



Pathogens Causes of Fever in Sickle Cell Children in Mali

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Commentary

Fever is a common symptom in sickle cell patients, and may be a sign of a bacterial or non-bacterial infection. It is recognized as a natural defence of the human body; however, it is a symptom resulting in discomfort and is sometimes life-threatening for sickle cell disease children because it is the most frequent factor that can initiate and maintain haemoglobin S gelation responsible for sickle cell complications that are sometimes fatal. The extent of association of fever with bacterial infections in sickle cell children is not known in Mali where 5,000 to 6,000 sickle cell children are born each year [1]. Our study describes from April 2014 to January 2016, the bacterial aetiologies of fevers and the extent of co-infection with other pathogens among sickle cell children followed up by the "Centre de Recherche et de Lutte contre la Drépanocytose" (CRLD). In order to specify the different causes of fever in sickle cell children consulted or hospitalized, and the extent of co-infection with other pathogens in children at CRLD in Bamako. The 231 sickle cell patients with fever included in our study were 6 months to 15 years old. They comprised 138 SS homozygotes (79.2%), 26 SC (11.3%), 12 S/β thalassaemics (4.3%) and 10 S/β thalassaemics (4.3%). The 231 sickle cell patients accounted for 36.67% of the Centre's paediatric population during our recruitment period, with mean age was 7.7 ± 3.6 years and sex ratio (M/F) was 1.6. Pathogens exploration during the fever documented positive blood cultures in 10 sickle cell patients, i.e., 4.32% of blood cultures, and positive urine cultures in 33 patients, i.e., 14.28% of urine cultures. In the nasal swab, Streptococcus pneumonia was found to be the cause in two cases of pneumonia documented by x-ray of the lung, and K. pneumonia was the cause in one meningococcal meningitis case which was gradually cured with antibiotic therapy. Malaria was found in 16 patients, i.e., 6.92%. The malaria cases were classified as severe when the haemoglobin level was $< 5\text{g/dl}$ [2] in 3 patients. These co-infections were observed in 4 homozygous SS sickle cell patients and 1 S/β thalassaemics sickle cell patient. Namely two cases of bacteraemia, one of which was associated with hepatitis B virus sera-positivity and the other with a urinary infection with *Candida albicans*, and two cases of urinary tract infections, one of which was associated with malaria infection and the other with hepatitis B virus sera-positivity. They were mostly found in SS homozygous patients, and they were constantly associated with leucocytosis (more than $10,000/\text{mm}^3$) and increased PCT level. Sickle cell complications associated with fever episodes were Vaso Occlusive Crisis (VOC) in 138 patients (59.7%), acute chest syndrome in 45 patients (19.5%), severe anaemia in 13 patients (5.6%), splenic sequestration in 3 patients (1.3%) and osteomyelitis in 3 patients (1.3%). Compared to our studies in Gabon in 2014, in Kenya in 2009 and in Jamaica in 2001 reported higher bacteraemia rates [3-5]. These differences reflect the different methodologies adopted in the studies. The prevalence of urinary tract infections estimated at 14.28% in this study is lower than that reported by some authors in Africa [6,7]. The rate of malaria infection found in this study is similar

to that reported by a study conducted in Cotonou in 1999, i.e., 6.7% [8]. However lower, rates were reported for the paediatric population in rural areas in Mali and a retrospective study on sickle cell patients in Gabon in 2014 [3,9]. This study is, to our knowledge, the first study that has prospectively and systematically investigated bacterial aetiologies of fever in children with sickle cell disease in sub-Saharan Africa. An assessment of the scope of the results obtained must, however, take into account some limitations: The fact that patients were taken only from the hospital, only children were considered, and certain infections, particularly those caused by oro-pharyngeal tropic viruses common in children, by mycobacteria or mycoplasmas, have not been investigated. This study shows that fever is a frequent reason for outpatient consultation and hospitalization of sickle cell children in Mali. It also shows a high frequency of bacterial infection in this context, mainly related to enterobacteria other than salmonella. However, malaria and viral infections are important in the aetiologies of fevers and life-threatening complications. The immunological features that contribute to the occurrence of these infections among sickle cell patients should be explored in our context.

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