Clinico- pathologicl study of sickle cell Anemia in Basrah

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Abstract

Basrah is located in the world's map of geographical distribution of sickle cell anemia (SCA) that carries significant morbidity. Data on the true gene frequency, clinical spectrum of the prolem and hematological and biochemical profiles of patients that could define the natural history of the problem in our country are scarce .In the present study the medical files of patients with SCA admitted to Basrah Teaching hospitals (1990-1998) were review Data on age, sex, residence, clinical presentations , mean hemoglobin level , frequency of readmissions and blood transfusions were collected .

The clinical presentation of SCA were found to be protean. The most frequent one was acute painful crisis (40%) follwing by aplastic crisis(10%) and hemolystic crisis(9%) . Infection comprised 30% of total presentation including urinary tract infection, osteomyelitis and gastroenteritis. Splenomegaly, hepatomegaly and hypersplensim were reported in different frequencies (50%, 42% and 20% respectively). Splenic sequestration was the lest common presentation (2%). The mean hemoglobin leve was 7.5± 1.2 gm % and the total frequencies of re-admission and blood transfusion were 80-92 respectively.

It is concluded that the clinical severity of SCA in Basrah tends generally to be more sever than Mosul and Baghdad cases. Different hemoglobin haplotypes , possible interaction between sickle cell gene and red blood cells genetic marker such as thalassemia and G6PD deficiency and environmental factors are probale etiological for more sever clinical presentation in Basrah .

Keywords: Sickle cell anemia, Basrah.

Introduction

Sickle cell disease is an inherited disorder caused by the abnormal properties conveyed to sickle cell erythrocytes by mutant cell hemoglobin (Hb S)[1-3] .The disease is complex, having as its cardinal features chronic hemolytic anemia and recurrent painful epsodes. The illness is engendered by the interaction of the patient with this multisystem disease, the psychosocial impact of the chronic painful disorder , and the ethnic complexities of contemporary society.

Taditional understandings of sickle cell disease attribute all disease features to a causative pathophysiologic cascade : an A(r) T nucleotide substitution in the sixth codon of the b globin gene; a Val (r)Glu b globin substitution on the surface of the Hb

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Stetramer; the reduced solubility and polymerization of deoxygenated Hb S; the impaired deformaility and sickling of polymer-containing erythrocytes; and the occlusion of the microvasculature by poorly deformable red cells. The importance of these interdependent events notwithstanding, a contemporary understanding of sickle cell pathophysiology includes Sickle cell disease is an inherited disorder caused by the abonormal properties conveyed to sickle cell erythrocytes by mutant sickle cell hemoglobin (Hb S).The disease is complex , having as its cardinal features chronic hemoglobin (Hb S). The disease is complex, having as its cardinal features chronic hemolytic anemia and recurrent painful episodes. The illness is engendered by the interaction of the patient with this multisystem disease, the psychosocial impact of the chronic painful disorder, and the ethnic complexities of contemporary society The clinical features of SCA reflect propensity of red cells to assume a sickled configuration when blood is oxygenated leading to a shortened red cell survival and tendency to vaso-occlusion[4].It is characterized by severe hemolysis, recurrent vaso- occlusive episodes and increases susceptibility to acute bacterial infections which lead to enhanced mortality particularly in early childhood[5,6]. Basrah is located in the world's map of geographical distribution of SCA that carries significant morbidity and mortality. The carrier frequency of HbS in Iraq is 0-22%[7].The objective of the present study is to highlight the clinical and hematological spectrum of patients with SCA in Basrah.

Methods

The medical files of under patients sicklers admitted to Basrah teaching hospitals, from 1990-1998 were reviewed . The diagnosis in patients were documented by hemoglobin electrophoresis The reviewed data were age, sex , residence , clinical presentation , mean level of hemoglobin (Hb) and frequency of re- admissions and blood transfusion was made between our data and those reported from Mosul and Baghdad[8].

Results

The total Number of patients was 405(224males and 181 females) with a male to female ratio of 1.24:1. Their ages at the time of the study ranged between 2years and 49 years, with mean age of 33.± 3.4 years .The frequency distribution of different variables in rthe studied sample is shown in table1. Splenomegaly and hepatomegaly were the predominant clinical findings in the studied sample noticed in 165(40.6%) and 162(39.6%) cases respectively. Acute painful crises were seen in 164(39.1%) cases which presented as generalized pain all over the Body, back and extremities.

Infection were found in 122(30%) cases, manifested mainly as urinary tract infections (UTI), osteomyelitis and gastroenteritis. Hypersplenism, aplastic and hemolytic crises were noticed in 81(20%), 40(10%) and 36(9%) cases respectively. Splenic sequestration was the least common presentation seen in 8(2%) case. However, dactylitis and acute syndrome were not reported. The mean hemoglobin level in the studied sample was 7.5±1.2 g/dl. The total number of re-admission and blood transfusion were 152 and 181 respectively

Table 1:frequency distribution of deferent variables in the studied sample (n=202).

