RETROSPECTIVE DEMOGRAPHIC ANALYSIS OF SICKLE CELL DISEASE ON PEDIATRIC PATIENTS

THESIS

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By : SHAIMAA FARRAG MAHMOUD

M.B.B.CH

Supervised by

Prof. Dr NORMEEN ABD EL HALIM KADDAH

Professor of pediatrics

Head of Hematology and Bone marrow transplantation unit

Cairo University

Prof. Dr MONA HASSAN Abu El ELA

Professor of pediatrics

Cairo University

Dr. Mona Kamal EL-Ghamrawy

Lecturer of pediatrics

Cairo university

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Abstract

The objective: This was a retrospective study of demographic data of sickle cell anemia patients attending Haematology outpatient clinic of new children Hospital , Cairo University.

The subjects and methods: Our data collected from medical records , this included clinical ,laboratory data & different treatment modalities. studied population consisted of all SCD patients who attending & following up at hematology outpatient clinic ,new children hospital, Cairo university . The data was retrospectively collected .

***The results*:** we show retrospective demographic analysis of SCD patients as 106 of them S-S and 43 S-β thalassemia, 78 male and 71 female ,54.4% of positive consanguinity and 126 patients on transfusion program , 31.7% of them on chronic transfusion and 46 patients on chelation and 65 patients treated by HU .

The study demonstrate the major complication affect SCD patients . the study demonstrate 16.1% affected by HCV by PCR and other haematological values. The number of painful crisis, hospitalizations and the number of transfused blood units were significantly reduced by regular follow up and proper treatment espicially by HU, there was a statistically significant in HbS and HbA and positive consangunity with p-values= 0.003 ,0.05 and 0.0001 respectively .

Conclusion: Proper follow up and routine investigation with good chelation and proper treatment especially with hydroxyurea currently provides the best available stratige to achieve hematological and clinical

improvements in sickle cell disease.

Keywords: Sickle cell disease, Haemoglobin S, Hydroxyurea, Haemoglobin F.

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Lists of Abbreviation

ABGs	Arterial blood gases
ACS	Acute chest syndrome
ANC	Absolute neutrophilic count
APS	American pain society
ATP	Adenosine triphosphate
BMT	Bone marrow transplantation
CSSCD	Cooperative Study of Sickle Cell Disease
CT scan	Computerized tomography scans
CVS	Chorionic villous sampling
Hb	Hemoglobin
Hb A	Adult hemoglobin
α -HBD	α-Hydroxybutyric dehydrogenase
Hb F	Fetal hemoglobin
Hb S	Sickle hemoglobin
HCT	Hematocrit
H. influenza	Haemophilus influenza
HIB	Haemophilus influenza vaccine
HIV	Human immune deficiency virus
HPLC	High performance liquid chromatography
HPHP	Hereditary persistent fetal haemoglobin
HU	Hydroxyurea therapy
ISC	Irreversibly sickled cells
IUHSCTx	In utero hematopoietic stem cell transplantation
LC	Laparascopic cholecystectomy
MCH	Mean corpuscular hemoglobin
MCHC	Mean corpuscular hemoglobin concentration
MCV	Mean corpuscular volume
MMR	Measles,Mumps,Rubella

MRA	Magnetic resonance angiography
MRI	Magnetic resonance imaging
MTD	Maximum tolerated dose
MSH	The Multicenter Study of Hydroxyurea in Sickle Cell Anemia.
NHLBI	National Heart, Lung and blood institute
NO	Nitric oxide
Polio	Oral polio vaccine
SCA	Sickle cell anemia
SB	Sickle beta thalassemia
SCD	Sickle cell disease
SCI	Silent cerebral infarcts
SCT	Stem cell transplantation
S. Pneumonia	Staphylococcus Pneumonia
TBV	Total blood volume
TCD	Tran cranial Doppler
TIAs	Transient ischemic attack
UTI	Urinary tract infection
VOC	Vaso- occlusive crises

Chapter (1)
Introduction

SICKLE CELL DISEASE

Definition

Sickle cell disease (SCD) is a chronic hemolytic disease resulting from premature destruction of sickle red cells and presents by special clinical course attributed to ischemic changes resulting from vascular occlusion by masses of sickle cells.(Powars and Hitti,1993).

SCD includes sickle cell anemia (Hb SS disease), sickle cell hemoglobin C disease (Hb SC disease) ,sickle cell β.thalanemia and others (Beutler,1995).

History :

Sickle cell anemia was first described in a West indian student by Herric in1910.

Pathologic bases of the disorder and its relation to the hemoglobin molecule were defined 1927 by Hahn and Gillespie (Herric, 1910).

In 1949 Pauling and colleagues found that Hb in patient with sickle cell anemia show an abnormal slow rate of

migration on electrophoresis and this abnormal HbS caused the SCD.(Pauling ,1949).

Ingram found that the abnormality in HbS exists in the sixth position of β globin chain and consist of substitution of glutamic acid by valine.(Nathan and Oskin 2000).

The Noble Prize chemist, Linus Pauling, deduced the genetic nature of the disease (Pauling,1949).

Hemoglobin molecules in normal red cells bind oxygen in the lung for delivery to the body cells. Sickle cells have a genetically defective hemoglobin and although they bind oxygen, upon its release and delivery to the body cell, the remaining hemoglobin, now de-oxygenated, crystallizes. (Styles , 1996).

The crystals distort the shape of red blood cell giving it the sickle appearance (Pauling , 1949).

Geographic distribution:

HbS gene is prevalent in equatorial Africa, the Mediterranean area, the near east and parts of India. The highest prevalence of HbS occurs in parts of central and West Africa, where up to 40% of some ethnic groups are carriers. The major sickle haplotype in Africa are Senegal, and Benin (Platt, 1995).

In the Mediterranean area, the sickle cell gene is derived from Central and West Africa (Benin haplotype). HbS gene is present in Southern Italy, Turkey, Sicily, and Cyprus (Serjeant, 1999).

In Saudi Arabia and Kuwait ,there is particular clinical subtype of sickle cell anemia ,where the frequency of sickle cell trait approaches 20% and homozygous disease is common (Gelp,1979).

In a study of one thousand normal Egyptian persons of different ages, HbS was detected in 0.3 % of cases (El-Beshlawy et al., 1994).

Mokhtar et al .,1998 reported that 8 patients (1.2%) had sickle cell anemia among 660 patients referred to the genetics clinic Medical Research Institute of Alexandria ,to determine the frequency of genetic disorders and the proportion of autosomal recessive disorders .

In another study among 26 Egyptian sickle cell patients, genetic analysis was done and it was concluded that the commonest haplotype in Egypt is the Benin .(Abu El-Hassan et al., 1995).

El-Hazmi et al., 1996 stated that the 14 Egyptian patients included in their study Benin haplotype was found in 100 % of cases with a severe presentation of sickle cell disease.