

Original Article

Parenteral testosterone therapy's effect on penile size before hypospadias surgery

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ABSTRACT

Objectives: The purpose of this study was to see the effect of parenteral testosterone injection on penile length, glans diameter, and diameter at the base of the penis in hypospadias patients before surgery.

Material and Methods: The study was conducted from September 2019 to March 2021. This study comprised a total of 20 hypospadias patients. At a dose of 2 mg/kg body weight, an injection testosterone propionate was administered deep intramuscularly in three doses with a 3-week gap before reconstructive surgery. Before surgery, the penile length, glans diameter, and penile diameter at the base of the penis were all measured.

Results: The mean increase in penile length, glans diameter, and diameter at the base of penis following parenteral testosterone therapy was 1.07 ± 0.23 cm ($P < 0.001$), 1.01 ± 0.46 cm ($P < 0.001$), and 0.92 ± 0.12 cm ($P < 0.001$), respectively. All three measurements were statistically significant.

Conclusion: Intramuscular testosterone increased penis size, glans diameter, and penile diameter without causing any notable side effects. Development of fine pubic hair, acne, and aggressiveness is minor adverse effects.

Keywords: Hypospadias, Testosterone, Glans penis

INTRODUCTION

Hypospadias is a birth defect that is associated with three anomalies of the penis

1. Opening of urethral orifice on ventral surface
2. Ventral curvature of the penis
3. Dorsally hooded prepuce.^[1,2]

Hypospadias is the most common congenital defect, which affects 0.3–0.7% of all live male births.^[3]

Hypospadias is most likely caused by a combination of factors.^[4]

The aim of hypospadias repair is to achieve excellent functional and cosmetic results.^[5] Anthropometry of the penis particularly the biometrics of the glans penis is an important consideration before hypospadias repair.^[6] Studies have shown that small glans diameter measuring <14 mm (mm) is associated with glans dehiscence following hypospadias repairs.^[7,8] It has been hypothesized that increasing the size and girth of the penis preoperatively may lead to a larger surgical site, thus reducing intraoperative and postoperative complications of the hypospadias corrective surgery.

To enlarge phallus size, temporary stimulation with testosterone or dihydrotestosterone cream has been used. However, the results were inconsistent, but its absorption was also variable.^[9] This observation has made surgeons administer parenteral testosterone to increase the glans diameter before hypospadias repair.^[10,11] Testosterone is the peripherally acting androgen 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.

MATERIAL AND METHODS

This prospective study was conducted at the Department of Urology, Dr. S.N Medical College, Jodhpur, from September 2019 to March 2021. A total of 20 patients with hypospadias were included in this study of ages between 6 months and 18 years.

Inclusion criteria

Six months–18 years of male patients with hypospadias were included in the study.

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Received: 30 April 2022 Accepted: 02 November 2022 Epub Ahead of Print: 17 December 2022 Published: 11 March 2023 DOI: 10.25259/IJMS_128_2022

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Exclusion criteria

The following criteria were excluded from the study:

1. Patients for hypospadias reoperation
2. Undescended testis (unilateral or bilateral).

Informed consent was obtained from the patient's caregivers.

Following parameters were measured in centimeters:

1. Stretched penile length from pubic bone to the tip of the glans
2. Maximum transverse diameter of the glans penis at the coronal sulcus
3. Diameter of penis at its base.

These dimensions were measured before the therapy and on the day of surgery using a Vernier caliper. At least two measurements of each parameter were made by the same person and the average was taken. This minimized observer and operator variability.

Injection testosterone propionate was given deep intramuscularly in three doses with an interval of 3 weeks before reconstructive surgery at the dose of 2 mg/kg body weight. Side effects such as the development of fine pubic hair, acne, and aggressive behavior as reported by parents were also evaluated.

IBM Statistical Package for the Social Sciences for Windows version 23 (IBM Corp., Armonk, NY) was used for data entry and analysis. Data were expressed as percentages, median, means, and standard deviation. The Chi-square test or Student's *t*-test was used to test for significance. $P < 0.05$ was considered statistically significant.

RESULTS

Patient demographics

The mean age of presentation was 3.8 years (range, 6 months–10 years). Eight patients were between 6 months and 2 years of age. Six patients were between 2 and 5 years of age. Six patients were more than 5 years of age. Familial history was seen in two patients.

Type of hypospadias

Of 20 cases, 10 were of distal (three coronal, four subcoronal, and three distal penile), seven were of middle (five midshaft and two proximal penile), and three were of proximal hypospadias (three penoscrotal) [Figure 1].

Penile dimensions

The mean stretched penile length was 2.45 ± 0.82 cm. It increased to 3.52 ± 0.56 cm. The mean increase in penile length was 1.07 ± 0.23 cm ($P < 0.001$) [Table 1], [Figure 2].

