

Byar's Flaps in the Management of Congenital Megaprepuce

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Abstract

Introduction: Early management of congenital megaprepuce (CMP) is necessary to address recurrent urinary tract infections and parental concerns. Different procedures, mostly using the inner preputial skin to cover the phallus, have been described. However, cosmetic appearance with the inner preputial covering of the penis is suboptimal. Owing to this, we conducted this study using outer preputial skin in the form of Byar's flaps to cover the penile shaft and analysed the results. **Patients and Methods:** This prospective study included 19 patients with CMP operated by a single surgeon using the Byar's flap technique. Following surgery patients were assessed on the 4th post-operative day, at 3 months and 1-year post-operative for cosmetic and functional outcomes. Parental satisfaction about cosmetic results was evaluated using a subjective score. Data were collected and analysed. **Results:** Nineteen patients with CMP were studied with a mean age of 6.3 months. Nineteen patients (100%) patients presented with buried penis and preputial ballooning, malodorous infected urine in 15 (78.9%) patients, thin stream of urine in 17 (89.4%) and dysuria in 12 (63%) patients. One of the patients had associated glanular hypospadias and the other two had isolated chordee. There were no significant complications except for one patient who developed meatal stenosis which was later managed by a meatoplasty. All patients had satisfactory cosmetic appearance. **Conclusion:** CMP is an uncommon but easily identifiable condition. Early surgical correction is recommended to prevent complications. Byar's flap technique yields very good functional and cosmetic results in the management of CMP.

Keywords: Byar's flap, dartos, megaprepuce, phimosis

INTRODUCTION

Congenital megaprepuce (CMP) is a rare congenital abnormality anatomically characterised by redundant inner prepuce, phimosis and deficient penile skin.^[1] Abnormal dartos muscle is thought to be the basic defect in congenital megaprepuce.^[2] The penile skin is loosely attached to the shaft at penoscrotal and penopubic angles. It is also characterised by typical ballooning [Figure 1] of the prepuce during micturition.^[1] Urine may collect in abnormally redundant prepuce, which necessitates the manual expression for full evacuation. The accumulated urine forms a medium for bacterial growth leading to recurrent urinary tract infections (UTIs) and malodorous urine.^[3] The urinary stream is often poor. The CMP is often confused with buried penis, micropenis, and concealed penis.^[1] The absence of excessive suprapubic fat and previous surgical intervention in association with typical ballooning usually clinches the diagnosis. After diagnosis, early management is necessary to address recurrent UTI and parental concerns.^[4] Over the years

different procedures, mostly using the inner preputial skin to cover the phallus, have been described. However, cosmetic appearance with the inner preputial covering of the penis is suboptimal.^[5] Owing to the above, we conducted this study using outer preputial skin in the form of Byar's flaps to cover the penile shaft and analysed the results.

PATIENTS AND METHODS

This is a prospective study which was conducted at Al-Azhar University Hospital, Cairo, Egypt from June 2013 to December 2019. The study included 19 patients with CMP operated by a single surgeon using the Byar's flap technique. Patients were evaluated for clinical and anatomical features and basic investigations were conducted following which the patients were subjected to the surgical procedure.

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Procedure

Patients were placed in a supine position under general anesthesia. After scrubbing and draping, a small ventral midline slit was made [Figure 2] on the tight preputial opening to facilitate retraction of the prepuce. The prepuce was retracted and fully unfurled [Figure 3]. Circumferential incision was made on the inner prepuce 5 mm from the coronal sulcus after which complete degloving of the penis was performed right up to the penopubic and penoscrotal angles. On the ventral aspect, a midline incision was made on the skin. Redundant inner preputial skin was excised [Figure 4] along with bulky dartos. Dorsal skin of the penis was anchored to Buck's fascia by 6/0 polydioxanone, preserving the neurovascular bundle, to restore the penopubic angle. Another similar suture was placed at the penoscrotal junction to restore the penoscrotal angle. Byar's flaps were then prepared, rotated ventrally and sutured in place [Figure 5], as is done in Byar's stage I urethroplasty. Finally, the 5 mm mucosal collar was sutured to the skin with 6/0 polydioxanone. Light compressive dressing of the wound was done and patients were discharged on the same day to be followed up in the outpatient clinic.



Figure 1: Appearance of megaprepuce (preputial bladder)



Figure 3: Unfurled inner prepuce

Patients were followed up in the outpatient clinic on the 4th post-operative day, and dressings were removed. They were also assessed after 3 months and 1 year for the cosmetic outcome. Parental satisfaction about cosmetic results was evaluated using a subjective score (0 = no satisfaction, 1 = not completely satisfied, "2" = satisfied and "3" = excellent satisfaction). Data were collected and analysed with the IBM SPSS Statistics for Windows, Version 23.0. Armonk, NY: IBM Corp. Parental consent was obtained before the surgical procedure. The study was approved by the institutional ethical committee.

