Multiple endocrinopathies in ß thalassemia major child – A case report

Pottabathula Vinod kumar[1], B. C. Yelamali[2,*]

[1]Resident, [2]Professor,Dept. of Paediatrics, S. Nijalingappa Medical College & H.S.K. Hospital & Research Centre, Navanagar, Karnataka, India

***Corresponding Author: B. C. Yelamali**
Email: drbhuvaneshwari@gmail.com

Abstract
Beta thalassemia is a chronic blood disorder characterised by decreased production of beta globin chains and excess accumulation of the other globin chains. Multiple endocrinopathies in β thalassemia major patients are common. Because of iron overload, multiple endocrinopathies are still prevalent despite extensive chelation therapy. Usuallylife expectancy may be increased by regular blood transfusions, butthere might begrowth problems, thyroid dysfunctions, hypoparathyroidism and hypocalcaemia. Here we are presentingaunusual case of various endocrinologicaldys functions in a chronic case of β thalassemia major.

Keywords: Hypoparathyroidism, Hypocalcaemia, β-Thalassemia major.

Introduction
Survival of thalassaemic patients can be increased by repeated blood transfusions and extensive chelation therapy, still endocrinopathies like growth disturbances, diabetes mellitus, thyroid dysfunctions and unusually hypoparathyroidism in β thalassemia major patients can be seen.[1]Severe Hypoparathyroidism is usually associated with hypocalcaemia and presents with other symptoms like tetany, carpopedal spasm, paresthesia.[2]So, there is a need of regular hormonal profile assays in thalassaemic patients.

Case Report
A16 years aged girl, who is a known case of β-thalassemia major, brought to the emergency department of S.Nijalingappa Medical College & HSK Hospital, Bagalkot with dyspnoea, dysphagia, carpopedalspasm. At 3 months of age based on clinical features and investigations like High-performance liquid chromatography of Haemoglobin she was diagnosed as β-thalassemia major. From the age of 3 months, she is receiving repeated blood transfusions untiltoday. On general examination, the girl was of mild to moderately built with moderatepallor and icterus, stunted growth (<3rd centile). She had typical haemolytic facies with frontal bossing, mal-occluded teeth, prominent malar prominences and high arched palate. On systemic examination she had splenohepatomegaly. The girl belongs to Tanner stage 2 and had not attained menarche. She was supplemented with oxygen and intravenous calcium gluconate infusion for her presenting symptoms like difficulty in breathing and carpopedal spasm. The blood investigations showed Haemoglobin level of 7.1 g/dl, RBC count of 2.23million/cmm, 85000/cu.mm of platelets and slightly elevated reticulocyte count of 3%.The serum electrolyte levels areMg^{+2}-1.5mg/dl, Na-133 meq/L, K-3.1 mg/dl and $PO4^{3}$—4.2 mg/dl. The peripheral blood smear picture showed normocytic hypochromic anemia with pancytopenia and anisocytosis. The free calcium level was5.2mg/dl and ionised calcium level was 1.4mg/dl, both were found to be less than the normal value. The serum vitamin D3 level was 11.265 nmol/l (recommended reference level 36- 144nmol/l) and parathyroid hormone (iPT) level was of 4pg/ml (the recommended reference level 10- 65pg/ml) and concluded that both values were lowered compare to the normal values. In liver function tests, Liver enzymes were slightly elevated. The renal function tests like urea and creatinine etc were within normal ranges, but the urinary calcium excretion was increased from 77.2mg/dl to 209 mg/dl and serum calcium was also increased to 8.0mg/dl after treating with calcium gluconate. Which was suggestive of severe hypoparathyroidism. Serum ferritin was 2873 ng/ml which was very highly elevated than the normal threshold value, suggestive of iron overload. She is on deferasirox40 mg/kg/day since 9-10 yrs.

