



A Case Report

Overt hypothyroidism presenting as a case of severe anaemia: A case report.

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Abstract:

Hypothyroidism and anaemia are frequently related. A 22 year old patient presented with severe anaemia with weakness, tiredness and loss of appetite for the last three years. She gave no history of any acute or chronic blood loss. She underwent treatment for the same including several episodes of blood transfusion with no response. 2D Echocardiography revealed grade 1 diastolic dysfunction with moderate circumferential pericardial effusion and her TSH level was very high. She was started on iron and folic acid tablets and 100 microgram thyroxine per day. The patient recovered drastically over a period of 5 weeks with recovery of her symptoms and resolution of anaemia. Hence the diagnosis of hypothyroidism should be ruled out in patients presenting with severe anaemia.

Keywords: overt hypothyroidism, very severe anaemia, pericardial effusion, hypomenorrhoea.

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Introduction

There is a frequent association of anaemia with thyroid dysfunction with 21-60 % of patients with hypothyroidism reporting anaemia. The morphologic type of anaemia is not specific and may vary from normocytic-normochromic to hypochromic microcytic to macrocytic anaemia (1). A possible causal relationship between the two has led researchers to hypothesise

different theories. Both spectrum of thyroid disorders are assumed to potentially affect erythropoiesis with peripheral blood picture reflecting the effects in red cell abnormality and decrease in proliferation of hematopoietic progenitor cells (2). Here we report a case of very severe anaemia in a young girl of 22 years presenting to our OPD with weakness and tiredness for the last three years.

Case Report

22 years young female with 47 kgs and BMI of 21.17 kg/m² presented to outpatient department of our institution in view of ultrasound finding of ovarian cyst. She gave history of being very weak and always feeling tired with loss of appetite and hypomenorrhea for the last three years. She gave no history of puberty menorrhagia, epistaxis, gum bleeding, passage of black stools, ecchymosis, petechiae or any history suggestive of chronic or acute blood loss ever. She gave no history of breathing difficulty or palpitation. She consulted a number of physicians before reporting to our institution. She was transfused 4 units packed cells one year back and another 2 units 3 months back.

On examination she was pale white in colour with puffy face, dry coarse skin, thin scanty hair on scalp and coarse voice. Her investigations are presented in Table 1.

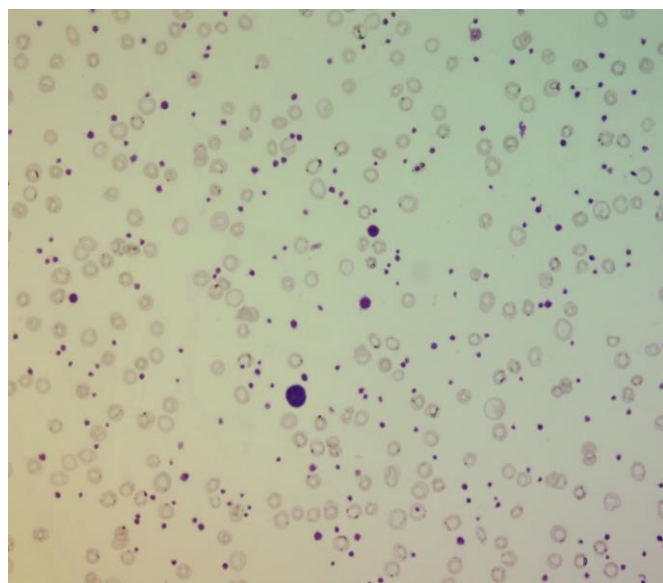
Table 1: Investigations of the patient on admission.

Investigation	Values
Complete Blood Count	
Haemoglobin	2.9 g/dl
TLC	6.10
RBC count	1.14 million/cu mm
PCV	11.1
RDW-CV	18.8
RBC Indices	
MCV	77.4
MCH	25.4
MCHC	26.1
Platelets count	1.42 lakh/microL
ESR	100
Coagulation Profile	
INR	0.98
APTT	23.3 secs
Plasma Fibrinogen	319mg/dL
FDP	<5 gm/dL
D dimer	<250 ng/ml
CR protein	<0.2
Iron Profile study	
Serum ferritin	<10ng/ml
Serum Iron	15.9 microgram/dl
UIBC	393.4 microgram/dl
Liver Function test	
Total Bilirubin	0.92 mg/dl
Albumin	3.95 g/dl
Globulin	3.09 g/dl
A/G Ratio	1.28
Gamma G.T	22.3 IU
SGOT	86.1
SGPT	64
LDH	586
Kidney Function Test	
Serum Urea	20.4 mg/dl
Serum Creatinine	0.93 mg/dl
Serum potassium	4.18 mEq/L
Serum Electrolytes	
Serum sodium	133 mEq/L
Serum calcium	8.8 mg/dl

Serum Chloride	106.50 mEq/L
Serum vitamin B12	313 pg/ml
Serum folic acid	7.2 ng/ml
Thyroid Function tests	
TSH	>150 µIU/ml
FT3	0.26 pg/dl
FT4	0.13 ng/dl
Peripheral blood smear examination	RBC show anisocytosis. Microcytic hypochromic RBCs. WBCs: normal in range and distribution. Platelets adequate.
Stool for occult blood	Negative
2D Echocardiography	Ejection Fraction 60%. Grade 1 diastolic dysfunction. Moderate circumferential pericardial effusion (approx.. 23 mm).

