

Could intramuscular testosterone differentiate between partial androgen insensitivity and 5 alpha reductase deficiency?

Shaymaa Raafat¹, Saber Mohammed Waheeb²

¹Pediatric Endocrinology and Diabetology Unit, Department of Pediatrics, Faculty of Medicine, Alexandria University, Egypt.

²Pediatric Surgery Department, Faculty of Medicine, Alexandria University, Egypt.



INTRODUCTION

- Disorders of sex development are challenging for patients, parents and the interdisciplinary health care team. Sex assignment of these patients needs optimal integrated hormonal profile, imaging and molecular diagnosis.
- Testosterone replacement is one of the cornerstones of management of DSD cases. When molecular diagnosis is unavailable, the DSD team searches for other diagnostic clues helping diagnosis as response to testosterone treatment.

AIM

This study aimed at finding a new tool for differentiation between partial androgen insensitivity and 5 alpha reductase deficiency especially when the molecular diagnosis is highly expensive or even unavailable.

METHOD

Forty-four boys were included in this study through a year from Jan 2020 to Jan 2021.

They were divided into **two groups**:

- partial androgen insensitivity (22 patients)
- 5 alpha reductase deficiency (22 patients)

All patients were assessed with emphasis on

- Detailed history
- Thorough clinical examination including stretched penile length and glans diameter.
- Karyotype
- Hormonal profile was done for all of them.
- Imaging studies including ultra-sound for pelvis and inguinoscrotal region were done.

All included boys received **three intramuscular injections of testosterone enanthate 25 mg** every four weeks as a preparation for masculinizing genitoplasty.

Stretched penile length and glans diameter were measured again after injections. Moreover, the predicted side effects such as darkening of genital skin and appearance of pubic hair were monitored if they appeared during treatment.

RESULTS

- Among boys of the study cohort, there were 22 patients with partial androgen insensitivity and 22 patients of 5 alpha reductase deficiency. Their ages ranged from one month to 56 months. Six patients were initially assigned as females then finally assigned as males after their complete assessment. (Table 1)

Table (1): Distribution of the studied cases according to demographic data (n=44)

Demographic data	No.	%
Initial Sex assignment		
Male	38	86.4
Female	6	13.6
Age (months)		
Min. – Max.	1.0 – 56.0	
Mean ± SD.	21.48 ± 14.82	
Median (IQR)	18.0 (10.50 – 28.0)	

- Their mean stretched penile lengths (SPL) before testosterone injections were 2.70 ± 0.72 cm, and after injections were 3.99 ± 1.05 cm. (Table 2)

Table (2): Descriptive analysis of the studied cases according to SPL before and after testosterone injections.

SPL	Min. – Max.	Mean ± SD.	Median (IQR)
SPL before	1.0 – 4.0	2.70 ± 0.72	2.70 (2.0 – 3.20)
SPL after	1.20 – 5.60	3.99 ± 1.05	4.15 (3.10 – 4.85)
% of increase in length	11.11 – 145.0	50.27 ± 32.39	43.93 (21.07 – 65.83)

- while comparing the effect of testosterone injections in both groups, there was statistically significant correlation between the etiology of disorder of sex development and the effect of testosterone injections on penile length. Boys with 5 alpha reductase deficiency had variable but significant increase in SPL after injections in comparison with partial androgen insensitivity boys. (Table 3, Figure 1)
- Adverse effects like pubic hair and darkening of genital skin were noticed in six patients (13.6%).

- Six boys needed to repeat the course of treatment to improve the penile length before surgery. Five of them had partial androgen insensitivity.

Table (3): Correlation between diagnoses and % of increase in stretched penile length

% of increase in length	Diagnosis		U	p
	Partial androgen insensitivity (n=22)	5 alpha reductase deficiency (n=22)		
Min. – Max.	12.0 – 78.26	11.11 – 145.0	95.0*	0.001*
Mean ± SD.	33.27 ± 19.33	67.26 ± 34.20		
Median (IQR)	29.33 (20.0–40.0)	60.0 (45.0–100.0)		

U: Mann Whitney test
p: p value for comparing between the two categories
*: Statistically significant at $p \leq 0.05$

