harbouring the organisms at the time of stricture formation is always a possibility, although remote. Specific cultures for gonococci are necessary to isolate the strain and treat accordingly. If this is not done, surgical efforts may be in¹ vain.

Intermittent dilatation remains the most effective treatment for the early stages of this condition. However, considering factors like poor attendance due to the patient's ignorance of the gravity of the condition and other socio-economic factors, I would suggest more use of the direct vision urethrotomy in all suitable strictures. This would go a long way in reducing hospital costs and offer the patients a chance of complete cure with fewer intermittent dilatations post-operative.

The one-stage urethroplasty as practised by Blandy and Singh in Britain and Devine and Devine in the United States has attracted a lot of attention recently. They have produced unquestionably good results in the last two decades with their slightly different techniques. This operation is very suitable for short strictures especially post-traumatic. Considering the increasing number of the later patients in direct proportion to our development one-[^]stage scrotal flap or Island

(60)

patch urethroplasty would most probably reduce morbidity and hospital costs in this condition. Of course, it should be kept in mind that not all types of strictures are amendable to this type of treatment.

I must stress at this point that this work has a number of shortcomings. With my inexperience, errors in data collection and analysis are likely. Nevertheless, an effort was made to produce results reflecting the actual situation of the disease as seen today at the Kenyatta National Hospital. The author takes full responsibility for any mistakes in this work. The fact that post-prostatectomy strictures and congenital strictures were excluded deliberately automatically disqualifies the study as being representative of all urethral strictures seen at the time of study.

ACKNOWLEDGEMENTS:

As with all types of work of this magnitude, considerable assistance was given.

My sincere thanks go to my supervisor, Mr. J.S. Oliech, FRCS for his guidance and assistance during the entire period of study and preparing the manuscript. His patience in reading and criticizing the manuscript has been particularly appreciated. Remembered also, is his encouragement during those initial critical moments when every student is uncertain about the subject to write on.

The Medical Illustration department gave considerable assistance and suggestions on the figures and histograms. Mr. Caleb Amoro of the Radiology Department gave much needed help with photography of radiographs and other illustrations. He also offered useful advice on the format of the final pictures.

Needless to say, the Medical Librarians, Medical Records Clerks, Nurses in the various wards and clinics offered help for which I am sincerely grateful.

(62)

i

Finally it gives me great pleasure to thank my sponsors DAAD for everything they have done towards my training. I would also like to express my gratitude for the patience and untiring secretarial help rendered by Susan Thuo.

R E F E R E N C E S

- WESTON, P.A.M.: Pathology and treatment of Urethral stricture and its complications in Jamaica. Annals of the Royal College of Surgeons of England: 28:203,1961.
- ONGOM, V.L., et al: Social Background of Venereal Diseases In Kasangatl (UGANDA} E.Afr.Med.J., 48,367, 1977.
- BENNET, F.J.: Gonorrhoea. Annual pattern of transmission E.Afr.Med.J., 41.163, 1964.
- OMO-DARE, P.: Urethral strictures in Nigeria (from Tropical Surgery, Edit. Seymor, 1,Schwartz, McGraw-Hill inc. 1971.)
- WEAVER, R.G. et al,: Experimental and clinical studies of urethral Regeneration Surg., Gyn, Obst. 115:729, 1962.

(64)

LEADBETTER,G.W. AND : Urethral strictures in children,
LEADBETTER, W.F. : ^{^ ^} of Urolog^{^ ^ ^ ^}
(1962).

SINGH, M. and BLANDY, J.P.: The pathology of urethral strictures.
Journal of Urology, 115:673, 1976.

BLANDY, J.P. et al : Urethroplasty by Scrotal Flap for
long urethral strictures.
Brit. J. Urology (1968) 40,261-267.

" Urethroplasty in context
Brit. J. Urol. (1976) 48,697-701.

" The results and complications of
scrotal flap urethroplasty for strictures.
Brit.J. Urol. (1971) 43,52-57.

" The technique and results of one-
stage Island patch urethroplasty.
Brit. J. Urol. (1975) 47, 83-87.

12. SYMES, J.M. AND BLANDY, J.P. : tuberculosis of the male urethra
Brit. J. Urol. (1973) 45, 432-436.
13. SMIDDY, F.G. : Tutorials in Surgery 2.
Pitman Medical, 1979.
14. RINTOUL, R.F. : Farquharson's Textbook of operative
Surgery.
Churchill Livingstone, 1978.
15. DEVINE, P.C. et al : Free full-thickness skin graft
urethroplasty, J.Urol. 116:444, 1976.
16. DEVINE, P.C. DEVINE, C.J. : Urethral stricture. (In current trends
in Urology Editor M.I. Resnik.
Vol. 1.
17. " : Urethral-strictures (Guest editorial)
J.Urol, 123; 506, 1980..
18. " : Free full-thickness skin graft
urethroplasty: current technique.
J.Urol, 121, 282-285, 1979.
19. DEVEREUX, M.H. et al : Prolonged follow-up of Urethral
strictures treated by intermittent
dilatation.
Brit. J. Urol. (1970) 42, 321-329.
20. WALTHER, P.C. et al : Direct Vision internal urethrotomy
in the management of urethral
strictures.
J.Urol. 123, 497-499, 1980.
21. KATZ, A.S. AND WATERHOUSE, K. : Treatment of strictures in men by
internal urethrotomy. A study of 61
patients.
J.Urol., 105: 807, 1971.

(66)

22. SACKNOFF, E.J. : Direct Vision cold knife urethrotomy.
WALTER, S.K. J.Urol. 123, 492-495, 1980.
23. KIRCHHEIM, et al : Transurethral urethrotomy under
Vision.
J.Urol, 119:496-499, 1978.
24. OLIECH, J.S. : Indwelling catheters and catheter
induced infections.
Proceedings of the Association of
Surgeons of East Africa.
237-238, Vol.5, 1982.