The modified Devine’s procedure for the management of concealed penis in children: an experience of 131 cases

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Abstract. – OBJECTIVE: With the current study, we aimed at describing our experience of surgical management of concealed penis using the modified Devine’s procedure.

PATIENTS AND METHODS: Medical records of all patients undergoing surgical management of concealed penis using the modified Devine’s procedure from January 2019 to June 2021 were retrieved. Penile length was measured before and after the procedure. Parental satisfaction on the penile size, morphology, voiding status and hygiene was measured using a 5-point Likert’s scale.

RESULTS: A total of 131 patients were included. The mean age of the patients was 8.56 ± 2.75 years. The mean BMI of the patients was 24.17 ± 1.78 kg/m². The patients were followed up to a mean of 15 ± 3 months. The duration of the surgery was 89.93 ± 16.85 minutes. There was a statistically significant increase in penile length from 1.8 ± 0.64 cm to 5.02 ± 1.11 cm after the procedure (p < 0.01). There was a statistically significant improvement in satisfaction status of all domains at 6, 12 and 24 weeks as compared to pre-operative levels.

CONCLUSIONS: The modified Devine’s technique is a simple and effective surgical technique for management of concealed penis in children producing predictable results and excellent parental satisfaction. The low rate of complications and good cosmetic outcomes lend support to its use in clinical practice.

Key Words: Buried penis, Surgery, Complication, Concealed penis, Satisfaction grade.

Introduction

“Concealed penis” is a congenital deformity characterized by concealment of the penis under the subcutaneous tissue. The anomaly is specifically associated with a lack of adequate outer penile skin and inadequate subcutaneous attachment to the Buck’s fascia due to which the penis seems to be fused with the scrotum. On a clinical examination, the shaft of the penis is submerged under the pre-pubic skin but can be easily seen and palpated after applying pressure to the base of the shaft. Indeed, the presence of this deformity can be the cause of phimosis and balanitis which lead to difficulties in voiding and hygiene maintenance. The reduced length of penile tissue is also a major cause of psychological trauma in adolescents and adults.

The deformity does not resolve spontaneously and needs surgical correction. Furthermore, animal studies have demonstrated that prolonged penile concealment can significantly impact the structure and function of the organ. Hence, early surgical correction of concealed penis is an important operation performed by urologists all over the world. There are numerous surgical techniques to correct a concealed penis described in literature; however, no single method has been universally adopted. We hereby describe our experience of correcting concealed penises by means of modified Devine's flap.

Patients and Methods

Patients

We retrospectively reviewed the medical records of all patients undergoing concealed penis correction surgery using the modified Devine’s flap at our Institute between January 2019 and June 2021.

All patients undergoing the procedure were diagnosed with concealed penis deformity, with
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flat or beak-shaped penises and reduced appearance of penile length. However, the penile shaft was palpable on preoperative examination on application of pressure on both sides of the shaft base.

Surgical Technique

All surgical procedures were carried out by a single senior urologist. The procedures were conducted under general anesthesia with patients in supine position (Figure 1). The key surgical steps were as follows. The mid-dorsal and mid-ventral aspect of the preputial opening were longitudinally incised to release the skin tension. The frenulum was preserved for around 1.0 cm. The ventral portion was incised to the midline of the scrotum. Adhesion to the head was released exposing the glans penis. The foreskin was incised 1.0 cm from the coronary sulcus; thus, the glans was lifted, and the penis was pulled free. The foreskin was detached from the superficial surface of the tunica albuginea to the root, and the penis was fully stretched. The dorsal blood vessels and nerves of the penis were protected. The dorsal penile dysplastic sarcolemma and cord-like tissue were as much as possible removed. The tunica albuginea at the root of the penis and the flesh membrane at the root of the foreskin were sutured and fixed. The excess inner plate of the foreskin was then excised on the dorsal side of the penis; thus, the dorsal foreskin was pulled and sutured. The ventral foreskin was lifted, the inner plate of the foreskin was sutured in a circular manner, and the penis root was cut obliquely on both sides. The scrotal skin and subcutaneous tissue were then opened, the scrotal skin flap was advanced to the root of the penis, the subcutaneous tissue on both sides was sutured with the ventral tunica albuginea at the root of the penis. The angle at the penis-scrotum junction was reconstructed (Figure 2). The suture site was externally coated with erythromycin eye ointment, fixed with mesh elastic gauze, and a urinary catheter was placed.

Data Collection

Baseline data collection included the patient’s age, body mass index (BMI), and penile length which was measured from the base of the penis to the tip perpendicularly in the flaccid state. Patients were recalled at 6 weeks, 12 weeks and 24 weeks post-surgery for follow-up visits. Questionnaires were administered to the parents pre-operatively, right after surgery and during the follow-up visits to assess the satisfaction about the penile size, morphology, voiding status and hygiene. This was done using a 5-point Likert scale where 1 corresponded to “very unsatisfactory”; 2 for “unsatisfactory”; 3 for “neither satisfactory nor unsatisfactory”; 4 for “satisfactory”; and 5 corresponded to “very satisfactory”. We also assessed and recorded any complications occurring in the immediate post-operative period and at the follow-up visits.

