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A Case of Thalassemia-Hb S Disease in Jakarta

by

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In 1945, Silvestroni and Bianco described a hematologic syndrome caused by double heterozygosity for sickle hemoglobin and thalassemia genes. Sickle - cell thalassemia disease has been recognized in many individuals from several ethnic backgrounds especially in Africa. The clinical findings in individuals with sickle-cell thalassemia are remarkably variable, ranging from an asymptomatic mild microcytic anemia to a severe hemolytic state. Weathe rall (1964) recognized that according to the clinical and biochemical examinations there are 2 groups of sickle - cell thalassemia. The first group is characterised by a severe course, similar to that found in sickle - cell anemia, the electrophoresis pattern showing only a small quantity or even absence of Hb A. The second group is much milder in course, showing about 25 - 35% Hb A on electrophoresis. But some authors, Motulsky et al., (1954), Sturgeon et al., (1955), Went and Mac Iver (1958), Zuelzer (1959) and Pearson (1969) reported severe cases of sickle-cell thalassemia with Hb A production. So the prognosis cannot be predicted from the hemoglobin pattern in any individual case. Sickle-cell hemoglobin differs from Hb A by having in its two b-chains in position 6 a neutral valine residue instead of glutamic acid residue (alpha-2, beta-2, 6 glu-val.).

The first Hb S (Hb S trait) in Indonesia, was found by Lie-Injo Luan Eng (1956) in Jakarta. As far as we know the case presented in this paper, is the first patient with thalassemia-Hb S disease ever found in the Indonesian literature.

Methods

Peripheral blood examinations were done by routine methods. Hb F was determined by alkaline denaturation and hemoglobin electrophoresis was performed by using starch-block, cel-

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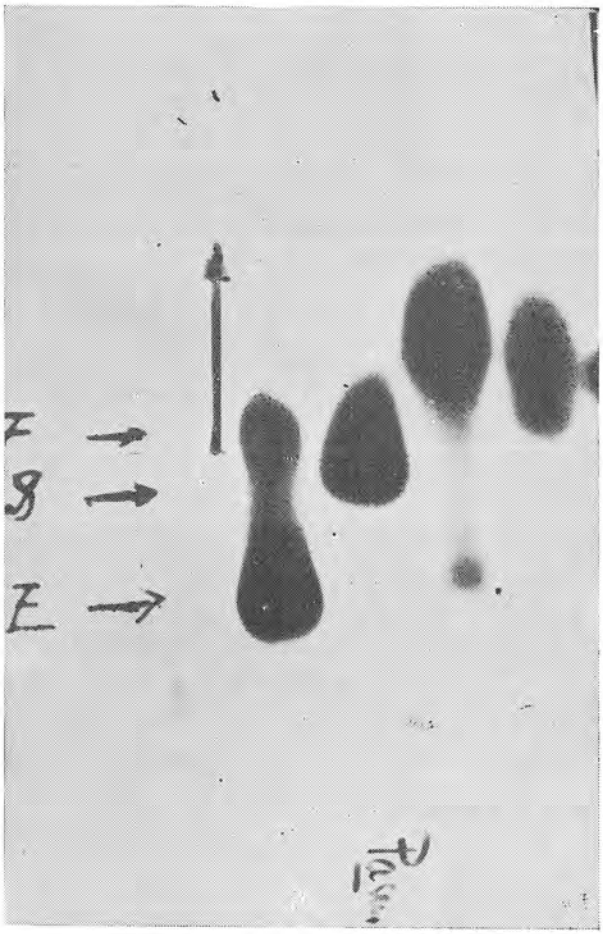

FIG. 1 : *Agar Electrophoresis of Hb. E. thalassemia disease, patients blood, control and thalassemia major (from left to right).*

