

Thyroid dysfunction in children after hematopoietic stem cell transplantation : short term follow-up for 12 months

Yeon Jin Jeon, In Ah Jung, Shin Hee Kim, Won-Kyoung Cho, Jae-Wook Lee, Kyoung Soon Cho, So Hyun Park, Nak-Gyun Chung, Min Ho Jung, Bin Cho and Byung Kyu Suh

Department of Pediatrics, College of Medicine, The Catholic University of Korea, Seoul, South Korea

Introduction

- Hematopoietic stem cell transplantation (HSCT) is a potentially curative therapeutic modality for patients with hematological malignancies.
- Endocrine dysfunctions are well-known complication after HSCT ; thyroid dysfunction and gonadal failure are most commonly observed adverse effect among the endocrinopathies.

Objective

- To evaluate 12 months follow-up of thyroid function in patients who underwent HSCT during childhood and adolescence of hematological malignancy.
- To evaluate the risk factors to predict thyroid dysfunction at 12 months.

Methods

- This study is a retrospective chart review of 217 hematologic-malignancy patients who underwent HSCT between January 2006 and December 2011. Patients enrollement is illustrated in Figure 1.
- Thyroid function of the patients was evaluated before and 1, 3, 6, 9, and 12 months after HSCT.

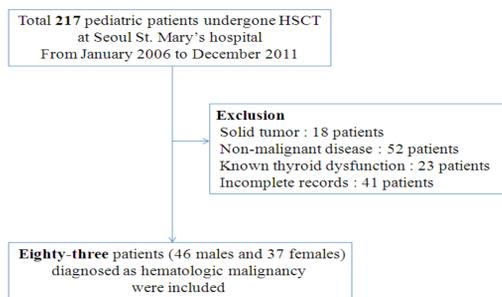


Figure 1. Study scheme.

Results

- There were 83 patients who met the inclusion criteria. The patient characteristics and treatment variable are presented in Table 1 and thyroid dysfunction after HSCT for 1 years who were studied are showed in Table 2.

Table 1. Patient characteristics and treatment variables

	Number (n=83)
Age at HSCT (years)	9.78 ± 4.42
Sex Male/ female	46/37
Disease and disease status	
ALL	25
First CR	16
Second CR	9
AML	51
First CR	49
Second CR	2
CML-First chronic phase	7
Type of HSCT	
Sibling / Unrelated	21/62
Cell source	
BM/PBSC/Cord	10 /72/ 1
Acute GVHD	
0-I	53
II-IV	30
Chronic GVHD (Yes/No)	
None	34
Clinical limited	11
Clinical extensive	38
Death	6

Table 2. Incidence of thyroid dysfunction after HSCT during the 12 months follow up

	No. (%)
After 1 month	14/81 (7.3%)
normal	67
euthyroid sick syndrome	8
subclinical hyperthyroidism	2
hypothyroxemia	4
After 3 months	10/83 (12.0%)
normal	73
euthyroid sick syndrome	5
subclinical hypothyroidism	2
subclinical hyperthyroidism	2
overt hyperthyroidism	1
After 6 months	14/81 (17.3%)
normal	67
euthyroid sick syndrome	3
subclinical hypothyroidism	7
subclinical hyperthyroidism	2
hypothyroxemia	2
After 9 months	21/82 (25.6%)
normal	61
euthyroid sick syndrome	3
subclinical hypothyroidism	13
hypothyroxemia	4
overt hypothyroidism	1
After 12 months	20/83 (24.1%)
normal	63
euthyroid sick syndrome	2
subclinical hypothyroidism	13
hypothyroxemia	2
overt hypothyroidism	2
overt hyperthyroidism	1

- Figure 2 shows that the percentage distribution of thyroid dysfunction after HSCT over 12 months. forty-four patients (53.0%) had thyroid dysfunction during follow up.
- Significantly positive association between overall thyroid dysfunction incidence and time period after HSCT was observed (P for trend 0.035). among the thyroid dysfunction, subclinical hypothyroidism (SH) incidence increased significantly (P for trend 0.00015) and euthyroid sick syndrome (ESS) incidence decreased significantly (P for trend 0.031) (Figure 3).
- Figure 4 shows that the changes in thyroid hormone levels after HSCT during the 12 months follow-up.
- In univariate analysis, there was no significant risk factor of thyroid dysfunction at 12 months after HSCT (Table 3).

