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## OUTCOME OF URETHROPLASTY FOR URETHRAL STRICTURE AT JOS UNIVERSITY TEACHING HOSPITAL.

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### ABSTRACT

**Background:** The treatment of urethral stricture disease has remained a challenge over the years. The outcome has also been varied, with recurrent stricture being a major concern. We determined the outcome of urethroplasty with particular reference to the complications.

**Methodology:** This was a retrospective study over 10 years (1995 to 2005) done at the Jos University Teaching Hospital, a tertiary health institution in the middle belt region of Nigeria.

**Results:** There were a total of 32 patients whose ages ranged from 0.06 to 75 years (mean 25yrs, SD 18.8yrs.). Eleven patients had had one form of stricture treatment or the other. Stricture aetiology was traumatic in 21 (66%) and inflammatory in 6(19%) patients. Of the 24 patients in whom the stricture length at operation was specified, six, 11 and seven were <2cm, 2-4cm and >4cm respectively. The stricture was located in the anterior urethra in 18(58.1%), posterior urethra in 2(6.4%) and bulbomembranous in 11(35.5%) of patients (unspecified in one). The bulbar urethra was the single most involved region, occurring in 12(38.7%) patients. Resection and end to end anastomosis was done in 16 patients and replacement urethroplasty in 16 others (Quarveys in 12, Swinney in 3 and Orandi in 1). Complications observed were urinary tract infection in 12(37.5%) patients, recurrent stricture 11(34.4%) wound infection 10(31.3%), oedema of genitalia 7(21.9%), urethrocutaneous fistula 4(12.5%), impotence 3(9.4%), wound haematoma 2(6.3%) and urinary incontinence in 1(3.1%) patient(s).

**Conclusion:** Urinary tract infection, recurrence of the stricture and wound infection remain our major challenges. We recommend that in order to improve outcome, surgeons should regularly audit their practice and make necessary adjustments. In addition, urethroplasty should preferably be carried out by those with the cognate experience, while not compromising the need to teach younger colleagues.

**Keywords:** urethroplasty, outcome, urethra, stricture

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### INTRODUCTION

The treatment of urethral stricture disease has remained a challenge over the years. The methods of treatment include dilatation, urethrotomy and urethroplasty. Urethroplasty may be either by resection and end to end anastomosis or as replacement urethroplasty. Various sources of the new urethra exist and these include skin, particularly penile skin. Buccal mucosa has been found useful in urethral replacement<sup>1</sup> and is gaining wide popularity for urethral replacement, although many centres are still not conversant with its use. Other sources include bladder mucosa and the tunica vaginalis. Replacement could be as a free or pedicled graft and the graft could be tubularised or used as an onlay graft.

A major complication that could occur following

urethroplasty is recurrence of the stricture. The factors responsible for such vary widely and may be related to surgeon factors (experience, ability), access difficulties particularly for posterior strictures and stricture characteristics (aetiology, site and length). Restricture in the initial periods following surgery is usually due to improper selection of cases or poor technique<sup>2</sup>. This problem may be compounded if there is fibrosis and impaired vascularity as a consequence of stricture aetiology (infective, ischaemic) or following multiple previous urethroplasties. The type of treatment also impacts on outcome in terms of restricture or success rates. Restricture rates are usually higher following substitution rather than anastomotic urethroplasty, Andrich et al reporting rates of 12%, 13%, 14% and 21%, 31%, and 58% at 5, 10, and 15 years for anastomotic and substitution urethroplasties respectively<sup>3</sup>.

In many developing communities as in our centre, inflammatory strictures are still common, as opposed

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To the developed world where post-gonococcal strictures have become rare. Studies in South-Eastern Nigeria buttress this fact with 48.5% of strictures due to infection<sup>4</sup>, though this was higher compared to a rate of 36.1% in an earlier study in the same region<sup>5</sup>. These strictures tend to be long, multiple and more associated with impaired vascularity and extensive spongiositis. Treatment of such strictures may thus be associated with more complications such as fistulation and recurrence. In South Eastern Nigeria, Nwofor and Ugezu<sup>4</sup> found a recurrence and overall complication rates of 16.7% and 25% respectively in 62 patients while Aghaji and Odoemene<sup>5</sup> found a recurrence rate of 10.4% in 144 patients. In Western Nigeria, there was a recurrence of 2/16(12.5 %), although this study was in children with post-traumatic strictures<sup>6</sup>. Osegbe in Southern Nigeria (Lagos) judged his outcome as excellent in 85% and very fair in 15% of 20 patients who had one stage urethroplasty for complicated strictures<sup>7</sup>.

