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INFLAMMATORY MARKER IN SUDANESE SICKLE CELL ANEMIA PATIENTS

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ABSTRACT

Background: Sickle cell disease (SCD) was recognized as inflammatory condition. C_reactive protein (CRP), white blood cell (WBC) and Erythrocyte Sedimentation rate (ESR) consider as biomarkers for inflammation. Objective: The present study aimed to assess the role of CRP, ESR and WBC count among Sudanese patients with sickle cell disease. Material and Method: This is case control study which conducted at Khartoum state during the period from May to August 2017. A total of 100 Sudanese patients with sickle cell disease (45 were in sickle cell disease and 55 were healthy individuals). **Results:** The result showed that TWBC level was significantly increased in SCD (24.95±14.73) when compared to control subjects (6.79±1.77) with p-value 0.000.Lymphocyte level was significantly increase in SCD (38.47±20.62) when compared in control (30.05±5.88) with p-value 0.005. Neutrophil level was significantly increased in SCD (93.97±4.79) when compared with control (45.36±3.56) with p-value 0.001. **Conclusion:** The study concluded that inflammatory markers were significantly higher In SCD.

KEYWORD:

INTRODUCTION

Sickle cell anaemia (SCA), the most common inheritable disease in Africa, leadingto public health problem in the region and elsewhere where descendants of Africans have settled (Roberts and Montalembert, 2007). Worldwide, it is recognized as a major cause of morbidity and mortality with tremendous social and economic impact mainly due to the recurrent acute episodic clinical events called "crises" and hospitalization (Lena et al., 2012). In Africa, SCA is estimated to contribute to an equivalent of 5% of under-five deaths, and only half of the affected children live beyond their fifth birthday (Lena et al., 2012).

The symptoms and complications of sickle cell disease (SCD) arise mainly from the crises (clinical and subclinical). Activation and damage of endothelial cells with activation of adhesion molecules lead to inflammation, release of C-reactive protein (CRP) and other inflammatory mediators and subsequent enhancement of ischemia.

(Manwani and Frenette, 2013). Vaso-occlusive crisis activate and damagetsthe endothelial cells lead to inflammation; As a result inflammatory marker.

Production of c-reactive protein is part of acute phase response to inflammation. Elevated levels of CRP, as general biomarker of inflammation, have been previously reported in patients with sickle cell anemia. White blood cell count was also be considered as biomarker of inflammation and also increased. Erythrocyte sedimentation rate (ESR) in sickle cell anemia that sickle erythrocyte fail to form rouleaux, which result in lower ESR values.

MATRIALS AND METHODS

Study area

The study was conducted in Military Hospital in Sudan, Khartoum State.

Study design

This is a case control study included a total of 45 patients all of them were diagnosed with sickle cell anemia as well as 55 healthy volunteers as control group.

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All patients with sickle cell anemia of both sexes.

Exclusion criteria

Patients use hydroxyurea or any treatment which affect the results, and in cooperation patients were excluded from the study.

Ethical considerations

This study was approved by the faculty of medical laboratory sciences, Al Neelain University, and informed consent was obtained from each participant before sample collection.

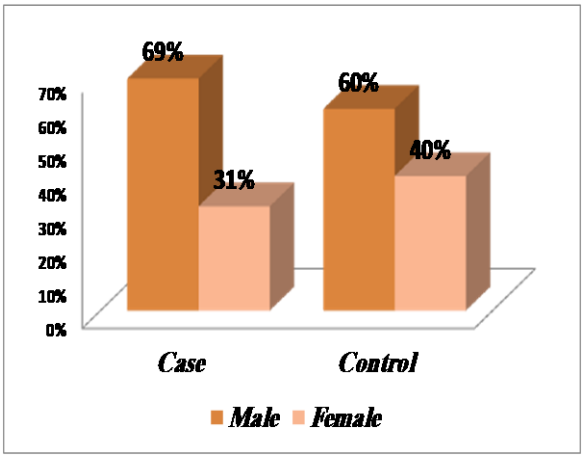
Statistical Analysis

Data of this study was analyzed by statistical package for social sciences (SPSS) version 21.