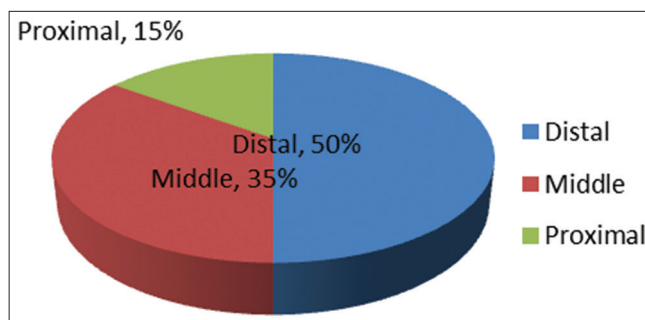


Figure 1: Types of hypospadias.

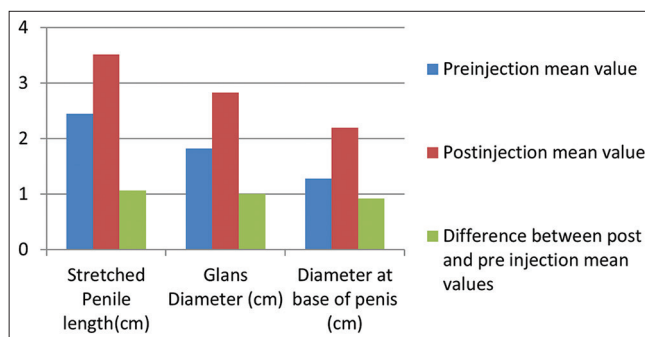


Figure 2: Penile dimensions before and after testosterone injection.

Table 1: Penile dimensions before and after injection.

Mean values	Stretched penile length (cm)	Glans diameter (cm)	Diameter at base of penis (cm)
Pre-injection	2.45 ± 0.82	1.82 ± 0.42	1.28 ± 0.18
Post-injection	3.52 ± 0.56	2.83 ± 0.28	2.20 ± 0.32
Difference	1.07 ± 0.23	1.01 ± 0.46	0.92 ± 0.12
P value	<0.001	<0.001	<0.001

The mean of transverse diameter of the glans was 1.82 ± 0.42 cm which increased to 2.83 ± 0.28 cm. The increase was statistically significant ($P < 0.001$).

The diameter at the base of penis was 1.28 ± 0.18 cm which increased to 2.20 ± 0.32 cm. The difference was statistically significant ($P < 0.001$).

Two patients developed mild pubic hair, after two doses of injection. There were no parents reported cases of acne or aggression.

DISCUSSION

Testosterone increases size of the penis in prepubertal males due to its androgenic effects. This effect is beneficial for the surgical repair of hypospadias because a larger penile size makes correction easier and less risky.^[12]

One study that administered human chorionic gonadotropin (hCG) to children over 5 weeks found that hCG produces disproportionate penile enlargement and decreases the severity of hypospadias.^[13] However, the use of hCG lacked a treatment protocol and there were wide variations in response.

Topical application of testosterone has also been found effective in increasing penile length and glans circumference.^[14] The drawback of topical testosterone is that the results of its use are inconsistent due to variable absorption. Concerns over absorption and potential side effects after local application led to the use of injectable slowly releasing testosterone for pre-operative genital stimulation.

In a study conducted by Ahmad *et al.*, 23 patients aged between 6 months and 10 years; preoperatively, testosterone was given deep intramuscularly in three doses at 4, 3, and 2 weeks before reconstructive surgery at the dose of 2 mg/kg body weight and concluded that parenteral testosterone can be safely used to improve the surgical outcome of hypospadias repair.^[15]

In our study, the effect of intramuscular testosterone on penile growth from the day of injection to the day of operation was statistically significant ($P < 0.001$). The mean increase in penile length was 1.07 ± 0.23 cm. There was an increase in transverse glans diameter of 1.01 ± 0.46 [Table 1]. The texture and vascularity of penile skin also improved. This increased transverse length is helpful particularly in proximal hypospadias. Negligible side effects were noted in the form of development of pubic hair in two patients.

CONCLUSION

Penile augmentation with parenteral testosterone is associated with an increase in phallus size and diameter with few adverse effects. The vascularity of penile skin also improved. Thus, parenteral testosterone can be safely used to improve the results of hypospadias surgery.

Limitation

Study lacked a control group and there was no follow-up of patients post-surgery.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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How to cite this article: Godse S, Kumar A, Singh H, Choudhary G, Chhabra MK. Parenteral testosterone therapy's effect on penile size before hypospadias surgery. *Indian J Med Sci* 2023;75:15-7.