She had severe anaemia (Hb=2.9 gm/dl) with peripheral blood smear examination suggestive of microcytic hypochromic anaemia (Figure 1).

Figure 1: Peripheral Blood Smear showing microcytic hypochromic anaemia.



Iron profile study was consistent with iron deficiency anaemia. 2D Echocardiography was done which revealed grade 1 diastolic dysfunction with moderate circumferential pericardial effusion (approximately 23 mm). Blood Coagulation parameters were normal. Liver and renal function tests showed no abnormal values. Viral marker reports were negative. Antinuclear antibody (ANA) was negative. Haemoglobin electrophoresis was normal. However, her TSH level was very high.

She was transfused one unit packed cell. The patient and her parents did not consent for further blood transfusion and hence she was started on iron and folic acid tablets and 100 microgram thyroxine per day. Thyroxine was asked to be taken in empty stomach in the morning 30 to 45 minutes before breakfast. Iron tablets were advised to be taken with lemon water 1 hour after meal. After 5

weeks the girl reported and it was difficult recognising her as there was complete transformation. She came with pink, glowing cheeks. Investigations were repeated and her haemoglobin level was 10.2 gm/dl. Her TSH was 10.46 μ U/ml.

Discussion

The relationship between thyroid dysfunction and anaemia has long been established with findings of higher odds of anaemia in individuals with both spectrum of overt and subclinical thyroid dysfunction. The index case report had such severe degree of anaemia that her survival was sustained with regular blood transfusions. With no history of acute or chronic blood loss, such a finding of severe anaemia in a young girl indeed puts the diagnosis at dilemma.

Daisy et al. in their individual participant data meta-analysis found that thyroid dysfunction of any spectrum is associated with slightly lower haemoglobin levels (3). In a cross-sectional analyses of 50 patients with hypothyroidism by Shah S et al, only 2 patients had haemoglobin between 5.5 – 7.4 gm/dl (1). Nomura et al way back in 1989 found an anaemic 55 year old woman with hypothyroidism reported with haemoglobin of 4.4 gm/dl (4). Our case had haemoglobin of 2.9 gm/dl when she reported to our institution and is indeed a rare finding with thyroid organ disorder. The diagnosis of overt thyroid dysfunction eluded in our case for a long time (three years) during which she was transfused blood regularly. Due to absence of chronic or acute blood loss by any means, the diagnosis was challenging for the treating physicians. There is similar case report of paediatric boy of 6-year-old boy who presented with severe anaemia (Hb) 3 gm% with low triiodothyronine (T3) and thyroxine (T4) level and increased thyroid-stimulating hormone (TSH) level (5). Both these cases show that anaemia is not always caused by deficiency of nutrients.

It is presumed that iron deficiency anaemia impairs thyroid metabolism through diminished oxygen transport (6). The synthesis of thyroid hormone may be impaired by affecting the efficacy of thyroid peroxidase (TPO) which is a heme-containing enzyme playing a vital role in the first two steps of thyroid hormone synthesis (6). However there are other theories of hypothyroidism causing anaemia through instability in the levels of hormones and associated malabsorption. Because our patient responded to treatment only after thyroid hormone replacement and not with iron and vitamin

supplements prescribed by other physicians prior to attending our institution, we believe that thyroid dysfunction has a pathophysiologic role in the causation of IDA in our patient. The mechanisms however needs to be elucidated.

The adverse effects of severe anaemia was evident in her symptoms as well as echocardiography finding of pericardial effusion. The incidence of pericardial effusion associated with hypothyroidism varies with regard to severity of the thyroid dysfunction accounting for 3% to 6% in mild cases and 30% to 80 % in severe cases (7). The pathophysiology of the disorder is related to the increase in the permeability of pericardial capillaries to albumin along with decline in drainage of albumin to lymphatic vessels. This in turn elevates the pericardial colloid pressure causing exudative pericardial effusion in the pericardial space (8–10). Hypothyroidism inducing the release of histamines by mast cells as well as altered permeability of endothelial layers of pericardial capillaries are proposed theories for increased albumin permeability (11). Pulmonary hypertension with elevation of right heart pressure caused by hypothyroidism are assumed to impair lymphatic drainage (10).

Hence hypothyroidism is an endocrine disorder the suspicion of which should be kept in patients presenting with anaemia having no other obvious cause. Strong suspicion in such cases will avoid the morbidities associated with the disorder, the dreaded among them are heart failure and myxoedema coma.

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Consent : Written consent was taken from the patient for publication of her case record.

Declaration: The authors declare no conflict of interest.