Statistical Analysis

Shapiro-Wilk test was used to examine the normality of data. All continuous data were presented as mean ± standard deviation. Post-operative data were compared with pre-operative values using the Student’s t-test. p-values lower than 0.05 were considered statistically significant. All statistical analysis were performed using SPSS for Windows 19.0 software (IBM Corp., Armonk, NY, USA).

Figure 1. Pre-operative picture of concealed penis.

Figure 2. Final post-operative picture.
Results

A total of 131 patients underwent the modified Devine’s flap for concealed penis in our Institute during the study period. The mean age of the patients was 8.56 ± 2.75 years. The mean BMI of the patients was 24.17 ± 1.78 kg/m². The patients were followed up to a mean of 15 ± 3 months. The duration of the surgery was 89.93 ± 16.85 minutes. There was a statistically significant increase in penile length from 1.8 ± 0.64 cm to 5.02 ± 1.11 cm after the procedure (p < 0.01). The average blood loss was minimal (4.05 ± 1.53 ml). Data on the parent’s satisfaction on penile size, morphology, voiding status and hygiene are presented in Table I. There was a statistically significant improvement in satisfaction status of all domains at 6, 12 and 24 weeks after surgery, as compared to pre-operative levels.

Complications were noted in 7 patients and consisted of infection and dehiscence of skin on the ventral side of the penis (3 patients), development of a narrow ring at the base of the penis (2 patients), unsatisfactory bloated appearance of the penis (1 patient) and foreskin edema (1 patient).

Discussion

Parents complaining about the small appearance of their child’s penis is not an uncommon presenting problem for urologists or pediatric surgeons around the world. In most cases, the small size of the penis is only on appearance since the shaft is actually buried under the subcutaneous skin and is very much normal in length. A number of terms have been used in literature to describe the conditions that can result in small appearance of the penis, namely: “buried penis”, “trapped penis”, “hidden penis”, “inconspicuous penis” and “concealed penis”. In a classification system proposed by Maizels et al., small penis was classified into four groups based on the concealment. Cases due to poor skin suspension in children or excess prepubic fat in adolescent were classified as buried penis; those due to penoscrotal web were grouped as webbed penis; those trapped under the scar skin post-circumcision were classified as trapped penis while the last ones were micropenis, which are normal penis but < 2 standard deviations below mean length when stretched. Another classification by Jung et al. classifies a small penis as webbed, buried, entrapped and concealed. Webbed penis is the one wherein the ventral skin fold fixes the distal shaft to the scrotum, thereby obscuring the penoscrotal angle. Buried penis is caused by deficient penile skin at the shaft base or disproportionate suprapubic fat while entrapped penis is the one trapped by scar caused by the circumcision. The last one, the concealed penis, is due to deficient outer penile skin or lack of elasticity of dartos fascia or abnormal attachment of inelastic fibrous bands. In our study, we focused on surgically treated cases of concealed penis.

Management of concealed penis is fraught with several controversies. Firstly, the timing of surgery. A research suggests that prompt surgical correction can minimize the psychosocial impact of small penis on the child and aid in normal sexual development. Furthermore, early surgical intervention can also minimize the development of symptoms like infections, poor hygiene, balanitis, anxiety of appearance, and erectile dysfunctions. Since the deformity does not correct spontaneously, most surgeons are of the opinion that these cases should be surgically corrected as soon as possible. Secondly, the impact of weight loss in obese children with buried penis. It is

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p-values as compared to pre-operative data.
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The modified Devine’s procedure for the management of concealed penis in children producing predictable results and excellent parental satisfaction. The low rate of complications and good cosmetic outcomes lend support to its use in clinical practice.

Conclusions

The modified Devine’s technique is a simple and effective surgical technique for management of concealed penis in children producing predictable results and excellent parental satisfaction. The low rate of complications and good cosmetic outcomes lend support to its use in clinical practice.

Conflict of Interest

The Authors declare that they have no conflict of interests.
Funding
Not applicable.

Data Availability
The data that support the findings of this study are available from the corresponding author upon reasonable request.

Authors’ Contribution
H.-K. Chen conceived and designed the study. H.-K. Chen and Y.-S. Chu collected the data and performed the analysis. H.-K. Chen and Y.-F. Hu was involved in the writing of the manuscript and is responsible for the integrity of the study. All authors contributed to the article and approved the submitted version.

ORCID ID

Informed Consent
Written informed consent was obtained from the patients’ guardians for the surgical procedure.

Ethical Approval
The Institutional Ethical Committee of Zaozhuang Municipal Hospital approved the conduct of the study (No.: LL22041502).

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