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Case Report

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Detection of Puberty Tarda in a Patient Applied for Screening: A Case Report

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ABSTRACT

Puberty is a critical period in an individual's physical and psychological development. Annual physical examinations are recommended for adolescents, regardless of the presence of symptoms. This report presents the case of a 14-year-old licensed male football player who visited our Education Family Health Unit without any additional complaints and was evaluated for delayed puberty. The discussion emphasizes the importance of adopting and maintaining healthy eating habits during this stage of rapid physiological, psychological, and social growth. A thorough and detailed physical examination is essential for every adolescent presenting to family health centers.

Keywords: Delayed puberty, family practice, nutritional status

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INTRODUCTION

Adolescence, marked by the hypothalamic-pituitary-gonadal axis, is a key growth milestone. If this axis does not work by the age of 13 years in girls or 14 years in boys, delayed puberty may be diagnosed.[1] Although there is no universal definition for puberte tarda, it is commonly thought to occur when puberty signs are >2–2.5 standard deviations below the age average.[2] In the determination of this condition, it can be evaluated that breast budding (breast Tanner stage 2) has not started, even though being at the end of 13 years of age in girls, and testicular volume has not reached 4 mL (genital Tanner stage 2) even though being at the end of 14 years in boys.[3] Puberte tarda is a symptom rather than a diagnosis and may be due to chronic illnesses, excessive thinness, hypogonadotropic hypogonadism, hypergonadotropic hypogonadism, or constitutional delay of growth and puberty.[4]

"Protocol Guide for Infant, Child, and Adolescent Follow-up, published by the Ministry of Health of the Republic of Türkiye recommends annual adolescent follow-ups from 10 to 21 years.[5] Within the scope of the school screening programme, patients in this age group visit their family physicians. These visits should be used for anamnesis, physical examinations, growth assessments, and necessary laboratory tests. Conditions like delayed puberty should be identified early to ensure timely treatment and planning.

In this case report, it was presented a case of puberty tarda in a 14-year-old boy directed to our family health unit within the scope of the school screening programme without any complaints.

CASE REPORT

A 14-year-old male patient visited our family health unit without additional complaints. The patient is also a licensed soccer player. In accordance with national guidelines, anthropometric measurements were taken, a home, education/employment, eating, activities, drugs, sexuality, suicide/depression assessment was conducted, a comprehensive physical examination was performed, and the necessary laboratory tests were ordered.

The anamnesis revealed good school performance; also, he had a history of specific learning disabilities and speech disorders, with no current medication. Anthropometric measurements of the patients and growth percentile values according to Neyzi data are summarized in Table 1.[6]

Growth retardation was identified. On obtaining consent, a genital examination showed a stretched penile length of 3 cm, suggesting micropenis. Testicular volume was not assessed due to a lack of an orchidometer. There was no axillary or pubic hair, and the patient was evaluated as Tanner Stage-1. Other system examinations were normal. The home, education/employment, eating, activities, drugs, sexuality, suicide/depression, safety (HEEADSSS) assessment was performed, revealing no substance abuse. The patient's socio-economic status was low, with poor protein intake and an irregular diet, as reported by his parents.

The patient, with lagging height and weight percentiles and Tanner Stage 1, was referred through our system to the pediatric polyclinic for further evaluation of delayed puberty and growth retardation. In our patient's data checked through E-nabız (consent was obtained from the patient and parents), it was seen that he was referred to pediatric endocrinology.

Table 1. Anthropometric measurements of the patients and growth percentile values according to Neyzi data

	Measurements
Height (cm)	146.1 (SDS: −2.61, persentile: 0.45, Age of height: 11.34)
Weight (kg)	36.9 (SDS: −2.35, persentile: 0.94, Age of weight: 10.84)
BMI (kg/m^2)	17.29 (SDS: −1.29, persentile: 9.85)
Target height (cm)	161.3 (SDS: −2.42, persentile: 0.78)
Height of mother (cm)	147.3
Height of father (cm)	162.3

BMI: Body mass index; SDS: Standard deviation score.

Complete blood count and lipid profile were also requested, and the results were within normal ranges (checked in our center). Laboratory parameters of the patients are summarized in Table 2. Laboratory test results (checked in another hospital) indicated Vitamin D deficiency. Tissue transglutaminase immunoglobulin was <2 (negative), ruling out celiac disease. Alkaline phosphatase levels, expected to rise during growth periods, were low. Morning cortisol and adrenocorticotropic hormone levels were measured between

