

# PROTEINURIA IN ADULTS WITH SICKLE CELL DISEASE: THE ROLE OF HYDROXYUREA AS A PROTECTIVE AGENT

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## OBJECTIVES

Renal abnormalities are one of the main complications of sickle cell disease (SCD). The aim of this study is to investigate the role of hydroxyurea as a protective factor in sickle cell nephropathy.

## METHODS

This is an observational cohort study including all consecutive patients with clinical and laboratory diagnosis of SCD undergoing consultation in a public health service in the Northeast Region of Brazil from December 2010 to June 2012. All of them were homozygous for HbS. All patients were treated with folic acid 5mg/day and 12 with hydroxyurea 1g/day. A comparison between the studied parameters was done between hydroxyurea and non-hydroxyurea group.

## RESULTS

Patients mean age was  $32.1 \pm 9.9$  years, and 16 (61%) were males. Glomerular hyperfiltration was found in 9 patients with SCD (34.6%).  $GFR < 60 \text{ mL/min/1.73m}^2$  was observed in 3 cases (11.5%). Microalbuminuria (30-300mg/day) was found in 7 cases (27%) and macroalbuminuria ( $>300 \text{ mg/day}$ ) in 1 patient (3.8%). All patients presented urinary concentrating deficit, and inability to acidify urine was found in 10 cases (38.4%). The comparison of patients according to the use of hydroxyurea showed lower levels of serum creatinine in those using the drug ( $0.6 \pm 0.1$  vs.  $0.8 \pm 0.3 \text{ mg/dL}$ ,  $p=0.03$ ), as well as lower levels of 24h-proteinuria ( $226 \pm 16$  vs.  $414 \pm 76 \text{ mg/dL}$ ,  $p=0.0001$ ), but not microalbuminuria ( $79 \pm 15$  vs.  $55 \pm 86 \text{ mg/dL}$ ,  $p=0.35$ ).

Table 1. Demographic and clinical characteristics of patients with SCD according to the use of hydroxyurea.

	Hydroxyurea (n=12)	No-hydroxyurea (n=14)	p
Age, years	$29.3 \pm 7.4$	$34 \pm 11$	0.19
Gender			
Male	4 (34%)	6 (43%)	0.70
Female	8 (66%)	8 (57%)	
SBP, mmHg	$118 \pm 15$	$116 \pm 5.7$	0.64
DBP, mmHg	$70 \pm 11$	$76 \pm 5.7$	0.08
Weight, Kg	$58 \pm 11$	$58 \pm 11$	1.0
Fetal Hb (%)	$11 \pm 6.8$	$8.7 \pm 4.8$	0.32

Table 2. Comparison of renal function parameters among patients with SCD according to the use of hydroxyurea.

Parameters	Hydroxyurea (N=12)	No-hydroxyurea (N=14)	p
Age, years	$29.3 \pm 7.4$	$34 \pm 11$	0.19
Gender			
Male	4 (34%)	6 (43%)	0.70
Female	8 (66%)	8 (57%)	
$P_{U_{r}}$ , mg/dL	$17.8 \pm 10.3$	$22 \pm 7.1$	0.15
$P_{Cr}$ , mg/dL	$0.6 \pm 0.1$	$0.8 \pm 0.3$	0.03
GRF – CKD-EPI, mL/min/1.73m <sup>2</sup>	$112 \pm 21$	$105 \pm 30$	0.504
Microalbuminuria	$79 \pm 15$	$55 \pm 86$	0.35
Proteinuria, mg/dia	$226 \pm 16$	$414 \pm 76$	0,0001
$FE_{Na}$ , %	$0.65 \pm 0.3$	$0.68 \pm 0.4$	0.83
$S_{Na}$ , mEq/L	$137 \pm 2.1$	$137 \pm 2.4$	1.0
$S_{K}$ , mEq/L	$4.2 \pm 0.4$	$4.4 \pm 0.5$	0.27
$P_{Osm}$ , mOsm/ KgH <sub>2</sub> O	$285 \pm 6.2$	$285 \pm 6.7$	1.0
TTKG	$5.5 \pm 3.1$	$5.4 \pm 1.7$	0.91
$Tc_{H_2O}$ , L/day	$0.29 \pm 0.2$	$0.21 \pm 0.3$	0.44
Arterial pH <sub>T0</sub>	$7.36 \pm 0.03$	$7.36 \pm 0.03$	1.0
Arterial pH <sub>T4</sub>	$7.34 \pm 0.03$	$7.34 \pm 0.03$	1.0
$HCO_3$ T <sub>0</sub> , mEq/L	$24 \pm 1.8$	$24 \pm 1.9$	0.68
$HCO_3$ T <sub>4</sub> , mEq/L	$22 \pm 2.0$	$22 \pm 1.8$	0.89
$U_{osm}$ , mOsm/kg	$369 \pm 37$	$343 \pm 74$	0.28
$U_{osm}/P_{osm}$	$1.2 \pm 0.1$	$1.1 \pm 0.2$	1.0
$U_{pH T0}$	$5.8 \pm 0.3$	$5.9 \pm 0.4$	0.48
$U_{pH T4}$	$5.2 \pm 0.3$	$5.3 \pm 0.3$	0.48
Urinary concentration deficit	12 (100%)	14 (100%)	1.0
Urinary acidification deficit	2 (16.6%)	3 (27.2%)	1.0

