

جامعة السودان للعلوم والتكنولوجيا
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**Study on Hematological Parameters in Children with
Sickle cell anemia and sickle cell trait at AL-BULUK
Teaching Hospital - Omdurman**

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Dedication

I dedicated this research to

My father

My mother

My brother

And

My sisters

Acknowledgment

I am greatly indebted to my supervisor Dr. Mansoor Mohamed Mansoor for his guidance, patience, continuous follow up, advices and great help during my study.

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Abstract

Sickle cell anemia is an inherited autosomal recessive disorder characterized primarily by chronic anemia and periodic episodes of pain. The disorder produces abnormal hemoglobin, which causes the red blood cells to sickle or become crescent shaped. These sickle shaped RBCs are much less deformable, and therefore obstruct microcirculation, and cause tissue infarction. This study aimed to investigate the blood parameters of patients with sickle cell anemia in comparison to healthy controls. The age range of this population was from five months to 12 years, with 83% (n = 83) their ages < 7 years and 17% (n = 17) their ages were ≥ 7 years. The sex ratio of males to females was 1:1 for all studied groups. Venous blood samples were collected from patients with sickle cell anemia (n = 92) and controls (n = 8) attending Al Buluk Teaching Hospital, at Omdurman City of Khartoum State. The samples of patients with sickle cell disease { SS = 48 ; 52.2% (48/92) }, sickle cell trait AS = 44; 47.8% (44/92) and eight healthy controls (AA) were screened for complete blood count and hemoglobin electrophoresis. The mean and standard deviation for hematological parameters for each group (SS, AS and AA) were compared using SPSS 16.00. This study revealed a highly significant differences ($P < 0.05$) in Hb, PCV and WBCs between healthy controls (AA) and patients with sickle cell anemia (SS and AS). The present study did not find any significant differences ($P > 0.05$) between healthy controls and patients with sickle cell anemia (SS + AS) concerning other hematological parameters (MCV, MCH, MCHC, Neutrophiles, Lymphocytes, Monocytes, Eosinophiles and Basophiles). This study showed low hematological parameters of SCD patients may also be due to various causes including poor nutrition as well as infections and hemolytic processes. This study recommended pre screening for infants and children so as to mount the necessary precautions to avoid complication of sickle cell anemia that may lead to death.

المخلص

الانيميا المنجلية مرض وراثي محمول على الكروموسومات الجسدية كصفة منتحية والعراض المميزة له تتمثل في انيميا مزمنة وموجات الم متقطعة ، وهذا الخلل الوراثي يتسبب في انتاج هيوفلوبين غير طبيعي او مشوه ، هذا الهيوقلوبين يتسبب في تغيير شكل خلايا الدم الحمراء القرصية الى الشكل المنجلي . وهذه الخلايا المنجلية اقل مرونة وال تشكل بسهولة الشبي الذي يتسبب في انسداد الاوعية الدموية الصغيرة ، وبالتالي تدمر الانسجة . هدفت هذه الدراسة بمقارنة التغيرات في الصفات المميزة للدم في مرضى الانيميا المنجلية والاصحاء . وتراوحت اعمار مجموعة الدراسة ما بين خمسة اشهر الى 12 سنة، وكانت اعمار معظمهم (83% و 8.83) تقل عن سبع سنوات ، والبقية 17% (8.17%) تزيد اعمارهم عن سبعة سنوات . وكانت نسبة الذكور للاناث 1:1 في كل مجموعات الدراسة . تم جمع عينات الدمن من الوريد من 92 مريضا بالانيميا المنجلية بالاضافة الى 8 اصحاء من مستشفى البلك التعليم للاطفال بامدرمان بولاية الخرطوم . وكانت نسبة المرضى المصابين بالانيميا المنجلية (SS) وعددهم 48 مريضا ، وكانت نسبة حاملي المرض (AS) 47.8% وعددهم 44 بالاضافة لثمانية اصحاء (AA) . وقد اجريت لهم جميعا فحوصات كاملة للصفات المميزة لدمهم وفحص كامل للدم وتم اجراء الترحيل الكهربائي لكل العينات لكشف وتحديد نوعية الهيموقلوبين الذي يحمله كل مرضي . وقد تم استخدام برنامج SPSS 16 لتحليل ومقارنة النتائج ، وقد اوضحت هذه الدراسة وجود فروقات احصائية معنوية ($P < 0.05$) في نسبة الهيوقلوبين والحجم الفعلي لخلايا الدم PCV وخلايا كريات الدم البيضاء بين المرضى وحاملي مرض الانيميا المنجلية والاصحاء . وقد وضح من الدراسة عدم وجود فروقات احصائية معنوية ($P < 0.05$) بين المجموعات الثلاث (مرض SS) حاملي المرض AS والاصحاء AA فيما يختص بقية الصفات المميزة للدم (MCV) متوسط حجم الخلايا ، MCH متوسط نسبة الهيموقلوبين في الخلايا MCHC متوسط نسبة تركيز الهيموقلوبين بالخلية Nutrophil نسبة الخلايا المتعادلة نسبة الخلايا المتعادلة essnophil نسبة الخلايا الحمضية ، Basophil نسبة الخلايا القاعدية ، monocyte نسبة الخلايا الفريدة lymphocyte نسبة الخلايا اللمفاوية . وخلصت الدراسة لوجود انخفاض عام في الصفات المميزة للدم بمرضى الانيميا المنجلية وهذا قد رجع الى التغذية او الاصابة بالميكروبات وعملية التحطيم المستمر لخلايا الدم .
توضي هذه الدراسة بعمل مسح صحي لمعرفة الرضع والاطفال المصابين بالمرض لوضع الاحتياطات اللازمة لتفادي مضاعفات الانيميا المنجلية والتي قد تؤدي الى الوفاة .

List of abbreviation

- Hb Hemoglobin

- RBc Red Blood cell
- WBC White Blood cell
- Ph Platelit
- PCV Packet Cell volume
- MCV Mean Cell Hemoglobin
- MCH Mean Capsular Hemoglobin
- CBC Complete blood caunt
- Hbss Hemoglobin
- Mbas Hemoglobin As tract
- SPSS Statistical Package of the Social Science

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