Table 2. Laboratory parameters of the patients

	Patient Value	Reference Value
25-hydroxy vitamin D (nmol/L)	55	≥50
Protein (g/L)	67.4	67–84
Albumin (g/L)	44.83	32–48
Sodium (mEq/L)	140	132–146
Potassium (mEq/L)	5.09	3.5–5.5
Magnesium (mg/dL)	2.28	1.3–2.7
Calcium (mg/dL)	9.70	9.1–10.3
Phosphorus (mg/dL)	4.62	3.4–5.9
ALP (U/L)	109	115–471
Fasting blood glucose (mg/dL)	87	70–99
TSH (mU/L)	3.11	0.51–4.94
Free T4 (mU/L)	1.07	0.83–1.43
FSH (U/L)	1.6	1.4–18.1
LH (U/L)	0.1	Tanner Stage-1: <0.02 – 0.5 Tanner Stage-2: 0.03 – 3.7 Tanner Stage-3: 0.09 – 4.2 Tanner Stage-4/5: 1.3 – 9.8
Estradiol (ng/L)	<11.80	11.8–48.9
Progesterone (µg/L)	<0.21	0.28–1.22
17-Hydroxyprogesterone (nmol/L)	1.25	1.79–10.42
Prolactin (µg/L)	3.44	3.2–13.5
Total testosterone (µg/L)	<0.07	1.448.42
DHEAS (µg/dL)	44.24	37.3–270.2
Cortisol (µg/dL)	7.98	5.2–22.4
ACTH (pg/mL)	15.3	<46
IGF-1 (µg/L)	106	177–507
IGFBP-3 (mg/L)	3.6	3.5–10
IgA (nephelometric) (g/L)	1.450	0.40–3.50

ACTH: Adrenocorticotropic hormone; ALP: Alkaline phosphatase; DHEAS: Dehydroepiandrosterone sulfate; FSH: Follicle-stimulating hormone; IgA: Immunoglobulin A; IGF-1: Insulin-like growth factor-1; IGFBP-3: Insulin-like growth factor binding protein-3; LH: Luteinizing hormone; T4: Thyroxine; TSH: Thyroid stimulating hormone.

07:00 and 09:00 a.m. The patient's insulin-like growth factor 1 level was below the normal reference range for age and Tanner Stage 1, while the insulin-like growth factor binding protein 3 level was normal.

Bone age was found to be 12.5 years, and calendar age was found to be older than bone age and height. Pelvic ultrasound revealed normal testicular dimensions (right: 16×12×15 mm, left: 15×12×24 mm), with no pubic or axillary hair, confirming Tanner Stage-1. The patient was referred to a dietician; a 2200 kcal high-protein diet was organized, and healthy nutrition recommendations were made; called for follow-up after 3 months to be evaluated in terms of puberty and short stature.

DISCUSSION

Puberty onset can vary based on nutrition, environmental factors, and genetics.[7] Gastrointestinal, endocrinologic, or psychological disorders can affect the puberty process. 62% of puberty tarda cases are constitutional, which have a family history of puberty tarda. 0.7% of the cases are hypergonadotropic hypogonadism patients; for example, gonadal dysfunction due to chemo- or radiotherapy, bilateral cryptorchidism, trauma to the testis, sex chromosomal anomalies like (45 X/46 XY) or Klinefelter syndrome (47 XXY). When all cases were evaluated, 36.8% of the cases were hypogonadotropic hypogonadism patients due to primary chronic or systemic illness (asthma, chronic renal failure, inflammatory bowel disease, celiac disease, anorexia nervosa), excessive exercise or malnutrition, or hypothalamic or pituitary failure/damage. Abdominal pain or changes in bowel habits may suggest inflammatory bowel disease or celiac disease. Symptoms such as weight loss or heat intolerance could indicate thyroid disease. Micropenis with cryptorchidism may suggest hypogonadism. In cases of excessive exercise and dietary restriction, anorexia nervosa should be considered during this period of intense physical and psychological changes. Nutrition has an important effect on puberty progression, for example, pesticide residues are largely found in daily consumed food such as fruits, vegetables, and dairy products. In a review which's about the effects of endocrine disruptors employed in agriculture on puberty, they explored that some of the chemicals can cause a delay in puberty progression of menarche.[8]

Proper nutritional habits are crucial during adolescence, a period influenced by socio-economic and cultural factors, and vital for establishing lifelong behaviors and preventing adult diseases.[8] Evaluating growth percentiles and monitoring puberty at healthcare visits, with a focus on healthy nutrition, is essential.[5] Family physicians play a key role in adolescent care through school screenings and regular visits, as demonstrated by our case, where history, physical examination, growth percentile evaluation, and Tanner staging were crucial for early diagnosis and referral.

CONCLUSION

Monitoring growth and puberty in adolescents is crucial for their health. Any interruption in this monitoring could indicate underlying conditions. Following guidelines, primary care physicians should conduct thorough anamnesis, physical examinations, growth assessments, Tanner staging, and psychosocial HEEADSSS evaluations for every adolescent.

Disclosures

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