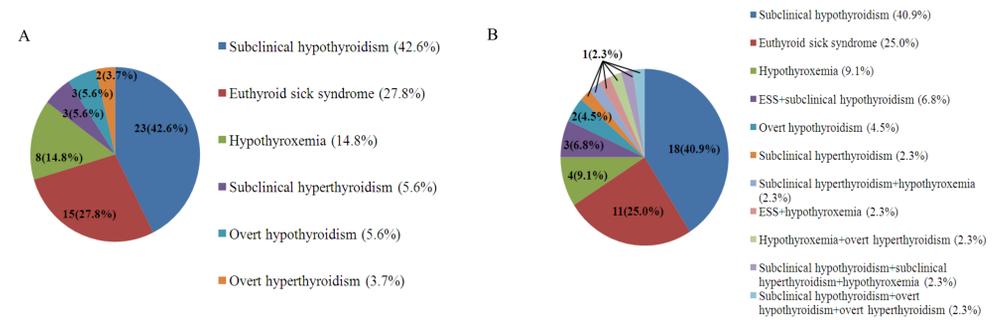


Figure 2. Percentage distribution of thyroid dysfunction incidence after HSCT. (A) Overall distribution of thyroid dysfunction incidence after HSCT. (B) Distribution of thyroid dysfunction incidence in each patients.

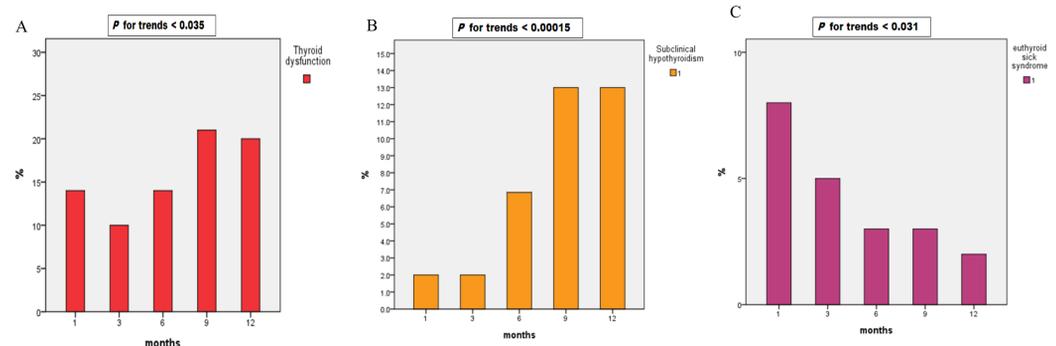


Figure 3. Frequency of thyroid dysfunction (A) and SH (B) and ESS (C) according to time.

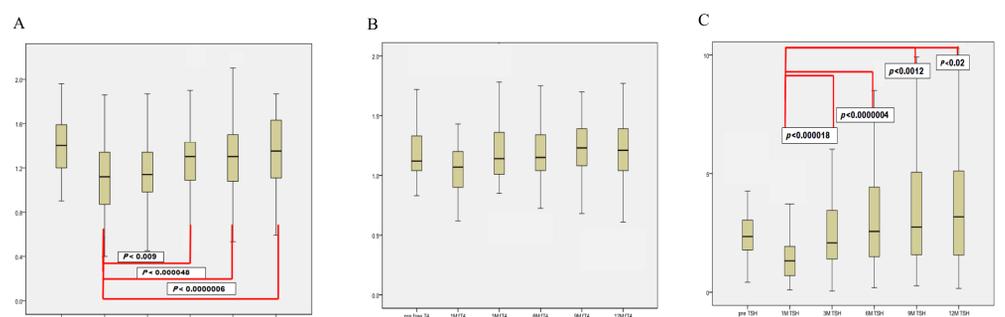


Figure 4. Changes in T3 (A) and fT4 (B) and TSH (C) levels over 12 months after HSCT.

Table 3. Risk factors associated with thyroid dysfunction at 12 months after hematopoietic stem cell transplantation

		Univariate logistic regression analysis	
		OR (95% CI)	P - value
Age at HSCT		0.913(0.813-1.025)	0.123
Sex	Male (n=46)	1	
	Female (n=37)	1.023(0.372-2.812)	0.965
Diagnosis	Lymphoid (n=25)	1	
	Myeloid (n=58)	1.008(0.336-3.019)	0.989
Conditioning regimen	BU based (n=56)	1	
	TBI based (n=27)	0.857(0.288-2.550)	0.782
aGVHD grade	0-I (n=53)	1	
	II-IV (n=30)	0.507(0.164-1.570)	0.239
cGVHD grade	0-Limited (n=45)	1	
	Extensive (n=38)	0.556(0.196-1.578)	0.270

Conclusion

After HSCT during childhood and adolescence, a significant number of patients experience thyroid dysfunction including ESS and SH. Short-term and continuous follow-up for thyroid function after HSCT is important to provide timely and appropriate treatment.