Fig. 1: Growth retardation

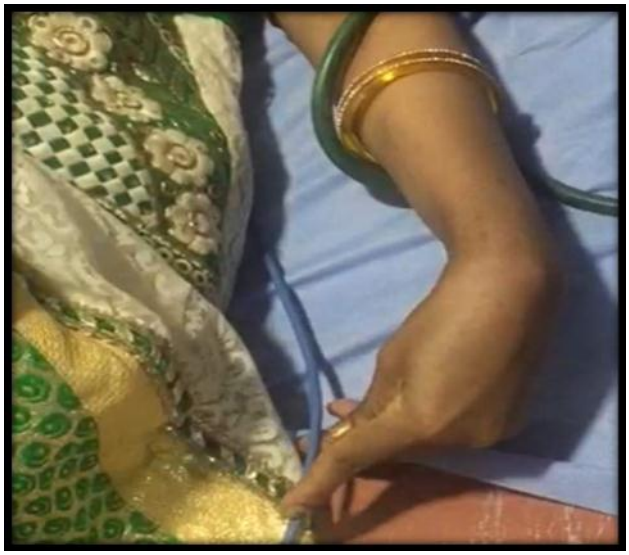

Fig. 2: carpopedal spasm

Discussion

In our case, the patient's serum ferritin status showed that she was suffering from iron-overload because offrequent blood transfusions. It has been already proved that the iron overload is the main culprit of various endocrinopathies in transfusion dependent patients.[3] The accumulation of iron in various organs may result in known complications, including diabetes, hypogonadism, hypothyroidism, low bone mass and hypoparathyroidism[4] In this case, we observed that growth hormone-insulin like growth factor axis dysfunction was the main cause of the growth retardation. As we all knew that different hormonal factors like GH, IGF-I, sex hormone and their receptors influence the bone metabolism and skeletal consolidation.[5]Adding to that, chelation therapy may also be one of the important cause of growth retardation, in transfusion dependent thalassemia major patients, like our case. Deferasirox– a iron chelating agent, though it decreases iron overload, it may also causes bony lesions like genu-valgumand spinal growth retardation.[6] Hypogonadism, bone marrow expansion, increased iron stores and Deferasirox toxicity may also lead to osteoporosis and osteopenia in transfusion dependent thalassemia patients.[7]Vitamin D deficiency and Hypocalcaemia may also causes the osteopenia in such patients. The elevated iron overload results in elevation of serum ferritin and deposition of iron in parathyroid glands, which may be a cause of reduced parathyroid function and leading to Vitamin D deficiency.

Conclusion

From the above discussion, it is obvious that multiple end ocrinopathies like hypoparathyroidism and hypocalcaemia are still important causes of morbidity even though the newer emergence of chelation therapy, hence we reported this case. This case report may be useful for practitioners for understanding and effective management of beta thalassemia patients by growth monitoring, periodic assessment of hormones and correction of any deficiencies.

Funding: None.

Conflict of Interest: None.

References

1. Olivieri NF, Nathan DG, MacMillan JH, Wayne AS, Liu PP, McGee A et al. Survival in medically treated patients with homozygous ß-thalassemia. *N Engl J Med*1994;331:574–578.
2. Aloia JF, Ostuni JA, Yeh JK, Zaino EC. Combined vitamin D parathyroid defect in thalassemia major. *Arch Intern Med*1982;142:831–832.
3. De Sanctis V, Vullo C, Bagni B, Chiccoli L. Hypoparathyroidism in beta-thalassemia major. Clinical and laboratory observations in 24 patients. *ActaHaematol*1992;88:105–108.
4. Ho WL, Chung KP, Yang SS, et al. A pharmaco-economic evaluation of deferasirox for treating patients with iron overload caused by transfusion-dependent thalassemia in. J Formosan Med Assoc. 2012;xx:1–9
5. Lasco A, Morabito N, Gaudio A, Crisafulli A, Meo A, Denuuzzo G et al. Osteoporosis and beta-thalassemia major: role of the IGF-I/IGF-III axis: *J EndocrinologicalInvesigation* 2002; 25(4):338-344.
6. De Virgiliis S, Congia M, Frau F, Argiolu F, Diana G, Cucca F. et al Deferoxamine-induced growth retardation in patients with thalassemia major: *J Pediatr* 1988;113(4):661-669.
7. Domrongkitchaiporn S, Sirikulchayanonta V, Angchaisuksiri P,Stitchantrakul W, Kanokkantapong C, Rajatanavin R Abnormalities in bone mineral density and bone histology in thalassemia. *J Bone Miner Res*2003;18:1682–1688.

How to cite this article: kumar PV, B. C. Yelamali, Multiple endocrinopathies in β thalassemia major child – A case report. *Int J Med PaediatrOncol*. 2019;5(1):37-38.