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Retrospective Analysis of Mathieu's Urethroplasty for Anterior Hypospadias Repair in Circumcised Children: A single Center Experience

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ABSTRACT

Introduction: Mathieu's technique (peri-meatal based flap) makes use of the urethral plate in the repair of anterior hypospadias, thereby creating an almost natural neo-urethra. In a circumcised baby or after previous unsuccessful repair, Mathieu's flap may be one of the few options left to repair anterior hypospadias.

Objectives: To evaluate the result of Mathieu's flap repair for anterior hypospadias in a resource poor setting.

Materials and Method: This is a retrospective review of post-circumcision anterior hypospadias managed by Mathieu's flap repair between January 1996 and December 2006 in the paediatric surgical unit of the Obafemi Awolowo University Teaching Hospital, a tertiary hospital in the South Western Nigeria.

Results: Mathieu's flap repair was performed in 16 patients with isolated anterior hypospadias; 15 (93.8%) were circumcised before presentation. The complications were urethrocutaneous fistula in 3 (18.8%), wound infection in 2 (12.5%) and flap necrosis in 1 patient (6.3%). Final outcome was satisfactory in all patients.

Conclusion: Mathieu's flap remains a viable option in the repair of anterior hypospadias even after circumcision.

Key Words: Hypospadias, repair, Mathieu, neourethra, fistula, chordee

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INTRODUCTION

Hypospadias is a congenital abnormality resulting from incomplete tubularisation of the urethral plate, leading to abnormal location of the meatus on the ventral aspect of the penile shaft instead of the tip of the glans. It is classified based on the location of the meatus into posterior, middle, and anterior. In the anterior type, which is the most common form, the meatal orifice opens either on the distal penile shaft, the corona, or under the glans[1]. In this condition, surgery is the only treatment modality, the aim being to achieve a functionally and cosmetically acceptable penis.

More than 100 operative techniques have been described for the surgical treatment of primary hypospadias. Different methods are used for special indications and the surgeon may find it difficult to choose a method due to varying degrees of hypospadias severity in different patients[2]. Among the surgical methods described for the repair of anterior hypospadias is the Mathieu technique (peri-meatal based flap) which is one of the most common techniques[3]. It makes use of the urethral plate which creates a nearly natural neo urethra, it has a low complication rate and is very useful in anterior hypospadias without

chordee[4]. However, the cosmetic appearance of the meatus remains a concern, especially when compared to the tubularised incised plate method described by Snodgrass[5].

In countries like Nigeria, where many patients do not present until after circumcision, or in cases of previous unsuccessful repair, Mathieu's flap repair may be one of the few options left[2]. The aim of this study is to evaluate the outcome of Mathieu's flap in anterior hypospadias repair in a semi urban tertiary centre in Nigeria.

PATIENTS AND METHODS

This study is a retrospective review of all cases of anterior hypospadias managed by Mathieu's flap repair between January 1996 and December 2006 in the paediatric surgical unit of the Obafemi Awolowo University Teaching Hospital, Ile-Ife Osun State of Nigeria. Approval was obtained from the research and ethics committee of the hospital, following which the case notes were retrieved from the medical record department and the required information was extracted. The data were collected on a proforma and analysed.

During the period under review, tubularised incised plate urethroplasty was not yet popular in the unit, therefore Mathieu's technique was the method of choice for the repair of post circumcision anterior hypospadias without chordee. The surgery was done as described originally by Mathieu without modification. The flap was subjectively measured according to the location of the meatus (objective measurement of flap length was not done). The flap was sutured to the urethral plate as an onlay and the penile skin closed directly over it without any intervening tissue. There was no magnification because loupes were not available and the instruments were relatively large. Vicryl 5/0 suture was used for the repair as smaller sutures were not available. The procedures were carried out by the same group of surgeons. Urethral stents and suprapubic catheters were routinely used. The patients were discharged within 10-14 days if there was no postoperative problem, because most were from neighbouring towns or states and the cost and stress of long distance journeys on bad roads were major constraint in ensuring postoperative clinic attendance. The patients were followed up in the clinic where the parents were asked if they were satisfied with the cosmetic appearance of the penis and urine stream and whether they had noticed any difficulty during micturition. The urinary stream was also visually assessed by the attending surgeon because there was no uroflowmetry available. Where the flow of urine was judged to be poor, urethral calibration was instituted as a day care procedure and mothers were taught to do this at home. Urethrocutaneous fistula was managed conservatively by calibration to ensure that there is no distal obstruction, following which the patient was followed up in the clinic. If spontaneous closure of the fistula did not occur after 6 months, the patient was considered for surgical closure of the fistula.