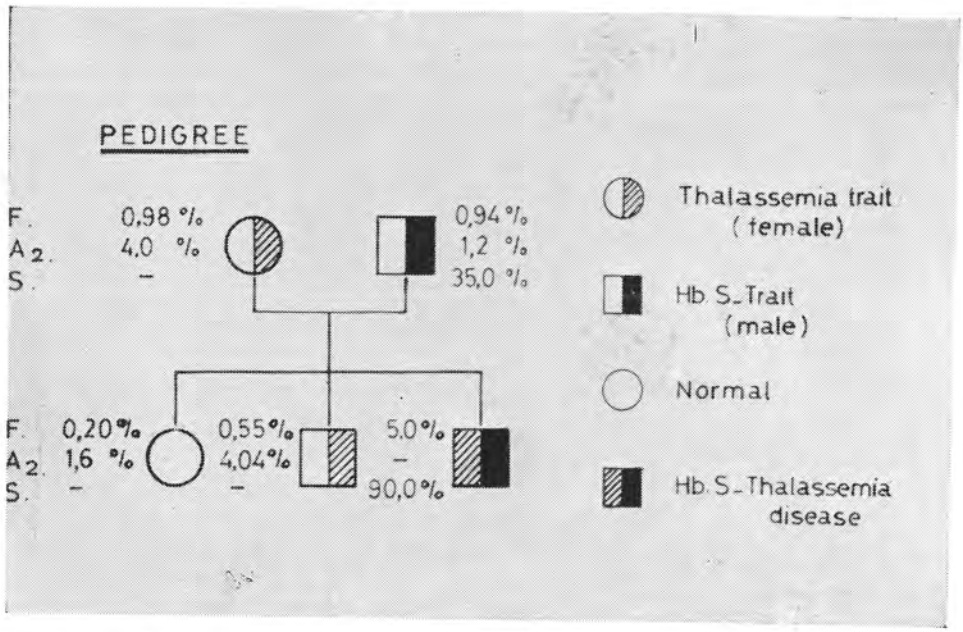

FIG. 2 : *Pedigree of Family G.*

LABORATORY DATA OF FAMILY G.

	Age / /year	Hb / /mg%	Retic ‰	Hb F / /%	Hb A_2 / /%	Hb S / /%	Remarks
Father (G)	36	130	7	0.94	1.2	35	Hb S-Trait
Mother (Mrs. G)	34	100	9	0.98	4.0	—	ß-Thalass. Trait, Hypochromi +
Sister (U)	6	100	6	0.20	1.6	—	———
Brother (D)	4	90	32	0.55	4.04	—	ß-Thalass. Trait
Patient (T)	2	80	51	5.0	—	90	Hb S-Thalassemia disease

TABLE 1 : *Some important data of family G.*

lulose-acetate and agar electrophoresis.

To differentiate Hb S from Hb D, solubility test was done (Itano, 1953).

Case report

An Indonesian boy, 21 months of age, Chinese by extraction was sent by a pediatrician to the Sub-Division of Hematology, Department of Child Health, Medical School, University of Indonesia in Jakarta. The chief complaint was anemia existing since several months.

Physical examination at that time revealed an anemic boy with a body weight of 8.300 kg. He looked not ill and was active. No particulars were observed on lungs and heart. Liver and spleen were not palpable. Except the anemia and the low body weight there were no other particulars found on the child.

Laboratory examination

Hb concentration was 5.5 gm%; leukocytes 13.000/cmm; erythrocytes 2.03 mill/cmm; reticulocytes 51‰; diff. count: eos. 3, meta. 1, segm. 29, lympho. 66, mono. 1; thrombocytes 212.000/cmm. The blood smears showed anisocytosis, poikilocytosis, target cells and polychromasia. Because of the high value of reticulocytes and the picture of the blood smear resembling that of hemolytic anemia, hemoglobin electrophoresis and alkaline denaturation test were performed. On cellulose-acetate electrophoresis, the presence of a fraction of hemoglobin which migrated slower than Hb A was noticed (see figure I), while Hb F was only 5%. The possibility of Hb S was then considered which was confirmed by the solubility test (Itano, 1953) and sickling test. The presence of Hb S was also confirmed by the Laboratory of Ulm University in Germany (Head: Prof. Dr. E. Kleihauer). The concentration of Hb S of the child was 90%. Further hematologic examinations of the parents and other siblings are shown in table 1.