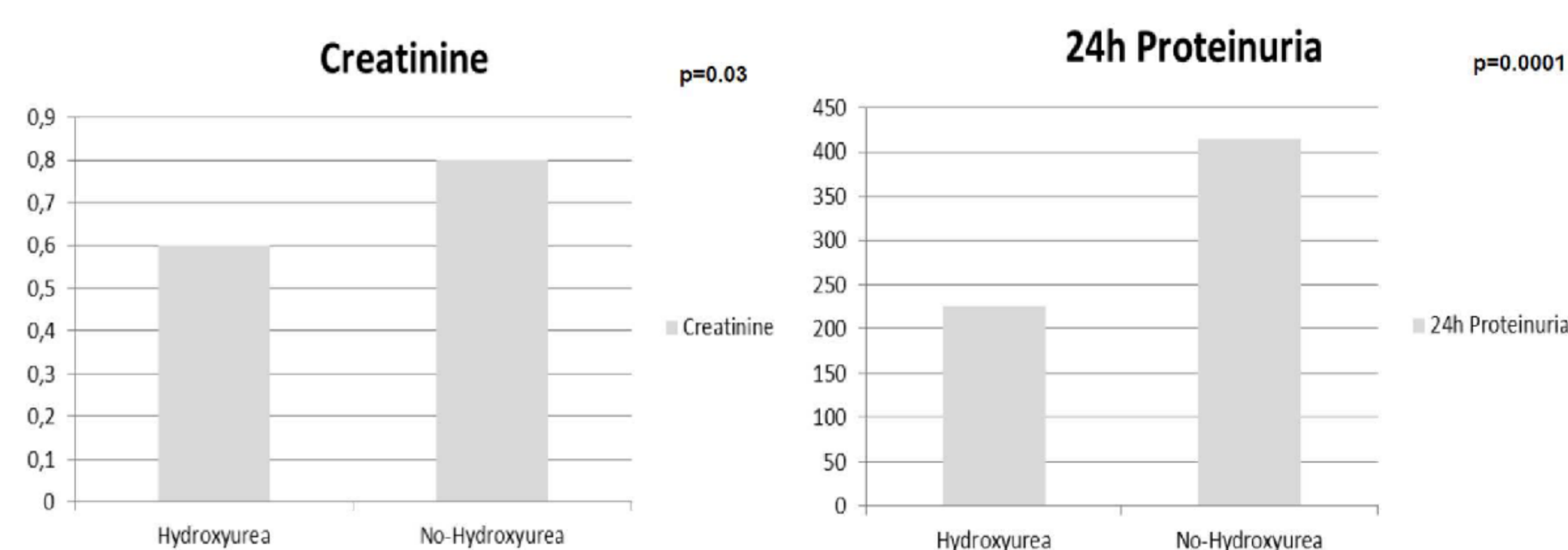


Figure 1. Comparison of creatinine levels and 24h proteinuria among patients with SCD according to the use of hydroxyurea.

## CONCLUSION

SCD is associated with important renal abnormalities. Hydroxyurea seems to protect kidney function in SCD by decreasing proteinuria. Further studies are required to better establish the mechanisms through which hydroxyurea protects kidney function in SCD.

## REFERENCES

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