Verse: - :-


أَلَمْ يَكُ نُطْفَةً مِّن مَّنِيٍّ يُمْنَىٰ ﴿٣٧﴾ ثُمَّ كَانَ عَلَقَةً فَخَلَقَ فَسَوَّىٰ ﴿٣٨﴾ فَجَعَلَ مِنْهُ
ٱلزَّوْجَيْنِ ٱلذَّكَرَ وَٱلْأُنثَىٰٓ ﴿٣٩﴾ أَلَيْسَ ذَٰلِكَ بِقَٰدِرٍ عَلَىٰٓ أَن يُحْۦِۦَ ٱلْمَوْتَىٰ ﴿٤٠﴾

Dedication

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Abstract:

This is an observational analytical case control study conducted to compare haemoglobin F levels in pediatric patients of sickle cell anaemia SCA, either treated with Hydroxyurea (HU) or treated with conventional treatments. Three hundred twelve individuals were selected and informed about the study objectives and their agreement for participation was obtained by using of a study questionnaire, this was performed in the period between May-2009 to June-2010. Sixty one SCA patients had been treated with HU were called group $\mathbf{A_1}$ and thirty sex SCA patients had been treated with conventional managements but not with HU called group $\mathbf{A_2}$ those were visiting Jafar Ibnouf Pediatric Hospital in Khartoum state, all were compared to 50 healthy individuals selected randomly to be matched in age, sex and tribe as control called group **B**. The study also included SCA patients at Heglig hospital in Heglig area (the petroleum filed) Western Sudan, seventy three SCA patients had been treated with conventional managements were resident inside the petroleum filed called group $\mathbf{C_1}$ and forty two SCA patients had been treated with conventional managements from outside the petroleum filed called group $\mathbf{C_2}$, all are compared to twenty five healthy individuals as control from inside the petroleum filed and twenty five from outside called group ($\mathbf{D_1}$ and $\mathbf{D_2}$) respectively. 2.5 ml of blood was collected from each individual into anticoagulated container. Hb F levels determined by used of Denaturation method, complete blood count CBC done by (Sysmex KX 21N) analyzer. Statistical package for social sciences (SPSS) program version 13 was used for data processing. The mean ± Standard deviation (Mean ± SD) for the patient's age was (6.1±3.1), and the mod was 3.0 years. Fifty two % of patients were males and the rest were females. The highest frequencies of patients were 121 found in Meseria tribe 57.1%. HbF levels in group A_1, C_1 (8.0±2.6), (4.7±2.0) percent of the total Hb respectively, this were found to be raised significantly when compared by group A_2 (0.8±0.2) % and C_2 (0.6±0.1) % with significant probability value (p=0.000) in each groups. The CBC parameters and cell counts showed some differences in groups A_1 and C_1 in compared with A_2 and C_2 respectively. Total white blood cells (TWBCs) lower in group A_1 and C_1. Red blood cells (RBCs) and haemoglobin (Hb) increased significantly in group A_1 but no statistical changes in group C_1. Packed cell volume (PCV), mean cell volume, (MCV) and mean cell haemoglobin (MCH) showed higher values in group A_1 and C_1. No significant change was seen in mean cell haemoglobin concentration (MCHC) in group A_1, but was reduced in C_1. Platelets and reticulocytes showed significantly reduced level in group A_1 and C_1. RBCs morphology showed no statistical changes in group A_1 and C_1, When compared to A_2 and C_2 of (p=0.325) and (p=0.878) respectively.

So, the study concluded that Hb F levels were raised significantly in SCA patient treated with HU compared to the conventionally treated patients and the drug can be used successfully in Sudan. Also as an important observation, patients resident inside the petroleum filed showed significantly higher percentage of Hb F, though less than the HU treated group, but opened an important new avenue for sickle cell anemia researches. In addition patients inside the petroleum field showed similar behavior to the HU treated group of significantly reduced Hospitalization and blood transfusion requirements, and showed low frequencies of crises onset.

