

Glycaemic abnormalities and Normal Thyroid Function in Adolescent Survivors of Childhood Acute Lymphocytic Leukaemia Who Required Repeated Packed Red Cell Transfusion during treatment

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Introduction

Packed red blood cell (PRBC) transfusions are an essential component of leukemia treatment regimens. Transfusion-induced iron overload can be seen after approximately 10 to 20 transfusions. Very little is known about transfusion-related iron burden in oncology populations and its possible effect on endocrine function and glycemia

Methods and Materials

We evaluated growth parameters and endocrine disorders in relation to the iron overload status measured by serum ferritin concentration and the quantity of liver iron (LIC) measured by the Ferriscan method .

7 adolescents aged 16 +/- 1.5 years treated with conventional chemotherapy for acute lymphocytic leukemia (ALL) between 2-4 years post diagnosis, who received more than 10 packed red cells transfusions (PCT) during their treatment.

Anthropometric measurements were recorded and height SDS and BMI were calculated. Lab investigations included measuring hepatic enzymes (ALT, AST and ALP), fasting blood glucose (FBG) and thyroid function (free T4 and TSH)

Results

The mean HtSDS of patients = -1.25 +/- 0.53, and their mean BMI = 24 +/- 5.2 kg/m². None had HtSDS < -2 and 1 had BMI > 30 (Obese).

They all had normal hepatic enzyme concentrations (ALT, AST and ALP) and renal function. Their mean serum ferritin = 853 +/- 480 ug/L and their LIC ranged between 1.2 and 5.6mg Fe/g dry liver (mild iron liver iron overload) .

All had normal FT4 and TSH levels.

- One had diabetes (BMI = 24, FBG = 7.4 mmol/L, ferritin level = 1600 ug/L and LIC = 3.3 mg Fe/g dry liver) and
- One had impaired fasting glucose (BMI = 20.4, FBG= 6.5 mmol/L, ferritin level 1250 ug/L and LIC = 3.4 mg Fe/g dry liver).

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Results

Endocrinopathy in Adolescents with Acute Lymphocytic Leukaemia treated with multiple Packed cell transfusions

Pt	Age	AST	ALT	ALP	Glucose (F)	FT4	TSH	Ferritin
	yr	U/L	U/L	U/L	mmol /L	pg/m L	U/ml	ng/ml
1	14	21	14	83	4.7	14	1.5	74
2	17	18	13	56	7.5	13.92	3.58	1603
3	17	11	36	87	5.6	12.1	1.13	934
4	17	24	14	68	5.6	15.4	1.3	699
5	18	21	13	194	6	12	2.3	1250
6	19	34	23	147	5.3	11	1.23	561
7	17.0	21.5	18.8	105.8	5.8	13.1	1.8	853.5

Growth in Adolescents with Acute Lymphocytic Leukaemia treated with multiple transfusions

Patients	Age	HtSDS	Wt	BMI
1	14.0	-0.3	69.0	22.0
2	17.0	-1.4	74.0	24.7
3	17.0	-1.8	91.8	35.0
4	17.0	-1.1	44.6	20.6
5	18.0	-1.8	53.5	20.4
6	19.0	-1.1	57.0	21.7
7	17.0	-1.3	65.0	24.1

Conclusions

Adolescent survivors of childhood ALL with a history of repeated PCT and serum ferritin > 1000 ug/L had higher risk for developing glycaemic abnormalities and they may need iron chelation and follow up of their glycaemic status.

