Management Practices of Thalassemia in Bangladesh

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Thalassemia is a blood disorder, transmit to the generations through inheritance in which the body makes an abnormal form or inadequate amount of hemoglobin. Hemoglobin is the protein in red blood cells that carries oxygen. The disorder results in large numbers of red blood cells being destroyed which leads to anemia.

There are main two types of thalassemia:-

i) Alpha Thalassemia-Occures when a gene or genes related to the alpha globin protein are missing or changed.

ii) Beta Thalassemia- Occures when similar gene defects affect production of the beta globin protein.

Undoubtedly thalassemias are emerging as a global public health concern. Standard thalassemia management comprises of a multidisciplinary approach involving an array of specialties including pediatric hematology, pediatrics, transfusion medicine, endocrinology, cardiology, dentistry, dieticians, psychology, psychiatry, social work along with a robust blood bank system and infrastructure.[1] In developing countries like Bangladesh, these multidisciplinary expertise and support facilities are not usually available in most public hospitals and private clinics. In addition, overall health awareness is very poor among the general population in Bangladesh and there is no organized patient referral system. As a consequence of inadequate access to healthcare, a significant proportion of the thalassemic patients might die even without knowing their disease conditions. There is no national policy or national health insurance system regarding thalassemia prevention in Bangladesh.

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Thalassemia Foundation Hospital (TFH) Dhaka, is a non government and pioneer specialized hospital in the country that solely deal with thalassemia management practice in Bangladesh. This day care service centre was established on 2008 by thalassemia support group and families of the patients. The procedure of thalassemia management practice in TFH is discuss below :-

After registration at the hospital each patient was provided a unique ID to maintain further documentation. At first visit to the center, detailed history, physical examination findings, height and weight, were recorded. CBC, Hb electrophoresis (Preferably at the time of diagnosis and prior to transfusion) basic metabolic panel, liver functions tests and baseline iron status were obtained. At initial visit, patients were assessed for the transfusion requirement. Patients were observed for 4 weeks and were followed up for clinical symptoms and Hb. Patients stable after this period were further monitored to determine the steady state Hb and correlation of Hb with clinical symptoms. This was to categorize the patients clinically into thalassemia intermedia and to determine transfusion trigger. Patients were followed up every 4-6 weeks for Quality Of Life (QOL). Worsening organomegaly and growth failure. Transfusion dependent patients were monitored for iron loading and medication side effects. Hydroxyurea was used in thalassemia intermedia patients and were followed up for QOL and Hb increment.

Last 5-years period (2018-2023) a total of 1594 thalassemia patients were served by TFH out of which 1178 complete cases were analyzed with a male to female ratio of 1.26. All cases of thalassemias were diagnosed using conventional electrophoresis method. Approximately 77.3% of the patients were diagnosed as HbE beta thalassemia, while nearly 15% were beta thalassemia major. About 91% patients (n = 971) required blood transfusion, where approximately 66.9% of them were Transfusion-Dependent Thalassemia (TDT) patients and 24.3% were Non-Transfusion Dependent Thalassemia (NTDT)

(Table I). About 41.1% of TDT patients required blood transfusion every 2-4 weeks. Due to incomplete medical record, the transfusion history was missing for 115 diagnosed cases (Approximately 9.7% of all cases).

Table I Pattern of thalassemia and transfusion practice in Bangladesh

Diseases types	n (%)	Median age (Year) at diagnosis	Transfusion status #/n (%)		
			TDT	NTDT	Not required
Hb-E-beta thalassemia	910 (77.25)	3.5	522/840 (62.14)	238/840 (28.33)	80/840 (9.52)
Beta thalassemia major	173 (14.69)	0.58	172/173 (99.42)	1/173 (0.58)	0/173 (0)
Beta thalassemia trait	64 (5.43)	27.5	8/26 (30.77)	14/26 (53.85)	4/26 (15.38)
Hb E disease	12 (1.02)	9	3/11 (27.27)	3/11 (27.27)	5/11 (45.45)
Hb-E trait	14 (1.19)	26	2/8 (25)	3/8 (37.50)	3/8 (37.50)
Others (H, Punjab D etc.)	5 (0.42)	4	5/5 (100)	0/5 (0)	0/5 (0)
Total	1178		712/1063	259/1063	72/1063
			(66.98)	(24.36)	(8.66)

Thalassemia carriers are healthy and do not require blood transfusion. Non-transfusion dependent thalassemias generally include HbE beta thalassemia and beta thalassemia intermedia that do not require regular blood transfusions for survival.[2]

Thalassemia Intermedia (TI) is defined as a group of patients with beta thalassemia characterized by diverse clinical severity between transfusion dependent thalassemia major and mild symptoms of beta thalassemia trait. Most TI patients are homozygous and compound heterozygous for beta thalassemia.[3] Based on clinical severity, HbE beta thalassemia could be classified into three categories: mild (15% cases) moderately severe (Majority of HbE beta thalassemia cases) and severe. Up to 50% of all patients with HbE beta thalassemia represent clinical manifestations similar to those of beta thalassemia major.[4]

Due to extensive clinical diversity, the management of NTDT is often challenging. Diagnosis and management of NTDT mainly depend on clinical observations. More than 60% of HbE beta thalassemia patients were treated as TDT while about 28% were NTDT (Table I). This unexpected higher proportion of transfusion dependent HbE beta thalassemia in Bangladesh might result from inaccurate or misdiagnosis of the severity of different clinical manifestations of thalassemia patients. It could also be attributable to using Hb level to determine need for transfusion in HbE beta patients as opposed to using other criteria including growth failure, delayed puberty, splenomegaly, tendency to thrombosis and pulmonary hypertension.[5] A complete mutation profile (DNA testing) prior to initiation of treatment is helpful to determine the prognosis, appropriate therapy and family counseling.[1]

Increased awareness among clinicians is a prerequisite for proper diagnosis and management of NTDT. Several studies have suggested the limitation of Hb level as a clinical decision indicator for starting transfusion dependent management since there were only minor differences in Hb levels (1.8-2.6 g/dl) between the mildest and most severe forms of HbE beta thalassemia. In addition, some children with HbE beta thalassemia were found to adapt to lower levels of Hb and managed almost normal life without transfusion.[2,6,7] Patients with NTDT sometimes could suffer from severe anemia due to acute infection, therefore, transfusion therapy is not recommended immediately after diagnosis of NTDT.[4] Despite this fact, patients are not dependent on regular transfusions for survival although transfusion therapy may provide significant clinical benefits for some patients if administered properly.[2]

Apart from patho-physiological, psychological and the financial burden, the regular arrangement of safe blood is one of the biggest challenges faced by transfusion-dependent families in developing countries. In Bangladesh, 85% of collected blood is contributed by patient's relatives and friends, while the rest (15%) is donated by voluntary blood donors.[8] Taking this into consideration, before starting transfusion therapy, accurate diagnosis should be a mandatory part of the thalassemia management practice in Bangladesh.

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