RESULTS

During the period under review, 51 patients had hypospadias repair: 38 (74.5%) had anterior hypospadias, 21 (41.2%) were without chordee while 18 (35.3%) were post circumcision. The technique used was transverse preputial island flap (Duckett) in 22, peri-meatal based flap (Mathieu) in 16, meatal advancement glanuloplasty (MAGPI) in 5, tubularised incised plate urethroplasy (TIPU) in 1 and staged repair in 7 patients. Of the 16 patients who had Mathieu's repair, the mean age at presentation was 1 year (range 2 months to 9 years) with 13 (81.3%) presenting within the first year of life. The mean age at treatment was 3 years and 10 months (range 11 months to 10 years). All cases had isolated anterior hypospadias, the meatal location was coronal in 10 (62.5%) and distal penile in 6 (37.5%). None of the patients had chordee, 15 (93.8%) were circumcised before presentation while the uncircumcised patient in the group had preputial fibrosis due to balanitis. The duration of stenting and suprapubic diversion ranged from 5 to 15 days and 14 to 19 days, respectively.

Table: Complications of anterior hypospadias reapair by Mathieu's technique.

Complication	n	%
Flap necrosis	1	6.3
Urethrocutaneous fistula	3	18.8
Wound infection	2	12.5
None	10	62.5
Total	**16**	**100**

Complications resulting from the treatment are shown in the Table. One of the urethrocutaneous fistulae closed spontaneously on conservative management within 3 months of follow up. The remaining 2 were closed surgically after 6 months. The wound infections were managed with antibiotics and dressings while the flap necrosis necessitated secondary repair. Duration of hospital stay was between 11 and 20 days except in those with flap failure who stayed for 28 to 39 days.

Final outcome of repair was assessed to be satisfactory in all patients except the one with flap necrosis who needed a repeat operation. Most of the patients were lost to follow up within the first 3 months postoperatively. Only patients with urethrocutaneous fistula were still attending the clinic after 6 months postoperatively.

DISCUSSION

Hypospadias is a common clinical problem with an estimated incidence of 1 in 300 male live births. The anterior types are commoner, constituting about 50% to 70% of all cases[1]. Hundreds of methods have been described for the repair of hypospadias, all aimed at a functionally and cosmetically normal penis. Many of these methods were designed for the treatment of anterior hypospadias with minimal or no chordee, but various concerns about each of the methods have been expressed[4,6-8].

The use of a meatal based flap was first described by Mathieu in 1932 for anterior hypospadias. It is still a standard technique used by many surgeons in the repair of anterior hypospadias, and it is suitable even when the prepuce has been excised[9-11].

We routinely inserted a urethral stent and diverted the urine by suprapubic cystostomy. Some surgeons have advocated Mathieu's repair without insertion of a stent, but the study by Hakim and colleagues reported a lower complication rate with stented compared to unstented Mathieu repair[9]. Similarly, Buson et al. noted a significantly higher complication rate in stentless compared to stented repair[11]. The stents were removed within 5-7 days if there was no complication. However, where there were complications like wound infection, urethrocutaneous fistula or flap necrosis the stents were left for longer to maintain adequate patency of the urethra while treating the complications. Overall hospital stay was long, though we would prefer and recommend a shorter duration. However, we had a peculiar situation because most of our patients preferred a few more days in hospital rather than frequent outpatient visits due to the high cost, risks and stress of long distance transportation.

Urethrocutaneous fistula remains the commonest complication after hypospadias repair and it occurred in 3 (18.8%) of our patients. With smaller sized sutures (7/0 vicryl), magnification and fine instruments, Mathieu's flap is known to have a fistula rate as low as 2%[12]. Careful preservation of the vasculature of the flap and non overlapping suture lines produce a watertight closure with minimal risk of fistula formation14. The viability of Mathieu's flap is based on marginal blood supply from the base of the flap. If adherence to basic principles is not ensured, there could be meatal stenosis or flap necrosis. Meatal stenosis was not observed in this series. This may be due to the location of the meatus (subcoronal and distal penile) which precluded the use of flaps that may be too long. Also, using a wide flap could have contributed to the absence of meatal stenosis. Assessment of this could have been better if this study were prospective.

Introduction of the tubularised incised plate technique by Snodgrass for anterior hypospadias repair should not make the Mathieu perimeatal based flap obsolete. Some authors have reported better results with the Snodgrass procedure, but several others have reported no significant difference except for better cosmetic appearance of the meatus[13]. Therefore, both techniques are acceptable and effective for hypospadias repair, regardless of cosmetic result[14-15]. The surgeon's experience is considered a very important factor and it is recommended that surgeons should be wary of changing their technique[16].

CONCLUSIONS

Mathieu's flap remains a viable option in the repair of anterior hypospadias without chordee. With the current surge of interest in the tubularised incised plate method, we recommend that a surgeon's experience should guide the selection of technique. However, all surgeons involved in the management of hypospadias should update their knowledge and become acquainted with a variety of methods, as no single method will suffice for all cases.

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