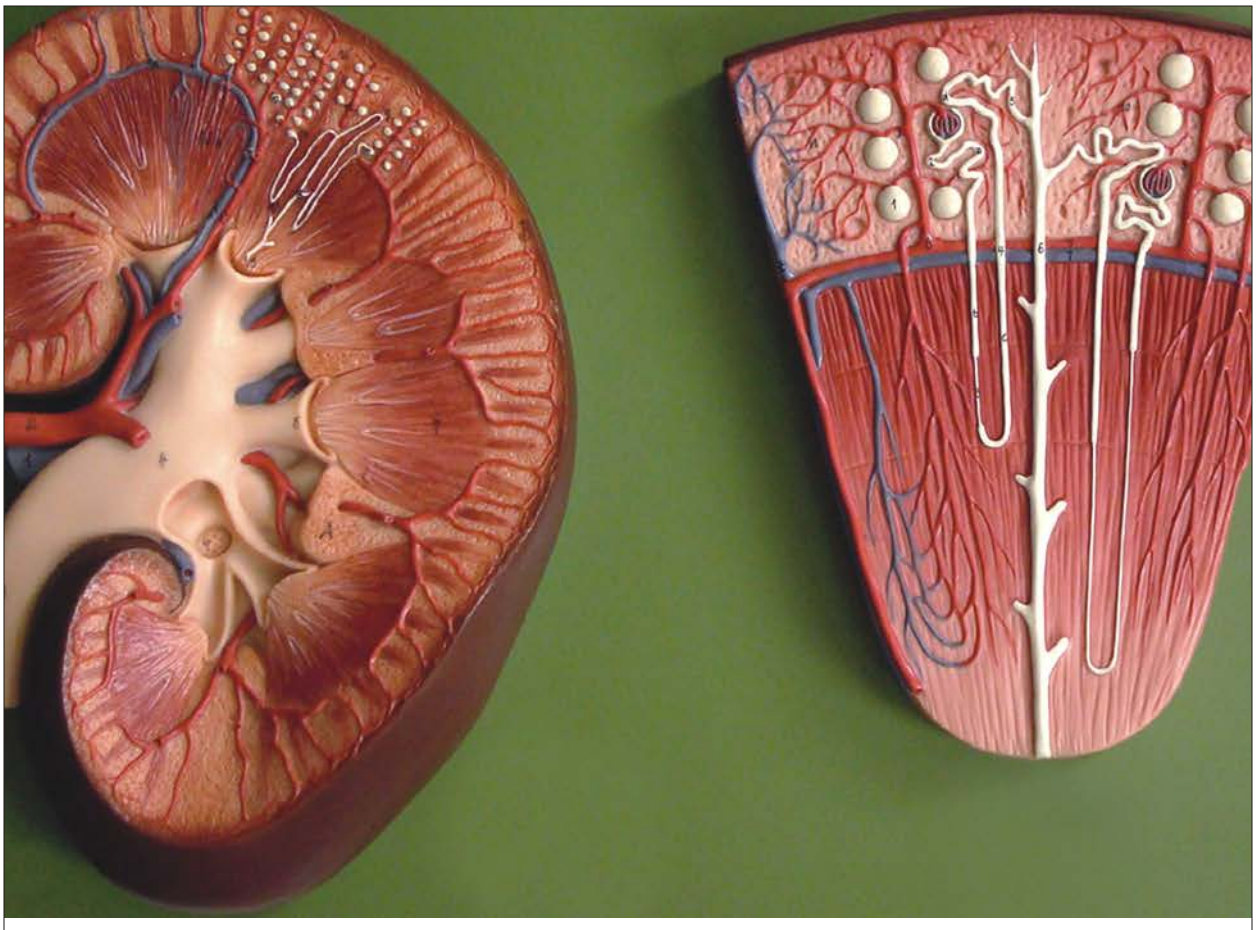

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Study of Prevalence of Infection in Sickle Cell Nephropathy: A Study from Tribal Area of India

Punit Gupta, Prachi Dubey, Prakash Khunte and G.B. Gupta
P.T.J.N.M. Medical College and B.R.A.M. Hospital Raipur (C.G.), India

Corresponding Author: Punit Gupta, P.T.J.N.M. Medical College and B.R.A.M. Hospital Raipur (C.G.), India

ABSTRACT

A total number of 86 patients of 15-38 year age group were taken, Out of which, 30 were males (34.88%) and 56 were females (65.11%). The mean age of population was 26±11.6 year. These all patients were suffered from sickle cell nephropathy. All patient were subjected to renal function test, Hb electrophoresis and all routine investigations in form of blood glucose urine analysis, lipid profile serum protein 24 h, urine protein, chest X-ray. In this study, it was found that the incidence of infection is more common in female i.e., 70% of total patients. The 81.08% patients having sickle cell nephropathy suffered from urinary tract infection, 66.66% patients of sickle cell nephropathy had pyuria and 13.33% patients show lung infection in form of consolidation and pleural effusion. Among patients suffered from urinary tract infection, 38.23% patients had proteinuria <1 g/24 h and 61.76% patients have proteinuria >1 g/24 h, that proved the glomerular involvement in sickle cell nephropathy. Hypothyroidism seen in 18.18% patients having infection as compared to 11.11% patients without in infection. Thus, this study has shown that sickle cell nephropathy manifestated more common in form of proteinuria and infection (urinary tract and lung infection).

Key words: Nephropathy, infection, proteinuria

INTRODUCTION

Sickle cell nephropathy is a type of nephropathy associated with sickle cell disease. It causes renal complications as a result of sickling of red blood cells in the microvasculature. The hypertonic and relatively hypoxic environment of the renal medulla, coupled with the slow blood flow in the vasa recta, favours sickling of red blood cells with resultant local infarction (papillary necrosis). Functional tubule defects in patients with sickle cell disease are likely the result of partial ischemic injury to the renal tubules (Bunn, 1997).