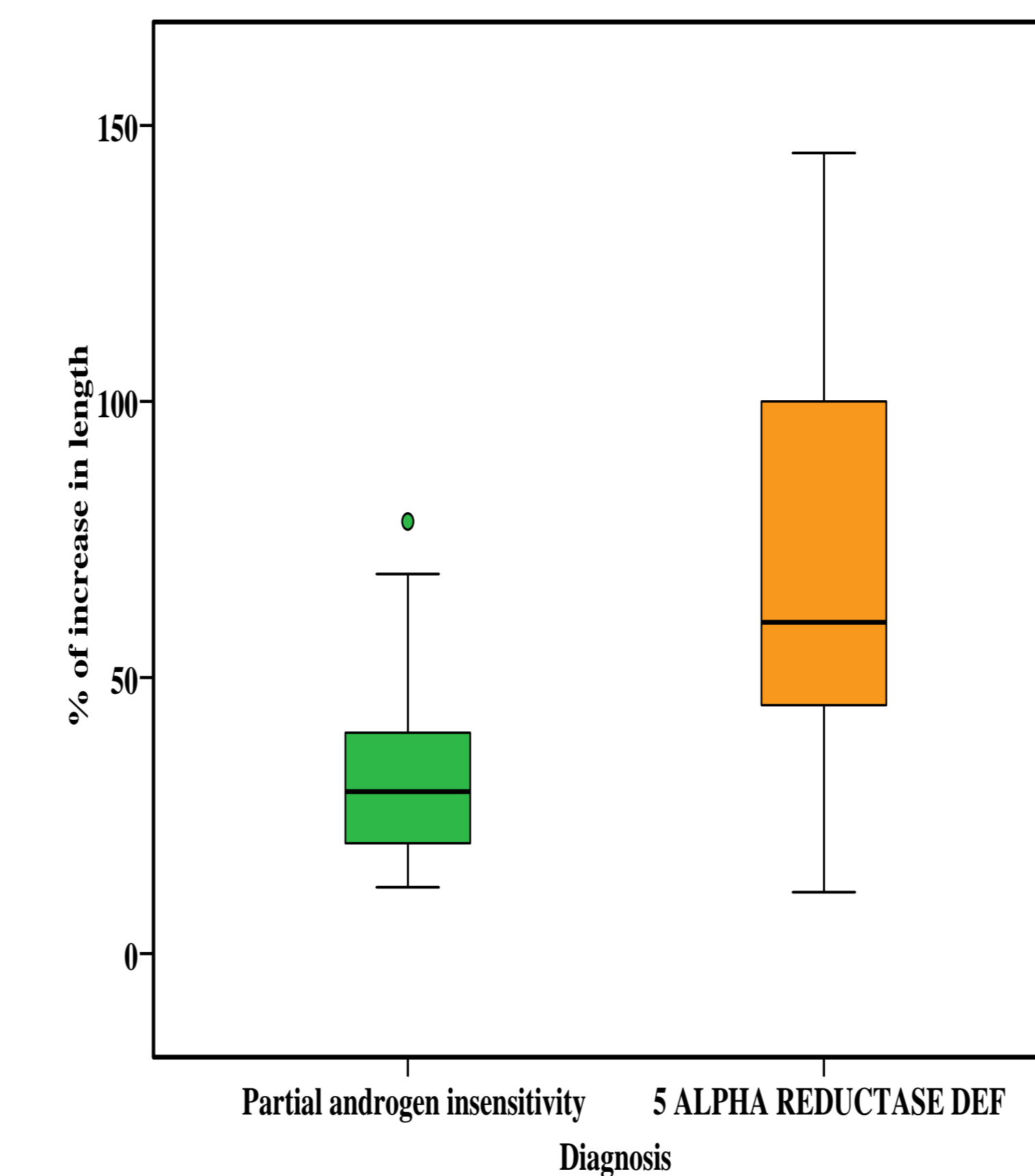


Figure (1): Correlation between diagnoses and % of increase in SPL

CONCLUSIONS

- Preoperative testosterone injections can help the treating team to reach an accurate diagnosis and proper sex assignment as they can differentiate between partial androgen insensitivity and 5 alpha reductase deficiency
- Patients with partial androgen insensitivity may need more than one course of testosterone injections or increasing the dose of injection to 50 mg.

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CONTACT INFORMATION

drshimoraafat@yahoo.com

S_elsaid00@Alexmed.edu.eg