

# ALBUMINURIA AND KIDNEY DISEASE IN PATIENTS WITH SICKLE CELL ANEMIA

We studied patients who submitted a sample of urine after signing an informed consent during routine clinical visits. After samples were collected, they were tested for creatinine, a urine waste product, and albumin, a protein. After determining the ratio, we looked at the patient's chart to see if he or she had a history of kidney damage and documented their last serum creatinine level. Fifty-two patients were used in the study; 21 were children and 31 were adults. A correlation was seen between a patient's albuminuria and his or her serum creatinine; however the study was not fully conclusive because no patients in the study had macroalbuminuria.

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## INTRODUCTION

Sickle cell anemia is an autosomal recessive genetic disorder that causes defective hemoglobin S, a component of the blood. The sickle cell trait is most common in people of African descent;  $\approx 8\%$  of African Americans have it, but it is also present in Hispanics and Middle Eastern people. This research determined whether patients' kidney damage can be accurately measured by the level of albumin in their urine.

## METHODS

Fifty-two patients, 31 adults and 21 children, at Grady Memorial Hospital's Georgia Sickle Cell Center in Atlanta who had given informed consent were asked to provide urine samples during a routine visit. To insure we did not receive abnormal albumin levels we did not request samples from patients who were in severe pain, had blood in their urine, had a fever, or had trouble urinating. The samples we received were tested for albumin by using radioactivity. Because albumin changes depend on how hydrated the person was at the time the sample was taken, the patient's sample was also tested for creatinine. Creatinine also fluctuates depending on how hydrated the patient is; therefore, the ratio between creatinine and albumin will remain the same, providing an accurate measure for albuminuria. Each patient's albuminuria level was compared with the latest serum creatinine level on file. The values were then compared to determine whether a correlation existed between

the amount of kidney damage indicated by the two.

## RESULTS

Of the 31 adult participants, 16 had normal albuminuria, 15 had microalbuminuria, and none had macroalbuminuria. The average albuminuria for adult participants with normal albuminuria was 9.84 and their average serum creatinine was .53. The average albuminuria for adult participants with microalbuminuria was 125.08 and their average serum creatinine was .714.

Of the 21 pediatric participants, nine had normal albuminuria, 12 had microalbuminuria, and no participants had macroalbuminuria. The average albuminuria for adult participants with normal albuminuria was 8.107 and their average serum creatinine was .344. The average albuminuria for adult participants with microalbuminuria was 79.140 and their average serum creatinine was .6.

## CONCLUSION

The results of the study proved a correlation between albuminuria and serum creatinine. Each of the two values indicated approximately the same amount of kidney damage. However, the results of the study are inconclusive because no patients had macroalbuminuria.

## DISCUSSION

The data demonstrate that using urine is an effective method for detect-

ing kidney damage in patients with sickle cell anemia. Testing for albuminuria would be more desirable than serum creatinine because it is performed on urine as opposed to blood. The test would be far less invasive, and patients would be more willing to have it conducted more often. The values of serum creatinine and albuminuria tended to demonstrate approximately the same degree of kidney function.

## FUTURE RESEARCH

To prove the correlation between albuminuria and serum creatinine is constant, a larger study would need to be conducted to include patients with macroalbuminuria. This study should also look at the patient's past albuminuria and serum creatinine levels to determine if a trend exists in the numbers.

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