Sickle cell disease is common in India, some endogamous groups like Jharia, Mehra Pradhan, Panika, Barela, Bhilala and Sahu caste. The presence of renal failure in Sickle Cell Disease (SCD) ranges from 5-18%. Of the total population of SCD patients there is significant morbidity associated with urinary tract infection and with renal dysfunction in sickle cell disease.

Clinically significant renal involvement occurs more frequently in sickle cell disease than in sickle cell trait with the exception of renal medullary carcinoma which appears to be more common among patients with sickle cell trait (Kaul *et al*., 1995). Renal infarcts and papillary necrosis occur in either sickle cell disease or trait, with prevalence estimates of 30-40% in radiographic studies

(Bruno *et al.*, 2001). In sickle cell disease, the prevalence of proteinuria has been estimated to be 20-25% and hematuria seen in 3-4% of patients (Powars *et al.*, 1991).

Microalbuminuria and/or proteinuria has been reported in 8-30% due to increase glomerulal filtration, nephrotic syndrome documented in 4% patients of sickle cell anaemia.

In the United States, sickle cell disease accounts for <1% of all new cases of end stage renal disease. Due to vasooclusive phenomenon, sickle cell disease patient also suffered from other kind of infection e.g., lung, bone infection etc (Hakimi *et al.*, 2007).

MATERIALS AND METHODS

Total number of 86 patients of sickle cell nephropathy admitted in Dr. B.R.A.M. Hospital in department of medicine under nephrology unit taken for study. Out of which 30, were males and 56 were females.

All patients were subjected to renal function test i.e., urea, creatinine, Hb electrophoresis and all routine investigations in form of blood glucose level, urine analysis, lipid profile, serum protein 24 h urine protein, urine routine and microscopy, thyroid profile and chest X-ray to find out various manifestation of sickle cell nephropathy.

RESULTS

In the study of 86 patients, it was found that infection is more common in female patients i.e., 70%. The mean age of patients suffered from sickle cell nephropathy was 26±11.6. The 81.08% patients having sickle cell nephropathy suffered from urinary tract infection, 66.66% patients had pyuria and 33.33% patients show lung infection in the form of consolidation and pleural effusion due to vasooclussion.

Patients of sickle cell nephropathy suffered from urinary tract infection, 38.23% patients had protienuria <1 g/24 h and 61.76% patient have proteinuria >1 g/24 h. The 81.08% of patients in our study are having anaemia associated with urinary tract infection. The hypothyroidism was found in 18.18% patients having infection as compared to 11.11% patients without infection. There were 30 patients of sickle cell trait, among them 79.31% had pyuria, 6.67% have consolidation while 60% have leucocytosis (Fig. 1 and 2).

Fig. 1: Prevalence of infection in sickle cell disease patients

Fig. 2: Among patients of sickle cell nephropathy, pyuria is more common than other infection

DISCUSSION

Infectious complications are a leading cause of morbidity and mortality in patients with sickle cell disease. The exact reasons of the propensity of sickle cell patients to infection are not clear and are matter of debate. Genetic factors have been investigated as potential factor risks for infection in sickle cell patients, for example: HLA system, genes encoding Fc Human Immunoglobulin G receptor IIA, mannose-binding protein and myeloperoxidase (McCall *et al.*, 1978).

Patients with SCD have an increased susceptibility to infection particularly with encapsulated organisms; *Streptococcus pneumoniae*, *Haemophilus influenzae*, *Salmonella* (Powars *et al.*, 2005). Bacterial infection may also be caused by intracellular organisms such as *Chlamydia pneumoniae*, *Mycoplasma pneumoniae*, *Salmonella* spp., *Escherichia coli* and extracellular pathogens such as *Staphylococcus aureus* (Sesso *et al.*, 1998).

Meningitis and septicaemia are the more serious infections and most of the time are caused by *Streptococcus pneumoniae* and *Salmonella*. Besides, patients with SCD are at risk for osteomyelitis which is specific in SCD since it often occurs in ischemic bone. Moreover, this complication affects frequently femur, humerus, vertebra, ribs and sternum (Lobel and Bove, 1982).

Osteomyelitis occur far more frequently in patients with SCD than in general population and the offending pathogens are generally *Salmonella* and *Streptococcus pneumoniae*. Furthermore, leg ulceration is a common complication of SCD. Because of its frequency, several mechanisms are believed to contribute to this susceptibility, a major factor being the early loss of splenic function. However, this justification is incomplete since functional splenectomy often occurs after the first infectious complications (Serjeant *et al.*, 1994). The unanimous opinion is that opsonising defect is a factor contributing to infection but the reasons of this defect are still discussed. Sickle cell nephropathy patients are susceptible for infections especially urinary tract infection. Frequency of asymptomatic bactiuria is common in sickle cell disease patients renal impairment in form of impaired concentrating ability, potassium ion excretion and impaired acidification of urine further increase sickling that increases the vasooclussive phenomenoma, protienuria is because of increase glomerular permeability (Zarkowsky *et al.*, 1986).

CONCLUSION

Our study supports the finding that sickle cell nephropathy patients are prone for different types of infection, more common, urinary tract infection followed by consolidation of lungs. Females

are more commonly affected than males and most of the patients have anaemia associated with urinary tract infection and leucocytosis was associated with the most of the patients Hypothyroidism is more common in sickle cell disease as compared to sickle cell trait patients.

So Early detection of renal complication in sickle cell disease can decrease the morbidity associated with infection.

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