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# Renal Manifestations among Adult Sickle Cell Disease Patients: A Single Center Study in Khartoum, Sudan

Amin S. Banaga<sup>1</sup>, Hala I. Elhardlu<sup>2</sup>, Khalifa Elmusharaf<sup>3</sup>

<sup>1</sup>Department of Medicine & Nephrology, University of Medical Sciences and Technology, Academy Charity Teaching Hospital, Khartoum, Sudan

<sup>2</sup>Clinical Research Assistants, Department of Nephrology, Academy Charity Teaching Hospital, Khartoum, Sudan

<sup>3</sup>Graduate Entry Medical School, University of Limerick, Ireland

Email: amin.banaga@gmail.com

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## Abstract

Sickle Cell Disease (SCD) in adults is one of the causes of renal abnormalities and Chronic Kidney Disease (CKD). In this retrospective study, we explore the renal manifestations among adult SCD patients. The subjects of the study are all adult patients diagnosed with sickle cell anaemia and admitted as to the Academy Charity Teaching Hospital, Khartoum/Sudan during the period (01/01/2015-31/12/2015). All adult SCD patients' medical files have been reviewed focusing on personal and clinical data in addition to presence or absence of renal manifestations, a total of 51 adult patients with SCD have been admitted to Academy Charity Teaching Hospital, Khartoum/Sudan. 11 patients have renal manifestations (21.5%). The mean age  $\pm$  SD of SCD patients with renal manifestations was  $20.2 \pm 1.9$  years, 63.6% were males, the mean Hb level was  $6.9 \pm 0.99$  gm/dl, proteinuria was present among 81.8% of patients, followed by haematuria (36.4%) and End Stage Renal Failure (ESRF) (18.2%). Further prospective studies are needed to explore the renal abnormalities among adult SCD patients.

## Keywords

Sickle Cell Disease, Renal Manifestations, Sudan

## 1. Introduction

Sickle Cell Disease (SCD) is a hereditary hematological disorder resulting from the presence of mutated form of hemoglobin, hemoglobin S (HbS) [1]. The prevalence of

renal involvement in SCD ranges from 5 to 18% [2]. 1.3% of causes of End Stage Renal Failure (ESRF) among patients less than 40 years old on regular haemodialysis in Khartoum/Sudan were due to SCD [3]. Sick cell anaemia is associated with renal ischemia, glomerular diseases and nephrotic syndrome [4] [5]. 40% of causes of mortality among adult SCD patients were due to renal failure [6]. Several published studies identified microalbuminuria and proteinuria as major renal manifestations among adult SCD patients [7] [8]. In this study, we focused on renal manifestations of adult Sudanese patients with SCD.

## 2. Materials and Methods

This is a hospital based cross sectional descriptive study. Medical records of all patients diagnosed and admitted as sickle cell anaemia to the Academy Charity Teaching Hospital, Khartoum/Sudan during the period (01/01/2015 - 31/12/2015) were reviewed retrospectively. We collected socio demographics characteristics of the patients, clinical data, and presence or absence of renal manifestations, we included all patients diagnosed as sickle cell anaemia admitted to the Academy Charity Teaching Hospital, Khartoum/Sudan during the study period, we excluded patients less than 18 years old. The research was approved by Ethics and Research Comities in the Ministry of Health and the local hospital.

## 3. Results

A total of 51 adult patients with SCD have been admitted to the hospital during the study period. 11 patients have renal manifestations (21.5%). The mean age of SCD patients with renal manifestations was  $20.2 \pm 1.9$  years, 63.6% were males. The mean Hb

**Table 1.** Characteristics of the study population (n = 11).

|                                    |  |
|------------------------------------|--|
| Age <sup>1</sup>                   | 20.2 ± 1.9 years   |
| Gender <sup>2</sup>                | Male: 7 (63.6%)<br>Female: 4 (36.4%)   |
| Clinical presentation <sup>2</sup> | Acute Chest Syndrome: 3 (27.2%)<br>Abdominal Crisis: 3 (27.2%)<br>Hemolytic Crisis: 5 (45.4%)<br>Anaemia needed blood transfusion: 6 (54.5%) |
| Hb level <sup>1</sup>              | 6.9 ± 0.99 gm/dl   |

<sup>1</sup>Mean ± SD; <sup>2</sup>Number (percentage).

**Table 2.** Renal manifestation of patients with sickle cell anaemia (n = 11).

| Renal Manifestations    | Frequency |
|-------------------------|-----------|
| Proteinuria             | 9 (81.8%) |
| Nephrotic syndrome      | 4 (36.4%) |
| Haematuria              | 4 (36.4%) |
| End Stage Renal failure | 2 (18.2%) |

level was  $6.9 \pm 0.99$  gm/dl. Five patients (45.5%) were presented with hemolytic crisis and six patients (54.5%) were needed blood transfusion (**Table 1**). Proteinuria was present among nine patients (81.8%), followed by haematuria in four patients (36.4%) and ESRF in two patients (18.2%) (**Table 2**).

#### 4. Discussion

In this study we found that 21.5% of adult SCD patients have renal manifestations. In published literature, prevalence of renal involvement in SCD range from 5 to 18 % [2]. In this study, proteinuria was the major renal manifestation among adult SCD patients. Several published studies identified microalbuminuria and proteinuria as major renal manifestations among adult SCD patients. In one study a urinary screening of asymptomatic SCD patients revealed microalbuminuria in 15.8% of patients [7]. Another study indicated that 22.3% of SCD patients had microalbuminuria [8]. Further studies pointed out that prevalence of proteinuria among adult SCD patients range between 26% and 68% [9]. Broad ranges of glomerular lesion were detected among SCD adults' patients. Focal Segmental Glomerulosclerosis (FSGS) and Membranoproliferative Glomerulonephritis (MPGN) were the most common glomerular lesions among adult SCD patients [10] [11].

In this study 36.4% of SCD patients with renal manifestations have haematuria. Previous studies indicated that the prevalence of haematuria among SCD patients ranged between 8.5% and 30% [12] [13]. Haematuria usually resulted from *sickling* of red blood cells in renal medulla. However, haematuria can occur as a consequence of acute papillary necrosis or renal medullary carcinoma [14].

In this study 18.2% of adult SCD patients with renal manifestations have renal dysfunction and ESRF. Patients with sickle cell anaemia have increased risk of development of CKD. 40% of causes of mortality among adult SCD patients were due to renal failure [6]. Factors determining the development of CKD among adult SCD patients were presence of proteinuria, hypertension and acute renal failure [15].

There were limitations in our study. It was a retrospective review of the medical records. This prevented us from exploring more details on other renal manifestations of SCD that may be present in our patient.

#### 5. Conclusion

In conclusion, the current study found that 21.5% of adult SCD patients had renal manifestations. Proteinuria was the major renal manifestation among our patients followed by haematuria and renal dysfunction.

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