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BRIEF COMMUNICATION

Influence of sickle hemoglobinopathy on growth and development of young adult males in Southern Iraq

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Patients with sickle cell disease (SC) turned to have weight (wt), linear growth and sexual maturation delay based on data from other countries.1,2 By 2 years of age, children with sickle cell disease (SCD) have detectable growth retardation, which affects weight more than height and has no clear gender difference.1 Normal height is achieved by adulthood, but weight remains lower than that of controls. More severe growth delay and retarded sexual maturation is noted in children with sickle cell anemia and sickle cell-b0-thalassemia while Hb SC disease is associated with a less severe growth delay. Skeletal maturation is also delayed. The aim of the study is to assess the wt, linear growth, BMI and sexual maturations of young adult males patients in Basrah (Southern Iraq). Males patients with SCD attending the out patients clinic of Basrah Military hospital were included in this cross-sectional case control

study from January 1999 to December 2001. The diagnosis was based on criteria mention elsewere.1 The total number of patients were 75, all males aged 18 years. They were 62 sickle cell anemia (SCA) and 13 sickle cell b-thalassemia (Hb S/bthal), of them 12 Hb S/b+ thal and 1 Hb S/b0 thal. The control was also 75 males, all aged 18-years attained the hospital for premployment routine examination. Anthropometry: height (ht) was taken while standing, wt taken with light clothes. The wt measurement is measured to nearest 100 grams and ht to the nearest 0.25 centimeters. The United States of America national center for health statistics (NCHS) is taken as references for ht and wt of patients in order to study the physical growth of patients.3 Body mass index calculated according to formula wt (kg)/ht (m2). Measurement of maturation: each male was assessed in a private room for secondary sex characters by comparing the body to drawing of Tanner stages. Combined genital and pubic hair staging taken as sum of both stages divided by 2. For statistical analysis Chi-square test used as appropriate. Comparison between 2 means is carried out using unpaired student t-test and between more than one mean is carried out using one-way analysis of variance (ANOVA). Level of significance was set to be <0.05 through out analysis. There were no significant differences in the both ht and wt among the 2 different genotypes of SCD. For the wt, 77.3% of SCD were in the wt band below the 5th centil and none of them reached to 50th centil. While for the ht 46.6% of SCD are in the ht band <5th and only 4% of them reached to the >=50th centile. Comparison between patients wt, ht and BMI made with that of control is in Table 1. Very significant differences (p<0.00001) between both wt and ht of patients with that of control in 2 centile bands of <5th and >= 50th. Seventy seven point three percent of patients wt were in the <5th band versus 10.6% of control lies in this band, and 46.4% of patients with 8% of control lies in the <5th band of ht. None of patients having wt >= 50th but 24% of control are (p<0.00002), and only 4% of them having ht >= 50th versus 57.3% of control (p<0.00001). The BMI of control and patients were 21.2 ± 3 and 16.9 ± 2.8 which were highly significant differences (<0.0001). Those with under wt (BMI <20) constitute 78.6% of patients and 38.6% of control (p<0.00001). No difference in combined Tanner stages between the 2 genotypes of SCD. Only 54.6% of patients reached to stage 5. The others lie in stages 2-3. Regarding Tanner staging system, comparison between combined pubic and genital stage between patients and control showed that all the control was in stage 5, but only 54.6% of patients reached to stage 5 (p<0.00001). There were 25.3% of patients in stage 4 (p<0.00001), 12% in stage 3 (p 0.005) and 8% in stage 2 (p<0.03) The relation between centil band and clinical characters is present in Table 2. Patients with wt and ht lie <5th band are more likely to have bone deformity, splenomegaly, blood transfusions, painful crisis, and hospitalization. Table 3 shows the relation between the mean Hb (hemoglobin) level, mean Hb S, Hb F in comparison with centil band of the wt and ht. Patients with lower centil band of wt tend to have lower mean Hb level (p<0.0001) and the same applied for ht (p 0.0003). Those with a lower centil band of wt tend to have higher level of Hb S level (P<0.0001), but this not significant when applied for ht. Those with a lower centil band for wt have higher mean Hb F (p 0.01) but again for ht the differences are not significant. All the patients in this study did not reach to the 50th centil band for wt, and the wt affected more

than the ht. This is also seen in previous studies.1 It's mentioned that in sicklers, normal height is achieved by adulthood, but in this study, 96% of patients failed to reached the normal adults ht (50th band) by the age of 18-years. For sexual maturations, 45.3% of the patients failed to reach the maturation. In general, boys with SCD have delayed sexual maturation that is more severe in those with SCA than in those with Hb SC disease. The retarded sexual maturation in males can be due to primary hypogonadism, hypopituitarism, or hypothalamic insufficiency. At least one study from the Kingdom of Saudi Arabia showed gonadal hypofunction in the sickle cell patients.2 While other opinion considered the cause of sexual immaturity inpatient with SCD is constitutional rather than a primary endocrinologics, and even there is elevated gonadotropin levels for the stage of sexual development.1 Patients with growth retardation in this study turn to have more bone deformity, splenomegaly, blood transfusions, painful crisis and hospitalization. Delayed growth and sexual maturation correlates with the degree of hemolysis in patients with SCD due to the increased basal metabolic requirements of a patient with hemolysis.4 The hypermetabolic state will require greater dietary energy compared with Hb AA. In this study patients with growth retardation tends to have lower mean Hb.

It has been possible to restore normal growth by nutritional supplementation. There have been reports of responses to folic acid, zinc supplementation or regular blood transfusion, but these approaches are not recommended as standard care. A high concentration of fetal Hb in boys with SS disease is associated with greater linear growth. It is postulated that in boys, low concentrations of fetal hemoglobin increase hemolysis and hence metabolic requirements for erythropoiesis, putting them at greater risk of poor growth.5 In this study patient with higher Hb F tend to have more underweight, and no explanation available for this paradoxical finding, whoever most agree that the relation between HbF level and clinical severity of SCD is not simple.1

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