

Evaluation of early puberty in boys and girls with Silver-Russell Syndrome: Discordance between testicular growth and pituitary-gonadal hormones in male cases

Melek Yildiz¹, Firdevs Bas¹, Birsen Karaman², Sukran Poyrazoglu¹, Seher Basaran², Feyza Darendeliler¹

¹Istanbul University, Istanbul Faculty of Medicine, Department of Pediatric Endocrinology, Istanbul, Turkey

²Istanbul University, Istanbul Faculty of Medicine, Department of Medical Genetics, Istanbul, Turkey



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INTRODUCTION

In Silver-Russell Syndrome (SRS), it is known that puberty starts early, frequency of premature adrenarche increases and adrenarche progresses aggressively.

However, data regarding gonadal functions and testicular development in males during pubertal period is still insufficient.

AIM

The aim of this study was to reveal the characteristics of puberty and gonadal features in our SRS cases.

METHOD

Twenty-four cases (9F, 15M) who were followed-up with diagnosis of SRS between 1990-2020 were included in the study. The diagnosis of SRS was based on the Netchine-Harbison clinical scoring system. Age at onset of puberty, physical and gonadal characteristics at different pubertal stages were recorded.

RESULTS

Congenital genital anomalies were present in 47% of boys. Age at onset of puberty and BMI SDS were negatively correlated ($r=-0.584$, $p=0.028$). While bone age (median SDS -2.8; -7.2 and 1.3) was delayed in the prepubertal period, significant advancement was observed at the onset of puberty (median SDS -0.5; -4.3 and 3.1) ($p=0.003$).

Table 1. Patient characteristics in prepubertal and pubertal period

	All cases (n=24)	Boys (n=15)	Girls (n=9)
Prepubertal period (Mean age: 7.2 ± 1.7 years)			
Height SDS	-3.1 ± 0.9		
BMI SDS	-2.1 ± 1.7		
Bone age SDS	-2.8 (-7.2 and 1.3)		
Testicular volume (orchidometer)		1 ml (0.5 – 2)	
Testicular volume SDS		-1.8 (-3.4 and 0.2)	
Tanner stage 2 (Mean age: 10.6 ± 2 years)			
Height SDS	-2.2 ± 0.9		
BMI SDS	-1.1 ± 1.4		
Bone age SDS	-0.5 (-4.3 and 3.1)		
Pubertal onset (years)		10.6 (9 – 14.9)	9 (7.8 – 10.9)
Pubarche (years)		11 (9.3 – 14.1)	8.8 (8.2 – 9.9)
Menarche (years)			13.6

CONCLUSIONS

In SRS, onset of puberty is earlier. During puberty, there is an increase in BMI and acceleration in bone maturation. In boys, testicular volume does not correlate with pituitary-gonadal hormone levels. Therefore, findings such as somatic growth, acceleration in bone maturation, gynecomastia should be evaluated rather than testicular volume to evaluate pubertal onset. Thus, it will be possible to improve the height prognosis and to plan appropriate treatment.

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Prepubertal gynecomastia and high estradiol/estrone levels were observed in 2 patients with early puberty. Median testicular volume of 5 male cases who completed puberty was 11ml (9-15) and testicular volume SDS was -3.3 (-3.4 and -2.0). FSH, LH and testosterone levels were at normal pubertal levels in these patients. For girls, median age at menarche was 13.6 years and all periods were regular. The median final height was 155.6cm in boys and 148.5cm in girls.

Table 2. Clinical features and follow-up findings of cases who has completed puberty

	Sex	Age at presentation (years)	Follow-up time (years)	NH score	Accompanying genital anomalies	Prepubertal mean testicular volume (ml)	Mean testicular volume at the end of puberty (ml)	Pubarche (years)	Menarche (years)	Treatment	Adult height (cm)
Case 1	M	1.2	20	6/6	Unilateral cryptorchidism	1 (-2 SDS)	10 (-3.4 SDS)	12.5	-	GH	155.6
Case 2	M	2.7	17	5/6	-	1 (-2 SDS)	12 (-3.2 SDS)	14.1	-	GH	160
Case 3	M	4	14.5	6/6	-	2.5 (-1.3 SDS)	11 (-3.2 SDS)	10.7	-	GH	154.6
Case 4	M	0.1	18	6/6	Isolated penis chordae, left cryptorchidism, hypoplastic scrotum	0.75 (-3 SDS)	9 (-3.4 SDS)	11	-	GnRHh	157
Case 5	M	3.3	10.6	6/6	-	2 (-0.2 SDS)	15 (-2.3 SDS)	11.5	-	GH	153.6
Case 6	F	3.2	17.5	6/6	-	-	-	8.8	13.6	GH GnRHh	149
Case 7	F	3.8	12.5	6/6	-	-	-	8.2	14.6	GH GnRHh	149

CONTACT INFORMATION

Melek Yildiz, MD

melekyildiz81@Istanbul.edu.tr