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أجريت هذه الدراسة التقييمية التحليلية ,التحكيمية في ٣١٢ شخص تم اعلامهم عن الدراسة واخذت موافقتهم علي المشاركة بواسطة إستبيان , خلال الفترة من مايو ٢٠٠٩م وحتي يونيو ٢٠١٠م , بغترض تقدير مستوياتهيموجلوبين في فقر الدم المنجلي المعالجين وغير المعالجين و ٣٦ (**A_1**) بعقارالهيدروكسيوريا, منهم ٦١ مريض يعالجون بواسطة عقار الهيدروكسيوريا تمت تسميتهم بالمجموعة في مستشفي جعفر ابنعوف لطب (**A_2**) مريض يعالجون بواسطة العلاجات التقليدية تمت تسميتهم بالمجموعة الاطفال بولاية الخرطوم, قورنت نتائجهم بمجموعة من الاصحاءعددهم ٥٠ تم اختيارهم عشوائيا ليتناسبوا في كما شملت الدراسة مجموعة من مرضى ,(**B**) العمر والجنس والقبيلة مع المرضي تمت تسميتهم بالمجموعة فقرالدم المنجلي يعالجون بواسطة العلاجات التقليدية بمستشفي هجليج داخل حقل البترول بمنطقة هجليج في و ٤٢ من خارج الحقل ,(**C_1**) غرب السودان منهم ٧٣ يقطنون داخل حقل البترول تمت تسميتهم بالمجموعة قورنوا بمجموعة من الاصحاء ٢٥ من داخل الحقل و ٢٥ من خارج الحقل ,(**C_2**) تمت تسميتهم بالمجموعة على التوالي, جمعت عينات الدم ٥.٢ مل في وعاء مانع للتجلط, تم (**D_2**) و (**D_1**) تمت تسميتهم بالمجموعة تقدير مستويات هيموقلوبين اف بطريقة استخلاص النيتروجين, تم تعداد الدم الكامل باستخدام جهاز و تم استخدام برنامج الحزم الإحصائية للعلوم الاجتماعية نسخة ٢٠ للتحليل (KX 21N (سيسميكس الإحصائي, كان المستوى الوسطي ± الإنحراف المعياري لاعمارالمرضي المشاركين بالدراسة ١٦ ± ١٣ وكان العمر الشايع ٣.٠ سنوات وجد ان ٥٢% من المرضي كانوا ذكور و ٤٨% كانوا إناث, أعلى تردد للقبائل في مجموعة المرضي كان ١٢١ من قبيلة المسيرية بنسبة ١٥٧ %. وجدت زيادة احصائية في مستوي الهيمو قلوبين ف في ٠.٢ % C_1 ٧.٤ ± وفي المجموعة ٠.٨.٢ % A_2 ٦ ± عند مقارنتهالمجموعة % ٠.٨.٢ A_1 ٦ ± المجموعة في كل من المجموعتين على التوالي. كما=p) ١٠. % بدلالة إحصائية)٠٠.٠ ± ٦.٠ C_2 عند مقارنتها بالمجموعة عند مقارنتهم C_1 و A_1 وجدت ان هنالك تأثيرات احصائية في نتائج فحص الدم الكامل في المجموعتين ارتفع عدد كريات الدم ,C_1 و A_1 علي التوالي, بحيث قل تعداد الدم الابيض في كل من C_2 و A_2 بالمجموعتين ارتفع حجم كريات ,C_1 بينما لم يظهر فرق احصائي في المجموعة A_1 الحمراء وكمية الهيمو قلوبين في المجموعة لم ,C_1 و A_1 الدم المضغوطة و متوسط حجم الخلية الحمراء ومتوسط هيمو قلوبين الخلية في كل من المجموعتين , (C_1) بينما ظهر تأثير احصائي بالنقصان عند المجموعة A_1 يتأثرمتوسط تركيزهيمو قلوبين الخلية في المجموعة عند C_1 و A_1 قل تعداد الصفائح الدموية و ظهر نقصان إحصائي في الخلايا الشبكية في كل من المجموعتين عند C_1 و المجموعة A_1 لم تكن هنالك فروق إحصائية في الشكل الظاهري لخلايا الدم الحمراء في المجموعة . علي التوالي=p) و (p=٠.٨٧) بدلالة احصائية)٣٢.٠ C_2 و A_2 مقارنتهما بالمجموعتين