Discussion

Hb S was first found in an Indonesian by Lie-Injo Luan Eng in 1956 during her survey on abnormal hemoglobin S. That case was just a trait for Hb E. As far as the Indonesian literature is concerned, there is no other Hb S published since the finding of Lie-Injo Luan Eng in 1956 and 1957. The case presented in this paper has a very high Hb S concentration (90%). Such a high level of Hb S may be due to sickle - cell anemia or Hb S - thalassemia disease. To differentiate these two possibilities, family examination must be done. Sickle - cell anemia is a homozygous state for Hb S, it means that both parents must be heterozygous for Hb S (Hb S trait). However, the family examination in our case revealed that the father is a trait of Hb S (Hb S = 35%) whereas the mother is a b-thalassemia trait with a high Hb A_2 level (4%). The sister U (6

years), seems to be normal, whereas the brother D (4 years) is also heterozygous for b-thalassemia. The pedigree of the family is shown in figure 2.

So this case is undoubtedly a Hb S thalassemia disease. According to Weatherall (1964) this child may be grouped to those with high Hb S and low Hb A level, which usually have a severe clinical course. But it seems, until this time, that the patient showed no complaints, except his anemia. The liver and spleen are still not enlarged. This is in accordance with the findings of some authors who stated that the hemoglobin pattern in Hb S-thalassemia does not indicate the severity of the disease.

During follow-up 1 year the haemoglobin content increased to 9 gm% without any specific treatment.

Summary

A boy of 20 months of age with sickle - cell thalassemia was discussed. The diagnosis was confirmed by the family examination. The father is heterozygous for Hb S, whereas the mother is heterozygous for b-thalassemia. This child seems to be the first case of Hb S-thalassemia disease found in Indonesia.

Acknowledgement

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REFERENCES

1. ITANO, H.A.: Solubilities of naturally occuring mixtures of human hemoglobin. Arch. Biochem. Biophys. 47 : 148 (1953).
2. LIE-INJO LUAN ENG: Penyelidikan hemoglobin patologik di Indonesia (1956). Tesis.
3. LIE-INJO LUAN ENG: Sickle-cell gene in Indonesia. Nature 179 : 381 (1957).
4. MOTULSKY, A.G.; PAUL, M.H. and DURRUM, E.L.: Paper electrophoresis of abnormal hemoglobins and its clinical applications, a simple semiquantitative method for the study of the hereditary hemoglobinopathies. Blood 9 : 897 (1954).
5. PEARSON, H.A.: Hemoglobin S-Thalassemia syndrome in Negro children. Ann. N.Y. Acad. Sci. 165 : 83 (1969).
6. SILVESTRONI, E. and BIANCO. I.: Microdrepanocito - anemia in un soggetto di razza bianca. Boll. Atti. Acad. Mod. Roma 70 : 347 (1944). Cited from: PEARSON, H.A.: Hemoglobin S-Thalassemia syndrome in Negro children. Ann. N.Y. Acad. Sci. 165 : 83 (1969).
7. STURGEON, P.; ITANO, H.A. and BERGREN, W.R.: Genetic and biochemical studies of "intermediate" types of Cooley's anemia. Brit. J. Haemat. 1 : 264 (1955).
8. WEATHERALL, D.J.: Biochemical phenotypes of thalassemia in the Ame-

rican Negro population. Ann. N.Y. Acad. Sci. 119 : 450 (1964).

9. WENT, L.N. and MAC IVER, J.E.: Sickle-cell anaemia in adults and its differentiation from sickle-cell thalassemia. Lancet 2 : 824 (1958).

10. ZUELZER, W.W. : Clinical and haematological aspects of the various haemoglobin syndrome. In abnormal haemoglobins. Ed. JONXIS, J.H.P. and DELAFRESNAJE, J.F., p. 100. Blacwell Scientific Publications. Oxford.