



A PROSPECTIVE STUDY ON THE EFFECTS OF TOPICAL TESTOSTERONE IN MANAGEMENT OF DISTAL HYPOSPADIAS

Urology

Dr Prabhat Kumar Senior Resident, Dept. of Urology, PMCH, Patna, Bihar

Dr D. K. Das* Associate professor, dept. of urology, PMCH, Patna, Bihar *Corresponding Author

Dr S.K. Sinha Associate professor, dept. of urology, PMCH, Patna, Bihar

Dr Shweta Kumari Junior Resident, Dept. of Surgery, PMCH, Patna, Bihar

Dr Md Habibullah Ansari Junior Resident, Dept. of Surgery, PMCH, Patna, Bihar

ABSTRACT

Objectives: The aim was to evaluate the effect of topical testosterone on penile length, preputial hood, vascularity of dartos pedicle in patients with distal hypospadias.

Materials and Methods: A total of 42 patients with distal hypospadias were included in this study. All were randomly allocated to 2 groups before surgical correction. Group 1 did not receive any treatment and group 2 received 1% testosterone propionate ointment twice daily for 30 days before surgery. Increase in penile length, transverse preputial diameter, and diameter at the base of penis were noted.

Results: Following topical testosterone application, the mean increase in penile length, transverse preputial width and diameter at the base of penis was 1.01 ± 0.25 cm, 1.250 ± 0.52 cm and 0.61 ± 0.35 cm, respectively.

Conclusion: Testosterone increased phallus size, diameter and prepuce hypertrophy without any adverse effects.

KEYWORDS

INTRODUCTION:

Hypospadias is defined as the spectrum of an abnormal ventral urethral meatus, an abnormal ventral penile curvature (chordee) and a deficiency of ventral preputial skin¹. Hypospadias results from the partial or complete failure of urogenital folds to develop throughout their normal length and also if the urethral folds fails to close distally if they have formed. The extent of the closure determines the position of the urethral orifice. A unifying etiology for hypospadias remains elusive and is likely multifactorial².

Hypospadias surgical procedure is characterized by three steps:

1. Chordee correction-straightening of the penis;
2. Urethroplasty reconstruction of the missing part of the urethra;
3. Restoration of the tissues forming the ventral radius of the penis the glans, corpus spongiosum, and skin, which finally will lead to the normal cosmetic appearance of the penis.

Surgical correction of genital defects was formerly advocated when the size of the penis was sufficient to permit easy surgical repair. Coincidentally, many children with hypospadias also have a small phallus. According to available data, a small phallus in hypospadias is a result of fetal testosterone insufficiency. To enlarge phallus size, temporary stimulation with testosterone or dihydrotestosterone (DHT) cream has been used; however, the results were not only inconsistent, but absorption was also variable.

Testosterone/DHT is the peripherally acting androgens causing growth and development of the external genitalia and secondary sexual characters. The effect is more pronounced on the genitals as a result of higher expression of androgen receptors. This is the basis of using preoperatively androgen stimulation in hypospadias surgery.

With genital repairs being accomplished in younger patients, the use of preoperative topical testosterone for temporary penile stimulation allows the surgeon to operate on a larger and more vascularized organ. This is especially useful in those with a paucity of penile skin, and those who have undergone failed hypospadias surgery.

However, there is no consensus in the literature regarding the choice of hormone, time, dose and route of administration.

In the present study, we intended to analyze the effect of topical testosterone in cases of distal hypospadias.

MATERIALS AND METHODS:

This prospective study was conducted at Department of Urology,

PMCH, Patna. A total of 42 patients of distal hypospadias aging from 6 months to 4 years with variable degree of chordee were included in the study. They were divided into two groups. All were randomly allocated to 2 groups before surgical correction. Group 1 did not receive any treatment and group 2 received 1% testosterone propionate ointment twice daily for 30 days before surgery.

Parents/guardians were informed about the risks and benefits associated with the study, and written consent was taken. Family history and siblings history was taken in details for any congenital disorders. Antenatal history was also taken so as to confirm any maternal history of steroids intake.

