Glycaemic dysregulation in transfusion dependent thalassaemia patients in a children's hospital

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Introduction

- Thalassaemia patients are at risk of developing diabetes mellitus (DM) and pre-diabetes status due to iron overloading.
- The prevalence is 20 - 30% in adult patients.[1,2]
- Age, serum ferritin, T2* magnetic resonance imaging (MRI) of the heart and pancreas volume were found to be associated with DM.[3]

Objective

- To establish the prevalence of glucose dysregulation (DM and pre-diabetes) in a group of Thalassaemia children;
- To determine factors associated with development of this condition.

Method

- A cross-sectional study
- All Thalassaemic children 12 years old and above by 31 January 2015 were enrolled.
- They had annual blood screening for endocrinopathy, and regular ferritin monitoring. Cardiac T2* MRI was done once every 2 years.
- Their medical records were reviewed to extract the latest glucose levels, cardiac T2* MRI value, and calculate mean annual ferritin level.
- DM and pre-diabetes are diagnosed based on standard oral glucose tolerance test following WHO criteria.
- Pre-diabetes includes impaired fasting glucose (IFG) or impaired glucose tolerance (IGT).
- Differences between children with abnormal glucose level and those with normal glucose level were compared with Student *t* test or Mann-Whitney test for continuous data, and Fisher's exact test for categorical data.

Results

- Total 55 children fulfilled the criteria.
- Their characteristics are described in Table 1.
- Five DM and three pre-diabetes detected. Prevalence of glucose dysregulation in this cohort was 14.5%. (Figure 1)
- Comparison between children with abnormal glucose level and normal glucose level is shown in Table 2.
- Affected children were significantly older, shorter, with higher ferritin level and lower cardiac T2* MRI.

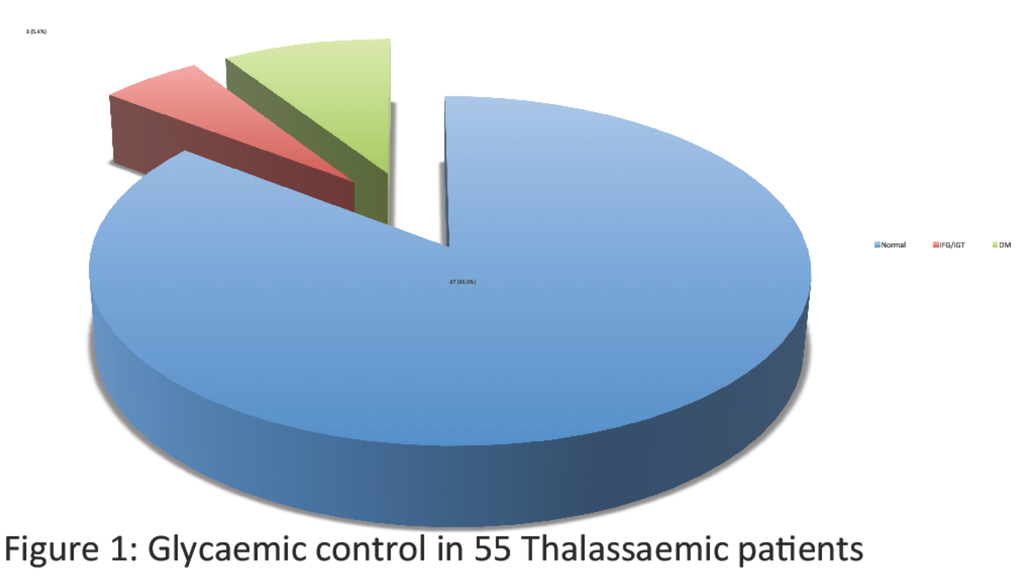

Figure 1: Glycaemic control in 55 Thalassaemic patients

Table 1: Characteristics of 55 patients

Age (years)*	14.0 ± 1.1
Gender Male Female	 32 (58.2%) 23 (41.8%)
Ethnicity Kadazan/ Dusun Chinese Bajau Melayu/ Brunei Others	 43 (64.2%) 6 (9.0%) 5 (7.5%) 3 (4.5%) 10 (14.9%)
Height SDS*	-2.62 ± 1.00
Puberty Prepubertal Pubertal	*n = 52* 35 (69.2%) 17 (30.8%)
Ferritin (ng/ml)	3296.0 (1912.0, 6958.5)
Cardiac T2* MRI (ms)	20.4 (8.5, 27.5)

*mean (SD), + median (25th, 75th centile)

Table 2: Comparison of clinical characteristics between 2 groups of glucose control

Parameters	Normal glucose	Abnormal glucose	*p* value
Age (years)*	13.9 (1.0)	14.8 (1.0)	0.022
Height SDS*	-2.50 (0.96)	-3.31 (0.89)	0.032
Ferritin (ng/ml)+	2842.5 (2095.3)	11224.5 (10103.5)	0.049
Cardiac T2* MRI (ms)+	21.2 (19.14)	5.82 (3.64)	0.009
Puberty Yes No	 31 13	 4 4	0.389

*mean (SD), + median (IQR)

Discussion

- Our studied population is younger compared to other studies.[1,2]
- The prevalence of glycaemic dysregulation is only slightly lower, but prevalence of diabetes in comparable to some adult studies.[4,5]
- Ferritin level was much higher and cardiac T2* MRI was much lower in the affected group compared to other study[3] indicates severe iron overload influence the development of glucose dysregulation in younger patients.
- Limitation in this study was the small sample size of our patients.

Conclusion

- Prevalence of glycaemic dysregulation is high even in pediatric thalassaemia patients.
- Older age, higher ferritin and lower cardiac T2* MRI are associated with development of this condition.

References

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