Urethroplasty for strictures in Nigerian children

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ABSTRACT

Background/Objective: To review the outcome of urethroplasty performed for urethral strictures in children at the University College Hospital, Ibadan, Nigeria, highlighting the difficulties that may hamper successful outcome of reconstruction and suggesting factors that may enhance successful reconstruction.
Method: A retrospective study of 16 children who had urethroplasty performed for urethral strictures over a 5-year period.
Results: All the strictures were post- traumatic. There were no post-inflammatory strictures. Fourteen of the patients had patent anastomosis as demonstrated by the pericatheter urethrogram, and they were able to void satisfactorily thereafter. Two patients developed recurrent strictures that required surgical intervention.
Conclusion: Urethroplasty should be performed for urethral strictures in children as soon as they present in order to prevent complications such as urinary tract infections, urinary calculi and epididymoorchitis, which may complicate prolonged catheterization. The outcome of urethroplasty in children can be satisfactory if appropriate fine instruments and fine sutures are used.

Key words: Urethral strictures, Nigerian children

Introduction

Urethral stricture is not common in children, but where it occurs it is often post traumatic or iatrogenic.[1] The causative trauma is often in form of posterior urethral disruption following pelvic injuries or a fall-astride injury, where the bulbar urethra is often damaged. In five years, urethral reconstruction was performed in 16 children at the University College Hospital (UCH), Ibadan, Nigeria for urethral strictures. The details of technique of repair and the results are the subject of this report.

Materials and Methods

All children who were referred to the UCH, Ibadan, Nigeria between July 1994 and June 1999 with a diagnosis of urethral stricture were included in the study. All the patients had had initial management of the acute injury done elsewhere. None of the patients was treated in the acute phase in our unit. Initial management often consists of supra-pubic cystostomy or an attempt at urethral repair that was unsuccessful.

The history of the accident resulting in the injury was obtained from the parents and the patients where appropriate. The blood count,

serum electrolytes and urea as well as creatinine estimation were done in all cases. An ultrasound of the kidneys, ureters and the bladder was performed in all cases to assess the upper tracts. A retrograde urethrogram was done in all cases to define the location of the stricture, and a micturating cystourethrogram was also performed where the retrograde urethrogram was inadequate. Intravenous urogram was done selectively. Urine culture was done pre-operatively in all cases. The range of the period between injury and surgery is 2 months to 3 years, with a mean of 11 months.

The technique of repair varied depending on the location of the stricture. Those with bulbar strictures that resulted from a fall-astride injury had excision of the strictured segment with anastomosis of the normal ends of the urethra done. The bulbar urethra was exposed through a mid-line perineal incision. The bulbar urethra was then mobilized taking great precaution not to open into the cavernous tissue surrounding the bulbar urethra or the corpora cavernosa. The stricture was then excised and a spatulated anastomosis done over a size 8F or size10F Foley catheter using a 4/0 or 5/0 interrupted Vicryl suture. All the children with prostato-membranous or bulbo-membranous stricture had excision and end-to end anastomosis done.

The proximal bulbar urethra was exposed via a mid-line perineal skin incision while the bladder neck was exposed in the retro-pubic space through a mid-line infra-umbilical skin incision. The bulbar urethra is mobilized as described above. The bladder neck is then freed of any restricting adhesions between it and the retro-pubic space where necessary. The bladder is then opened between stay sutures and a curved (ante-grade) bougie is passed through the internal meatus to define the proximal end of the stricture.

Having defined both the proximal and the distal ends of the stricture, the stricture was then excised along with all the fibrous tissues at the apex of the prostate and the bladder neck. A spatulated anastomosis is then performed as described above over a splinting catheter. There was no need to perform either partial or total pubectomy in any of the patients.

In the post-operative period, the bladder was drained through a supra-pubic catheter and the urethral catheter was used as a splint only. The splint was left in place for two weeks. At the end of two weeks, a pericatheter urethrogram (pericathetergram) (2) was performed to outline the urethra and to check for any leakage at the site of anastomosis. If there is free flow of the contrast medium into the bladder, and there is no leakage at the site of the anastomosis, the urethral catheter was then removed and the supra-pubic catheter spigotted to allow the child to void through the urethra. Once the child can void adequately, the supra-pubic catheter is removed and the wound dressed. The stoma usually closes subsequently. When there is a leakage, the splint was left in place for another week before removal. No further radiological investigation was done.

Results

There were 16 children who had urethroplasty performed for urethral strictures during the period under review. The ages ranged between one year three months and ten years. The average age was 6 years. The cause of the urethral injury was a fall-astride injury in seven of the children, while nine children had urethral transection following pelvic bone fractures, resulting from vehicular accidents.