Other complications that could occur following urethroplasty include wound infection, urinary tract infection, flap necrosis, wound haematoma, penile and/or scrotal oedema, erectile dysfunction and urinary incontinence. Restricture, however, is of paramount importance as success rate diminishes with each subsequent repair<sup>2, 8</sup>, and surgery is also more difficult. This has necessitated the emphasis on this particular complication in this paper.

This study therefore aimed to determine the outcome of urethroplasty in the middle belt region of Nigeria with particular reference to restricture and other complications.

## METHODOLOGY

**Study Area:** This is a retrospective study at the Urology unit of the Department of Surgery of the Jos University Teaching Hospital. This hospital is a tertiary health institution located in the middle belt region of Nigeria.

**Method:** Records of patients who had urethroplasty over 10 years (1995 to 2005) were obtained from the operation register; and those with evaluable information were included. All patients were clinically evaluated at the surgical outpatient unit of the hospital. The diagnosis of urethral stricture was confirmed by a combination of urethrography and urethroscopy. Other imaging investigations included an ultrasound scan of the kidneys, ureters and urinary bladder. Renal function was assessed by estimating the serum creatinine, urea and electrolytes. Other basic investigations including grouping and cross matching of blood, haematocrit determination, blood sugar estimation and urinalysis

were done to prepare the patients for surgery. Urinary tract infections were treated according to sensitivity results before surgery. Procedures were carried out under spinal or general anaesthesia. Some patients were converted to general anaesthesia from spinal in prolonged cases. The type of urethroplasty performed depended on the findings at surgery and the experience and preference of the surgeon, but included resection and end to end anastomosis and replacement by various methods. (Quarteys, Swinney, Orandi). Quarteys urethroplasty involved a one stage procedure in which a vascularised transverse distal penile/preputial island flap is rotated towards the zone of urethral replacement either in the form of a flap or a tube and sutured. The Orandi procedure, also a one stage procedure involved raising a ventral penile skin island on a subcutaneous vascular pedicle and rotating it inward and suturing as an onlay to augment urethral calibre. In Swinney urethroplasty, the first stage involved laying open the urethra from end to end. In the second stage six to 12 months later, buried skin or full thickness skin was used to reconstitute the urethra.

**Outcome Indices:** Data obtained were information regarding personal data, stricture aetiology and characteristics, type of surgery and the presence or otherwise of complications.

**Statistical Analysis:** The data was subsequently analysed using Epi-info 2004 version 3.2.2 to obtain percentages, means and median.

## RESULTS

There were a total of 32 patients whose ages ranged from 0.06 to 75 years (mean 25yrs, SD 18.8yrs, Fig I). Eleven patients had had one form of stricture treatment or the other while 21 had never had stricture treatment of any sort. Stricture aetiology was traumatic in 21 (66%) and inflammatory in 6(19%) patients (Fig II). Of the 24 patients in whom the stricture length at operation was specified, six, 11 and seven were <2cm, 2-4cm and >4cm respectively. The stricture was located in the anterior urethra in 18(58.1%), posterior urethra in 2(6.4%) and bulbomembranous in 11(35.5%) patients (unspecified in one). The bulbar urethra was the single most involved region, occurring in 12(38.7%) patients (table I). Resection and end to end anastomosis was done in 16 patients and replacement urethroplasty in 16 others (Quarteys in 12, Swinney in 3 and Orandi in 1). Graft source was penile skin in 18(94.7%) and scrotal skin in one (5.3%) patient(s). Complications observed were mainly urinary tract infection in 12(37.5%) patients, recurrent stricture in 11(34.4%) patients at a mean follow up of 12 months and wound infection in 10(31.3%) patients (Fig III).