Stretched penile length was measured from the pubic symphysis to the tip of the glans using measuring scale. Transverse preputial width was measured using measuring scale and diameter at the base of the penis was measured using a vernier caliper before the therapy and the surgery.

RESULTS:

The mean age of presentation was 2.6 years (range, 6 months to 4 years). 17 patients were between 6 months and 1-year of age. There were 10 patients between 1-year of age and 2 years. 15 patients were between 2 years and 4 years of age.

There was familial incidence found in 7 cases. Of these, 3 patients had his elder brothers, and two children had their first cousins suffering from hypospadias. Undescended testis and congenital hernia was found in 5 and 3 children's, respectively. There was patent ductus arteriosus in one case, and horse shoe kidney was present in another child.

In Group 2, The mean penile length of 2.35 ± 0.75 cm increased to 3.36 ± 1.12 cm. The mean increase in penile length was 1.01 ± 0.25 cm ($P < 0.001$). The mean increase in transverse preputial width and diameter at the base of the penis was 1.250 ± 0.52 cm and 0.61 ± 0.35 cm, respectively ($P < 0.001$).

Variables	Penile length (cm)	Transverse preputial diameter (cm)	Diameter at the base of penis (cm)
Pre application	2.54	2.32	1.10
Post application	3.61	3.29	1.98
Mean difference	1.07	0.97	0.88

Tubularized incised plate technique was used for repair of distal hypospadias cases. Two patients developed fistula, and one case had

meatal stenosis. No flap necrosis was seen. An overall complication rate was 7.1%. Of 42 patients, 40 patients followed-up to 1 year, 2 patients were lost to follow-up.

DISCUSSION:

Hypospadias being one of the most common genital anomalies in male newborns have an incidence of 1:300. Hypospadias is defined as an anomaly (hypo- or dysplasia) involving the ventral aspect of the penis. These malformations mainly comprise of an abnormal ventral opening of the urethral meatus, an abnormal ventral curvature of the penis (chordee) and/or an abnormal distribution of the foreskin⁸.

Hypospadias surgery was always regarded as nonrewarding surgical reconstruction; due to higher complication rate and repeated failures. To improve success rates, the use of hormonal stimulation before surgical intervention has been accepted as a relatively common practice among pediatric urologists and surgeons for decades.

Previous studies have revealed increase in penile length, glans circumference and tissue vascularity with the use of testosterone, DHT and human chorionic gonadotropin (hCG). A growing body of literature has raised concerns regarding the potential negative side effects associated with this practice^{5,6,9,10}.

Historically, hypospadias repair was considered multistage approach. With the concept of single stage repair, there were more complication rates and re-intervention rate^{11,12,13,14}. Several studies has been conducted to assess the role of preoperative endocrine therapy but none gave conclusive results, and it's still unclear whether to give preoperative endocrine therapy or not.

Chalapathi et al.⁹ compared the topical use of testosterone and topical testosterone and concluded that desired therapeutic effect of testosterone was achieved in both the groups, however, no statistical difference was noted in either group. The basal serum testosterone was within the normal range in both the groups. Linear growth did not alter significantly for chronological age, but the authors observed that there was evidence of unpredictable absorption of testosterone in a topical group. Although the study was done on small number of children, it does appear that intramuscular administration of testosterone is preferable. Similar results were reported by Nerli et al.¹⁶ in a randomized study of 21 patients with microphallic hypospadias.

Bastos et al. have reported that topical testosterone application produces neovascularization (by increasing the number of blood vessels and blood vessel volume density) and have postulated better surgical outcome due to better cellular oxygenation during healing¹⁷.

Netto et al. in their meta-analysis study have clearly mentioned the widespread use of hormonal therapy in hypospadias cases although infrequently reported, but they have insisted on large volume controlled randomized studies to establish a standard protocol¹⁸.

CONCLUSION:

Preoperative topical testosterone therapy was associated with an increase in phallus size and diameter with no adverse effects. There was associated increased vascularity and pliability. However, our study had limitations due to small series without a control group. Studies with larger sample sizes and control groups are required to establish the efficacy of topical testosterone in hypospadias.

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