Level of Hemoglobin in Sickle Cell Trait in Basrah Using HPLC

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ABSTRACT

Background: Sickle-cell trait (SCT) is the heterozygous state of the sickle cell gene. The aim of this study is to give hemoglobin S(HbS) level in SCT in Basrah (Southern Iraq), which is the discriminating test for diagnosis.

Methods: This was a cross sectional hospital based study for patients with sickling disorder who attended the hematology center for screening. The total number of patients was 647, of them 248 were males and 363 were females.

Results: Mean ±SD of HbS for males was 33.5±5.5% versus 33.4±6.2 % for females, and for both sexes 33.4±5.9%. In most of the patients (69.3%), the HbS range was 31-40 %. Only 5.7% of patients had HbS >40%.

Conclusion: We, for the first time, reported the level of HbS among both sexes with SCT in Basrah.

Key words: sickle, trait, hemoglobin S.

INTRODUCTION

Sickle-cell trait (SCT) is the heterozygous state of the sickle cell gene.[1] The prevalence of sickle cell disease reaches up to 16% of the population in the South of Iraq.[2] Reported incidence of SCT in Bahrain is about 11%,[3] and among Omani women is 9.1%.[4]

SCT contrary to common beliefs is not always a benign condition.[4] It has been associated with increased mortality during physical exertion in athletes and non-athletes, reduced exercise tolerance during long-distance running, increased coronary risk and coronary bypass graft surgery, heightened risk of renal carcinoma, thrombo-embolism and death during prolonged air flight, and a 10-fold increase in the risk of hemorrhagic stroke.[5] Differentiating this condition from other sickle syndromes is mandatory to take certain precautions during surgical procedures and other stressful situations, to detect rare but important complications.

The use of high-performance liquid chromatography (HPLC), which facilitates quantification of the various haemoglobin types, may help in subclassification of the sickle syndrome and make diagnosis of SCT easier.[6] The aim of this study is to give hemoglobin S (HbS) levels in SCT in Basrah (Southern Iraq), which is the discriminating test for diagnosis.

METHODS

This was a cross sectional hospital based study for patients with sickling disorder who attended the hematology center for screening. From each patient 5 ml of blood was taken in an EDTA tube and the test performed within 3-4 days, in the teaching hospital in Basrah. Patient samples were studied by HPLC on a Bio-Rad Variant [2] instrument (Bio-Rad Laboratories, Hemel Hempstead, Hertfordshire) to do quantitative assessment of haemoglobins F, A, A2, and S. The study was done in the years 2000-2005.

A diagnosis of SCT was made if patients had both haemoglobin A and HbS, with the proportion of haemoglobin A being greater than that of HbS.[7,8] The total number of patients was 647, of them 248 were males and 363 were females.

RESULTS

Mean ±SD of HbS for males was 33.5±5.5% versus 33.4±6.2 % for females, and for both sexes 33.4±5.9% *(Table 1)*. While for hemoglobin F for males was 1.5±1.5% versus 1.4±2.8% for females, and for both sexes 1.5±2.3%. In most of patients (69.3%), the HbS range 31-40 % *(Table 2)*. Only 5.7% of patients were having HbS >40%.

DISCUSSION

Mean level of HbS in our study for both sexes was 33.4±5.9 % among SCT. In Iraqi,Al-Shawi TS, found mean ±SD of HbS to be 34±6.[2] in males with SCT in a study of army recruits.[9] Previous study from Basrah concentrated on a trimodal distribution of the amounts of HbS, but no exact range value was given.[10] In general the level of HbS in SCT ranges from 20-50%[11] with a mean value of 38±5%.[12,13] In Jordan, the HbS level among SCT was 39.8± 3.8%.[14] In conclusion: we for the first time reported the level of HbS among both sexes with SCT in Basrah.

Table 1. Levels of hemoglobin S and F among 647 patients.

	Males (248)	Females (363)	Total (647)
Hemoglobin S mean ±SD	33.5±5.5	33.4±6.2	33.4±5.9
Hemoglobin Fmean ±SD	1.5±1.5	1.4±2.8	1.5±2.3

Table 2. Different levels of hemoglobin S.

Hemoglobin S (%)	Males n (%)	Females n (%)	Total n (%)
<20%	3 (1.0)	8 (2.2)	11 (1.7)
20-30	62 (21.8)	88 (24.2)	150 (23.1)
31-40	205 (72.1)	244 (67.2)	449 (69.3)
>40	14 (4.9)	23 (6.3)	37 (5.7)
Total n (%)	284 (100)	363 (100)	647 (100)
N denotes number.			

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