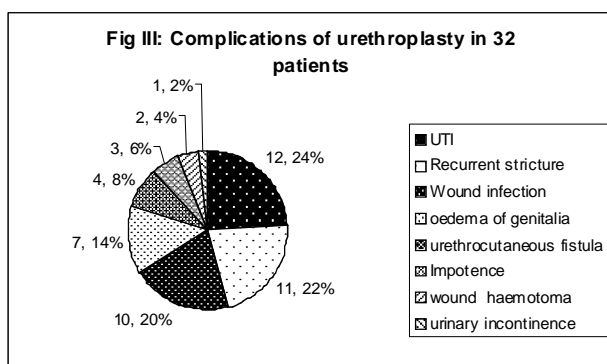
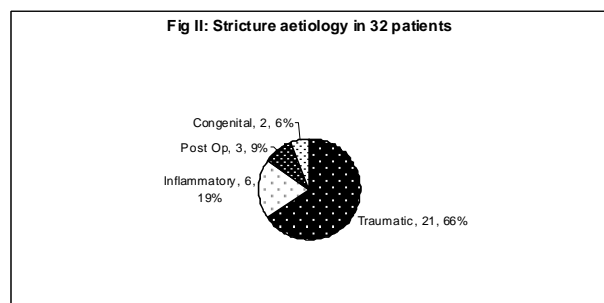
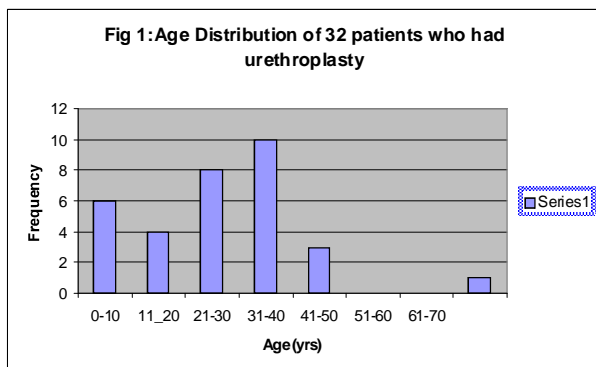


Table I: Urethral Stricture Location in 31 Patients.

Stricture Location	Frequency	% of Total
<b>Anterior</b>		
Bulbar	12	38.7
Glanular	2	6.4
Meatal	2	6.4
Penile	1	3.3
Penobular	1	3.3
Sub total	18	58.1
<b>Posterior</b>		
Membranous	2	6.4
Pro static	0	0
Sub total	2	6.4
<b>Combined</b>		
Bulbomembranous	11	35.5
<b>Total</b>	31*	100

\*Unspecified in 1 patient

## DISCUSSION

Our major interest was to find out the outcome of urethroplasty for urethral stricture and our study shows that urinary tract infection (UTI), recurrence of the stricture and wound infection remain our major challenges, occurring in 37.5%, 34.4% and 31.3% of patients respectively.

UTI should usually be treated before embarking on urethroplasty, which is the practice in our centre. This will amongst other measures reduce the incidence of post operative UTI which is capable of contributing to morbidity and particularly to failure of repair. Eradicating bacteriuria is, however, very difficult as these patients are usually on suprapubic catheters. Symptomatic infection must, however, be treated, and bacteriuria treated with caution. In the presence of asymptomatic bacteriuria, it must be ensured that the patient's catheter was recently changed and that appropriate antibiotics are administered before embarking on urethroplasty. Any UTI or wound infection developing must be vigorously treated. This is especially so as to avoid a breakdown of the repair especially as the first surgery is usually the best chance of ensuring a patent urethra, as recurrence of stricture has been shown to be directly related to the number of previous procedures, particularly previous urethroplasty<sup>2,8</sup>.

The recurrence rate of 34.4% observed in our study is high as compared with general recurrence rates of 16.7%<sup>4</sup> (although only 12 patients had urethroplasty in this study) and 10.4%<sup>5</sup> in South Eastern Nigeria. In Western Nigeria (Ibadan)<sup>6</sup>, there was a recurrence of 2/16 (12.5%), although this study was in children with post-traumatic strictures, and again only 16 patients had urethroplasty. Osegbe in Southern Nigeria (Lagos) judged his outcome as excellent in 85% and very fair in 15% of 20 patients who had one stage urethroplasty for complicated strictures<sup>7</sup>. Mundy in UK has a general recurrence of 10%, though this was in patients who had bulboprostatic anastomosis only<sup>9</sup>. Hermanowicz however reported a re-stricture rate of 52.4% in 287 patients<sup>10</sup> while de Jong had a re-stricture rate of 67.9%<sup>11</sup>.