Variable	value
Splenomegaly	202(50%)
Hepatomegaly	170(42%)
Acute painful crisis	162(40)
Infection	122(30%)
Hypersplenism	81(20)
Aplastic crisis	40(10)
Hemolytic crisis	36(9)
Splenic sequestration	8(2%)
Mean hemoglobin level	7.5(1.2%)
Dactylitis6(1.5%)	6(1.5%)
Total number of re-admissions	152
Total number of blood transfusions	181

Discussion

Traditional understandings of sickle cell disease attribute all disease features to a causative pathophysiologic cascade: an A(r) Tnucleotide substitution in the sixth codon of the b globin gene ; a Val(r)Glu bglobin substitution on the surface of the HB S tetramer ;the reduced solubility and polymerization of deoxygenated HB S; the impaired deformability and sickling of polymer-containing erythrocytes; and the occlusion of the microvasculature by poorly deformable red cells.The importance of these interdependent events notwithstanding,a contemporary understanding of sickle cell pathophysiology includes many polymerization-independent mechanisms [1-5]Fig.1.

The present study reveled that SCA is commonly associated with crisis and infection .Acute painful crisis , which is an emergency state and needs immediate management was the most common form of emergency presentation in Basrah (55.6%) Mosul (35.6%) and Baghdad (39%)studies . The main site involve in the Basrah cases were generalized all over the body, back and extremities; nearly similar to the Iraqi patterns. Acute painful crisis was reported in mush higher figure in the Senegalese sicklers that possibly reflects different hemoglobin haplotypes distribution [10] .Aplastic and hemolytic crisis were reported in nearly similar percentages (10%) (9%) respectively , in the Basrah study compared to that of Mosul (11.7%and 11.7% respectively) and Baghdad studies (7.4%and 7% respectively).

Infection represented the second leading case of hospitalization after crises in Basrah , Mosul and Baghdad studies (30%,14.8%and 6% respectively), while Urinary tract infection (UTI), osteomyelitis and gastroenteritis were predominant in the Baghdad series while pneumonia, UTI and typhoid fever were preponderant in the our series . Osteomyelitis and septic arthritis were reported in the Mosul study. Altered splenic function and deficient level of serum opsonins, of the alternate complement pathway, in sicklers are significant factors leading to their increase susceptibility to meningitis,

sepsisand other serious infections mainly caused by pneumococci and *H. influenza*. Moreover they have increased susceptibility to *Salmonella* osteomyelitis partly because of bone necrosis[5,10,12].

Splenomegaly and hepatomegaly were reported in a higher freqncy in our study (50%and 40% respectively)than other Iraqi study. The spleen is commonly enlarged during the first decade of life, but then undergoes atrophy due to repeated attack of vaso-occlusion and infraction leading to sidrofibrotic nodules (autosplenectomy) that renders siklers at risk of catching serious infection [5,12,13]. Persistent splenomegaly beyond this period can lead to increase morbidity and mortality from chronic hypersplenism and acute splenic seqestratioand acute splenic sequestration [14]. Hepatic involvement in SCAwas reported to range mild with normal liver function to sever liver disease[15]. Hyperssplenism and splenic sequestration were reported in higher frequencies in our study (20%and2% respectively) than other Iraqi study (17.6 and 6%respectively)
Splenic sequestration was recorded in a remarkable percentage (10%)in India reflecting possibly altered hemoglobin haplotype pattern[16].

Dactylitis was reported in1.5% study sample compare to what was reported in the Mosul (11.7%). Dactylitis together with severe anemia and leucocytosis thatb appear in the first two years of life can predict the possibility of severe SCA later in life[17]. In acute chest syndrome was not noticed in all the three studies though it was started in a considerable frequency (21.8%) in Jamaica representing the second leading cause of admission following the painful crisis[18]. Arecent observation that the a chest syndrome may be grossly under diagnosed by doctors implies that chest radiograph should be performed routinely in the management of any febrile child with SCA[19].
The mean hemogolobin level in the Baghdad, Mosul Basrah studies were (8.9± 1.13, 7.7 ± 1.95 and 7.5 ± 1.2)gm /dl respectively implying a worst hemoglobin profile in the Basrah cases.

The total number of re-admission and blood transfusions in our study was more (152and 181 respectively) that the Mosul study (116 and 104 respectively) denoting variation in health resources, methods of diagnosis and treatment and possibility more frequent complications in the Basrah cases. For patients with disabling chronic pain, ischemic organ damage (acute chest priapism)or stroke, or in preparation for major surgery, blood transfusion of normal RBCs can provide symptomatic relief prevent further ischemic complications. Packed RBCs transfusion are specifically for acute splenic sequestration and aplastic episodes [5,12].
The clinical spectrum of SCA in Basrah appeared to be of more sever than Mosul and Baghdad spectrum. The geographical location of Basrah in the south implying the presence of more than one hemoglobin haplotype together with possible complex interaction of sickle cell gene with other RBC genetic marker such as G_6PD deficiency and thalassemia and environmental factors are probable etiologies for worse disease tolerance in Basrah[20-23].
Decreased life expectancy is one of original correlates of sikle cell disease. In contrast with the mean life-expectancy of 14.3. years posited by Diggs in 1973 ,the current survival is 42 years for men and 45 years for women with sickle cell anemia [24-30]. This improved survival is more the result of better general medical care than of

specificantisickling therapy. The effect of prophylactic penicillin therapy on preventing mortality from S. pneumoniae bactermia is now influencing survival.

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