وعليه خلصت الدراسة علي ان مستوي هيمو قلوبين فترتفع بصورة معنوية في المرضى المعالجين بالهايدروكسيوريا والمرضى القاطنين داخل حقل البترول .

المرضى المعالجين بالهايدروكسيوريا والمرضي داخل حقل البترول اظهروا نتائج احصائية بنقصان فترة الرقاد بالمستشفى ونقصان الاحتياج لعمليات نقل الدم, كما قلت مضاعفات وحدة المرض.

List of abbreviations

A	All sickle cell anaemia patients in Khartoum
A_1	Sickle cell anaemia patients treated with Hydroxyurea in Khartoum
A_2	Sickle cell anaemia patients untreated with Hydroxyurea in Khartoum
ALL	Axis Loss Light
ANC	Absolute Neutrophils Count
AST	Aspartate transaminase
AVN	A vascular necrosis
B	All Control healthy subjects in Khartoum
C	All sickle cell anaemia patients in Heglig area
C_1	Sickle cell anaemia patients inside the petroleum field
C_2	Sickle cell anaemia patients outside the petroleum field
CO2	Carbon dioxide gas
CBC	Complete blood count
CT	Computed Tomography
D	All control healthy subjects in Heglig area
D_1	Control healthy subjects in Heglig area inside the petroleum field
D_2	Control healthy subjects in Heglig area outside the petroleum field
DPG	Diphosphoglycerate
E/G	Erythropoiesis: Granulopoiesis ratio
DNA	Deoxyribonucleic acid
EDTA	Ethylene-Diamine-Tetra-Acetic acid
G-6-PD	Gglucose-6-phosphate Dehydrogenase
Hb	Haemoglobin
Hb A	Haemoglobin A
Hb C	Haemoglobin C
Hb D	Haemoglobin D
Hb E	Haemoglobin E
Hb F	Haemoglobin F
Hb S	Haemoglobin S
HCT	Haematocrit
HiCN	Haemiglobincyanide
HPFH	Hereditary Persistence of Fetal Haemoglobin
HPLC	High performance Liquid Chromatography
HU	Hydroxyurea
IgG	Immunoglobin G
IgM	Immunoglobin M
ISCs	Irreversibly Sickled Cells
LDH	Lactate Dehydrogenase Enzyme
MCH	Mean Cell Haemoglobin
MCHC	Mean Cell Haemoglobin Concentration
MCV	Mean Cell Volume

Mhb	Methemoglobin
NRBC	Nucleated Red Blood Cell
NO	Nitric Oxid Gass
O_2	Oxygen
ODCs	Oxygen Dissociation Curves
PCV	Packed Cell Volume
PDQ	Pediatrics Departments Quality control
P_{50}	Partial pressure of oxygen at which hemoglobin is 50% saturated with oxygen
PO_2	Partial Oxygen
PLT	Platelet
RBCs	Red Blood Cells.
RDW	Red blood cell Distribution Width
RNA	Ribonucleic acid
SCD	Sickle Cell Disease
SCP	Sickle Cell Patient
SD	Stander Deviations
SPSS	Statistical Package for Social Sciences
TCD	Trans-Cranial Doppler
TEB	Tris/EDTA/Borate (Buffer)
TRCA	Transient Red Cell Aplasia
TRBCsC	Total Red Blood Cells Count.
WBC	White Blood Cell.
2,3-BPG	2,3-Bisphosphoglycerate
2,3-DPG	2,3-Diphosphoglycerate

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Chapter Two