RESULTS

Gender

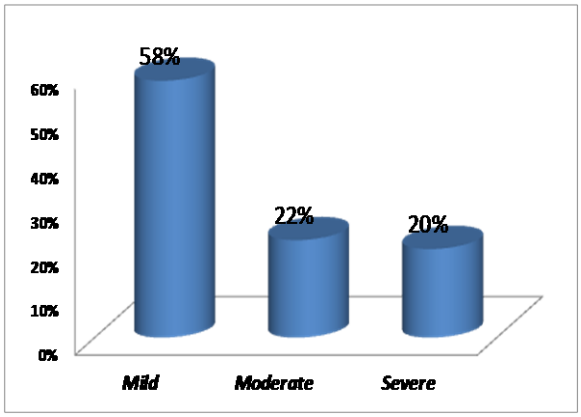
Atotal of 100 samples collected in this study 60 males and 40 females (45 sickle disease and 55 control). figure 1.



(figure. 1).

Severity

Most sickle cell patients was mild 58% followed by moderate 22% and remain 20% was sever. figure 2.



(figure. 2).

The result showed that TWBC level was significantly increased in SCD (24.95±14.73) when compared to control subjects (6.79±1.77) with p-value 0.000. Lymphocyte level was significantly increase in SCD (38.47±20.62) when compared in control (30.05±5.88) with p-value 0.005. Neutrophil level was significantly increased in SCD (93.97±4.79) when compared with control (45.36±3.56) with p-value 0.001.

_ESR level was significants increase in SCD (22.13±9.23) when compaired in control (15.74±6.55) with p-value 0.000 and also CRP level was significantly increased in SCD (32.15±9.44) when compared with control group (32.22±9.62) with p-value 0.000.

Neutrophil/Lymphocyte level was significants increase in SCD (3.96±1.59) when compared in control (1.56±0.31) with p-value 0.000. figure 3.

(Table 1).

Parameters	Case (Mean±SD)	Control (Mean±SD)	*P-value*
TWBCS	24.95±14.73	6.79±1.77	0.000
Lymphocyte	38.47±20.62	30.05±5.88	0.005
Neutrophil	93.97±4.79	45.36±3.56	0.001
ESR	22.13±9.23	15.74±6.55	0.000
CRP	32.15±9.44	32.22±9.62	0.000
Neutrophil/Lymph	3.96±1.59	1.56±0.31	0.000

TWBC level among male with SCD was insignificantly decrease in male (24.56±14.21) compared with female (25.78±16.34) with *P-value* 0.801.

lymophocyte level among male with SCD was not significantly increased in males (40.45±21.76) compared with female (34.07±17.75) with *P-value* 0.342.

Neutrophil level among male with SCD was not significant increase in male (94.51±18.11) compared with female (92.78±4.53) with *P-value* 0.801.

ESR level among male with SCD was insignificantly decreased in male (21.64±4.89) compared with female (21.64±4.89) with *P-value* 0.603.

CRP level among male with SCD was not significant decrease in male (32.12±9.51) compared with female (32.22±9.62) with *P-value* 0.975.

Neutrophil / Lymphocyte level among male with SCD was not significant increase in male (4.03±1.80) compared with female (3.79±2.69) with *P-value* 0.582. figure 4.

Table (2).

Parameters	Male (Mean±SD)	Female (Mean±SD)	*P-value*
TWBCS	24.56±14.21	25.78±16.34	0.801
Lymphocyte	40.45±21.76	34.07±17.75	0.342
Neutrophil	94.51±18.11	92.78±4.53	0.801
ESR	21.64±4.89	221.64±4.89	0.603
CRP	32.12±9.51	32.22±9.62	0.975
Neutrophil/Lymph	4.03±1.80	3.79±2.69	0.582

DISCUSSION

Sickle cell disease (SCD) is one of the most common inherited disorders ofhemoglobin in Africa. Rates of SCA and trait varied in different areas in Sudan.

A total of 100 patients with Sickle cell anemia attended to the Sickle cell centerduring the period of study were enrolled in this study. Most of them showed SCD while the remaining were in steady state, all study patients arechildren and adolescent, with high frequency seen in the children.

This study showed that CRP is significantly increased in SCD compared with the normal subjects this result is agreement with CE Okocha et al., (2012) they stated thatCRP is significantly increased in SCD compared with the stable state in Hb SS individuals.

In this study the males had the highest frequency than the female but this were not found in literature review, and most of study population have family history.

The total white blood cell count (WBCs) in this study was increased in SCD than in normal subjects, this is similar to report of Suba Krishnan et al., (2010).

In this study ESR showed a significant increase but this is not similar to report of Ghazi A. Damanhouriet al (2014).

CONCLUSION

CRP level was increased in SCD compared with healthy subjects .According to the gender; the results showed increased male patients more than female patients. Most of the patients had family history of sickle cell anemia.

The inflammatory markers were significantly higher In SCD.

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