The strictures resulting from fall-astride injury were all located in the bulbar urethra, while those arising from pelvic fracture injury were located either at the prostato-membranous junction or the bulbo-membranous junction. The cause of injury was road traffic accident in 9 children and straddle injury in 7. The location of stricture was prostatomembranous in 9 and bulbar in 7 children. Some of the patients suffered additional injuries along with the urethral strictures. The additional injuries included pelvic bone fracture in 6 patients who were hit by vehicles, friction skin burn in one patient, and multiple perineal sinuses in one patient who had had an attempt at a perineal repair of a bulbar stricture elsewhere. Other associated abnormal features found after examination and investigations are shown in table 1.

Table 1: Associated abnormal findings in 16 children with urethral stricture

Associated abnormal findings	No. (n = 16)
Hydronephrosis/hydroureters	5
Epididymoorchitis	2
Bladder calculi	3
Urinary tract infections	9
Uraemia	1
Perineal fistulae(watering- can perineum)	1

Table 2: Postoperative complications following urethroplasty in children

Complications	No.	Outcome/treatment
Urethral catheter fell out on 6th postoperative day	1	Re-stenosis/re-exploration and repair
Persistent perineal wound infection	1	Recurrent stricture/re-exploration and repair
Epididymoorchitis	1	Resolved with antibiotics and anti-inflammatory drugs
Perineal fistula	4	3 fistulae healed with non-operative treatment and 1 was closed surgically

Micturation was good in 14 of the 16 patients, and they were shown to have patent anastomosis on pericatheter urethrogram. Two patients developed recurrent strictures and the probable reasons for the failures are shown in table 2. These two patients have had a re-exploration and repair with excellent results. In the post- operative period, six patients developed 4 types of complications as shown in table 4, along with the outcome and treatment.

All the patients were continent post operatively and in those who were old enough to be assessed, there was preservation of penile erection. Patients were followed up in the out patient clinic every three months, and a visual assessment of their urinary stream is done. Where there is a history of difficulty with voiding or where the urinary stream is considered to be inadequate, a urethrogram is obtained to further assess the urethra. The period of follow-up ranged between three months and four and a half years with a mean of fourteen months. There was no case of total or stress incontinence. Three fistulae healed spontaneously while the fourth one required surgical excision and closure.

Discussion

In the years under review, strictures in children were caused by trauma to the urethra. The trauma was in the form of rupture from pelvic fractures that resulted from vehicular accidents or fall from a height or crush of the bulbar urethra from a fall-astride injury.

There was no post-inflammatory stricture recorded in this series. The aetiology of strictures in children as shown in this report is at variance with previous reports in the adult population in this environment. In the adult population, post-inflammatory strictures arising from gonococcal and non-gonococcal urethritis are predominant, although recently a change in this pattern is being observed. [3]

Hitherto, little or no attention was paid to the management of these unfortunate children who sustained urethral strictures, mainly because of the heavy load of adult urological conditions. The consequence of this neglect is deterioration of kidney functions from upper tract obstruction and infections, bladder calculi formation from prolonged catheterisation and urine infections as shown by some of the patients in this report, and

genital tracts infections such as epididymo-orchitis which may have significant implication for fertility in the future for these children.

Urethroplasty in children is difficult in our environment. Several factors contribute to this difficulty. The urethra is quite narrow compared to that in adults; therefore instruments that are used have to be appropriate. Very fine instruments such as shown in figure 2 are required. It is also important to use very fine sutures such as 4/0, 5/0, and 6/0 suture sizes. Equally important are small size catheters, either as urethral splints or urethral stents. It is difficult to come by many of the conditions mentioned above in our environment, where adult consideration is often used in the purchase of instruments and appliances. The consequence is often that surgery in these children is performed by improvising adult (big) instruments.

The patients with bulbar urethral strictures which resulted from perineal injuries often have short segment stricture, and we prefer to excise the stricture and do end-to-end anastomosis as done by others. [4] The strictures proximal to the bulbar urethra were approached from both the retro-pubic space as well as the perineum. This approach facilitates exposure and also allows for precise excision of the 'haematoma fibrosis' that often tethers the bladder neck to the pubic bone following the original injury. [5] It also allows for precise guide of the curved bougie (antegrade bougie) through the bladder neck, which helps in ensuring that the distal urethra is anastomosed to the urinary tract and not to a false passage. All repairs were successfully accomplished without resorting to either partial or total pubectomy as suggested by some authors. [6, 7] However some other authors have also not found pubectomy necessary. [8]

In the post-operative period, stenting of the area of anastomosis is quite important and various methods have been used. [1] Accidental dislodgement of this stent prematurely often leads to recurrent stricture, as it happened in one of the patients in this series whose catheter fell off on the 6th post operative day.

Although potency is difficult to assess in children [9, 10] all our patients who could be assessed were able to maintain erection, particularly those that sustained prostato-membranous urethral injury. The result of urethroplasty in these children has given a high patency rate with minimum complications. It is suggested that careful tissue handling with the use of fine precision instruments and appropriate sized catheters and sutures have contributed to this outcome.

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