RESULTS

Over the period of 6 years, nineteen patients with CMP were studied. The mean age of the patients was 6.3 months (range: 4 months to 15 months). All of the patients presented with buried penis and preputial ballooning [Table 1]. Infected urine was present in 15 (78.9%) patients. Infection was confirmed by urine culture and culture-sensitive antibiotics were instituted prior to the surgical intervention. Thin stream of urine and dysuria were



Figure 2: Ventral preputial slit to facilitate exposure of the glans

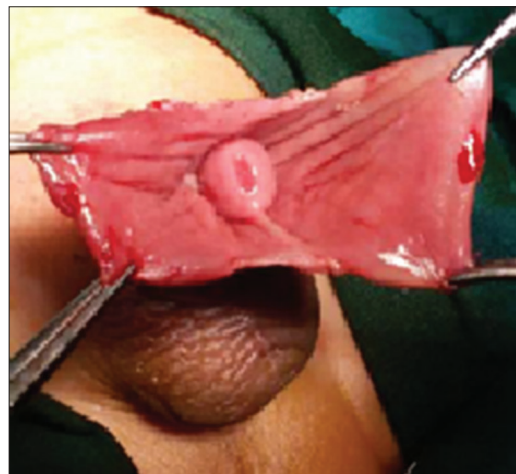


Figure 4: Circumferential resection of the inner layer of the prepuce and creation of Byar's Flaps



Figure 5: Ventral midline suturing of Byar's flaps

Table 1: Symptomatology of the patients

Symptom	Number of patients
Ballooning	19 (100)
Buried penis	19 (100)
Malodorous infected urine	15 (78.9)
Thin stream of urine	17 (89.4)
Dysuria	12 (63)

observed in 17 (89.4%) and 12 (63%) patients, respectively. One of the patients had associated glanular hypospadias and the other two had isolated chordee. The glanular hypospadias was managed by glanular approximation. Chordee was corrected by degloving with tunica albuginea plication. There were no significant complications except for one patient who developed meatal stenosis which was later managed by a meatoplasty. This was the same patient who had associated hypospadias. Fifteen patients (78.9%) had a satisfactory cosmetic appearance, three (15.8) had excellent, whereas one (5.3%) had incomplete satisfaction. There were no incidences of redo procedures except the one with meatal stenosis.

DISCUSSION

The inconspicuous penis is a condition that makes the penis look very small.^[6] It could be due to a short penile shaft known as micropenis.^[7] However more commonly, it is due to congenital conditions such as penoscrotal webbing or megaprepuce, developmental conditions as prepubic adiposity and iatrogenic causes such as a trapped penis.^[8] CMP is considered as a specific form of a buried penis.^[9] The actual etiology is hitherto unknown; however, it is attributed to the abnormal development of dartos.^[5] Some authors also think that this condition is secondary to narrow preputial ring^[10,11] while others contradict this view pleading that in some of the cases there is no true phimosis.^[1,12]

It presents early in childhood. Alexander *et al.* reported a median age of 20 months.^[3] The median age of presentation in our patients was 6.3 months. Over the years, the increased

reporting of this condition has raised the awareness levels among the attending physicians, thereby making early diagnosis convenient. This was perhaps the reason that our patients were diagnosed and treated at an early age. Another contributing factor for the early detection of this condition may be the ritualistic circumcision, which is usually performed early in infancy in societies such as ours.

The predominant symptom in our study was inconspicuous penis and ballooning of the prepuce seen in all the patients. Podestá and Podestá also reported a bulging preputial sac, engulfing the penile shaft that increased during voiding in all of their patients.^[12] Thin stream and dysuria were seen in 17 (89.4%) and 12 (63%) patients, respectively. In the literature, the risk of urinary infections, balanitis, dysuria, and urinary retention was estimated at 31% and 72%.^[13,14] Thin stream is usually caused by narrow preputial opening which eventually causes accumulation of urine in the redundant inner prepuce leading to ballooning. Recurrent ballooning further increases the size of the inner prepuce adding to the basic pathology. The accumulated urine in the inner prepuce may need manual expression for complete evacuation. It may also lead to infection of urine. We noticed UTI in 15 (78.9%) patients. Similar observations were made by other authors.^[3,11] UTI and parental concern for inconspicuous penis may demand an early intervention.^[14] Conventional circumcision is best avoided in patients with CMP as the penile shaft has deficient outer preputial skin.^[1,11] Other technical difficulties in surgical correction of CMP are the absence of defined penopubic and penoscrotal angles and a marked excess of inner preputial mucosa.^[8] Many reconstructive techniques have been described including ventral v-plasties, z-plasties, cutaneous flaps and unfurling techniques.^[5,15] However, consensus for the ideal management is still lacking. The goals of the surgeries are, removal of redundant inner prepuce as much as possible, covering of the shaft with outer skin to achieve best possible cosmetic results and finally fixing of the outer skin at the penopubic and the penoscrotal angles to impart normal appearance to the penis.^[8,9] Most of the authors have used inner preputial skin to cover the penis which gives inferior cosmetic results due to its different colour and thin structure.^[15] Furthermore, many such patients require redo procedures to manage the bulky appearing inner prepuce.^[15] Owing to this we used Byar's flap from dorsal preputial skin to cover the ventral aspect of the penis which allowed us to excise the entire redundant and bulky inner prepuce, thereby giving better cosmetic results. It will be worthwhile to mention that some of the patients may have associated anomalies such as transposition of scrotum, chordee, penoscrotal webbing and hypospadias. The surgical procedures may be tailored to address these problems. We noticed glanular hypospadias in one patient and isolated chordee in two patients. Patient with hypospadias was managed by glanular approximation and those two with chordee were managed with tunica albuginea plication. Hirsch *et al.* have reported two cases of hypospadias, six cases penile curvature in theirs series of seven patients.^[16] Penoscrotal transposition is also reported by other authors.^[12,17]



Figure 6: Post-operative appearance

There were no major complications with Byar's flap procedure. One patient had a meatal stenosis which was managed by meatoplasty. Baring this patient there were no redo procedures. The results were satisfactory in 78.9% of patients, excellent in 15.8% [Figure 6]. Only one patient (5.3%) had incomplete satisfaction.

CONCLUSION

CMP is an uncommon but easily identifiable condition. Early surgical correction is recommended to prevent complications. Byar's flap technique yields very good functional and cosmetic results in the management of CMP.

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Conflicts of interest

There are no conflicts of interest.

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