The factors that could influence the re-stricture rate are numerous. Mundy<sup>12</sup> has found out that a failed previous urethroplasty impacts negatively on the outcome. Roehrborn and McConell<sup>13</sup> similarly found that previous failed urethroplasty impacted more negatively on outcome than any other variable, with 42% of re-operative urethroplasties yielding unsatisfactory results following one stage urethroplasty at a mean of 24.6 months. Wadhwa *et al*<sup>2</sup> also had the same finding with re-stricture rate of 5% in those that had 1 previous repair, jumping to 66.6% in those that had 2 previous open procedures, after one to five years of follow up in patients with

Obliterative posttraumatic posterior urethral strictures. Barbagli *et al*<sup>14</sup> at a mean follow up of 57 months reported no recurrence in 20 patients studied with recurrent strictures, although 60% and 40% were reported as excellent(normal urethrography, uroflowmetry >14ml per second, negative urine culture) and satisfying(radiological evidence of mild narrowing, uroflowmetry of 10 to 14ml per second, urinary tract infection and/or persistent perineal urethrostomy) respectively. This study, however, was only in patients with penile and bulbar strictures. Webster *et al*,<sup>15</sup> reported a 5% restructure rate following redo urethroplasty for post traumatic posterior urethral stricture. Jenkins *et al*<sup>16</sup> reported a 20% restructure rate at a mean follow up of 8 years following one or two stage skin on lay urethroplasty. The restructure rate in our series calls for a closer audit (which we have commenced) as the factors responsible for failure after urethroplasty vary widely and may be related to surgeon factors(experience, ability), access difficulties particularly for posterior strictures and stricture characteristics(aetiology, site and length). Restructure in the initial periods following surgery is usually due to improper selection of cases or poor technique<sup>2</sup>. Mundy has also asserted that recurrence occurring early after urethroplasty may be due to ischaemic damage<sup>9</sup>. In his series, 70% of those who restricted did so in three months, generally three weeks and all patients who restricted were impotent, thus supporting the assertion that restructure is due to ischaemia as ischaemia is associated with impotence. Also, most failures following end to end urethroplasty may primarily be due to inadequate excision of fibrosis and/or inadequate distal bulbar mobilization, resulting in excessive anastomotic tension, as Morey and co-workers have found out<sup>17</sup>. Seven (21.9%) of our patients developed oedema of the external genitalia which all settled on conservative management. The penis was more involved in oedema in our series. This is consequent upon the extensive dissection involved in mobilizing the penile urethra in order to achieve a tension free end to end urethral anastomosis. Dissection should, however, be done only as far as is necessary to avoid devascularisation of the urethra thus endangering the success of the operation due to ischaemic damage. Long strictures should therefore be preferably treated by substitution methods. Urethrocutaneous fistula developed in 12.5% of our patients. Ideally, a pericatheter urethrogram should be obtained to ensure that the repair has healed without any signs of extravasation before the urethral catheter is removed<sup>9</sup>. This is, however not the case in our setting as most of our patients cannot afford this rather expensive test. Fortunately, the

fistulae will usually close spontaneously after a period of suprapubic drainage<sup>18</sup>, as was the case with all our patients.

Three of our patients had erectile dysfunction(ED). It was difficult to determine, as is usually the case whether this resulted from the cause of the stricture or the surgery. Urethral injury may be associated with ED due to either direct injury or to ischaemic injury consequent upon the attendant dissection at surgery. Although some authors deny that urethral surgery especially transperineal bulboprostatic anastomosis does run the risk of impotence<sup>19</sup>, others accept it. In Mundy's experience, 20% of patients have temporary impotence after a urethroplasty of any sort, while 5 or 6 % have permanent impotence as a consequence of their surgery<sup>9,20</sup>. Which ever is the case, surgeons are urged to be very cautious while dissecting around the membranous urethra.

Urinary incontinence occurred in one (3.1%) of our patients. In trauma related cases, it has been asserted that most patients have lost their urethral sphincter mechanism as a consequence of injury and will therefore have urgency with a full bladder and may have stress incontinence, symptoms which, however, lessen with time<sup>9</sup>.

We conclude that urinary tract infection (UTI), recurrence of the stricture and wound infection remain our major challenges. We recommend that in order to improve outcome, surgeons should regularly audit their practice and make necessary adjustments. In addition, urethroplasty should preferably be carried out by those with the cognate experience, while not compromising the need to teach younger colleagues.

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