Endocrine function, vitamin D and bone mass status in β-thalassemia major.

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OBJECTIVES

Despite the regular transfusions and advanced iron chelation protocols, endocrine complications have been reported as the frequent morbidities of thalassemia.

The aim of the study was to

i) investigate the prevalence of endocrine complications

ii) to examine the relationship between endocrine complications and metabolic parameters

iii) to investigate vitamin D status and bone mineral density in these patients.

METHODS

- Clinical data of 84 thalassemia major patients (46 females, 38 males) were evaluated from the thalassemia clinic in a single center, in Turkey.
- Height and weight measurement, pre-transfusion haemoglobin, serum ferritin, calcium, phosphorus, alkaline phosphatase, free thyroxine, TSH and vitamin D concentration were examined.
- Follicle stimulating hormone (FSH), luteinizing hormone (LH), estradiol and/or total testosteron levels were evaluated in females ≥13 and males ≥14 years old.
- Somatomedin-C (IGF-1) levels were evaluated in children with short stature (height standart deviation score (SDS) ≤-2).
- Oral glucose tolerance test (OGTT) was performed to patients with impaired fasting glucose.
- Dual energy X-ray absorptiometry (DEXA) method with Lunar Prodigy machine (General Electrics) was performed to evaluate bone mineral density (BMD) in patients older than 10 years old.
- T-scores of BMD of lumbar vertebral bodies in patients older than 20 years old, Z-scores of BMD of lumbar vertebral bodies adjusted for to age and gender in patients younger than 20 years old were recorded.

RESULTS

Table 1. Clinical and laboratory data of the patients

	Mean±SD	min-max value
Age (years)	19.35±9.5	3.48-53.9
Weight SD score	-1.13± 1.41	-3.9-1.56
Height SD score	- 1.44± 1.21	-3.78-1.45
BMI SD score	-0.40±1.09	-3.42-1.7
Pre –transfusion Hb (g/dl)	8.84±0.71	6.4-9.2
Serum ferritin (ng/ml)	1991.14±1789	290-8138
25-OH-vitamin D (ng/mL)	16.62 ±5.88	2.4-30.1
PTH (pg/mL)	49.09±22.54	6.2-141.2
Calcium (mg/dL)	9.3±0.56	6.4-10.8
Cortisol (µg/dL)	13.27 ±5.47	5.32-35.4
fT4 (ng/dL)	1,03±0.12	0.9-1.40
TSH (IU/mL)	2.37±1.14	0.5-5.6
Age at first chelation	4.04±1.90	1.10±8.2
BMD (gr/cm^2)	0.85±0.14	0.6-1.32
Lumbar Z score (corrected)	0.44±1.08	-1.71-2.6
Lumbar T score	-2.05±1.11	-4.6-1.4

Table 2. Prevelance of endocrinopathies in TM patients.

		Pediatric (n =45)	Adult (n=39)	Entire study group (n=84)
Short stature (height SDS ≤-2)		19/45 (42%)	7/34	26/84(30.1%)
Impaired gonadal function	female	3/12 (25%)	7/24 (29.1%)	10/36 (27.7%)
	male	2/8 (25%)	5/15 (33.3%)	7/23 (30.4%)
Hypothyroidism		0/45	3/39(7.6%)	3/84 (3.6%)
Hypoparathyroidism		0/45	2/39 (5.1%)	2/84 (2.4%)
Vitamin D insufficiency		45/45 (100%)	38/39(97.4%)	83/84(98.8%)
Vitamin D deficiency		30/45(66.7%)	26/39 (66.7%)	56/84(66.7%)
Diabetes Mellitus		1/45(2.2%)	3/39 (7.6%)	4/84(4.7%)
Impaired glucose tolerance		0/45	3/39 (7.6%)	3/84(3.6%)
Osteopenia		6/45(13.3%)	12/39(30.7%)	18/84 (21.4%)
Osteoporosis		0/45	16/39(41%)	16/84(19%)

- There was a negative correlation between BMD and vitamin D, ALP levels (r=-0.261,p=0.04, r=-0.48,p<0.01, respectively).
- Seventy three (86.9%) of the patients were on deferasirox treatment. Remaining were on deferoxamine and/or deferiprone treatment.
- There was a negative correlation between deferasirox dosage and BMD (gr/cm2) (r=-0.27, p=0.03).
- There was no correlation between serum ferritin levels and laboratory data.
- There was no significant difference in serum ferritin levels between patients with and without endocrinopaties.

CONCLUSIONS

- Most frequent complication was vitamin D deficiency and osteopenia/osteoporosis in our cohort.
- We want to highlight the importance of vitamin D replacement and early prevention of osteoporosis in thalassemia patients.

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Bone

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