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Leukocyte counts of typhoid fever patients in Kano, Nigeria.

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ABSTRACT: The leukocyte counts of 73 patients with proven cases of typhoid fever were compared with that of 80 healthy individuals and 68 non-typhoid febrile patients in order to determine the diagnostic value of the leucocyte counts for typhoid fever. The mean total white blood count (WBC) of $5.9 \pm 4.3 \times 10^9/l$; differential neutrophil count of $65 \pm 13.3\%$ and lymphocyte counts of $34.17 \pm 13\%$ recorded in patients with typhoid infections were found to be significantly different ($p < 0.05$) from the corresponding counts obtained in healthy subjects. However, only the mean differential neutrophil and lymphocyte counts of these patients were found to have significant differences ($p < 0.05$) from those of the patients with other febrile illnesses. The mean total WBC showed no statistical difference ($p > 0.05$). These findings suggest that typhoid fever in adult in Kano is characterized by normal leukocyte count and relative neutrophilia.

Key Words: Typhoid fever; Leukocyte counts; Kano; Nigeria.

Introduction

The borderline between white blood cell (leucocyte) counts in health and disease is indefinite, for the normal and abnormal values often overlap. However, leucocyte counts are determined by age, sex, genetic, nutritional, environmental and socio-economic factors, as well as the nature of diseases (Dacie and Lewis, 1995).

In typhoid fever patients, the leucocytes counts vary little from normal standard. The main value of WBC in typhoid fever lies in the fact that a marked rise makes such diagnosis most unlikely. Perhaps, the absence of leucocytosis may be at times of real diagnostic value in distinguishing typhoid fever from various septic and acute inflammatory processes (Adams, 1989).

As the leucocyte count in health and disease vary from one community to the other, the diagnostic value of this count for various ailments may therefore vary in various communities. In this study we assessed the diagnostic value of leucocyte counts for typhoid fever in Kano Metropolis.

Materials and Methods

Study Area

Kano Metropolis, the capital city of Kano State of Nigeria, with atypical setting of West African cities and a Sudan Savannah vegetation. It covers an area of 550KM² with an estimated population of 1.6 million people, distributed within six Local Government Areas (Epid. News, 1998).

Study Population

A total of 221 subjects were sampled for the study. They comprise 80 apparently healthy individuals selected from within Kano Metropolis, 73 patients with clinical evidence of typhoid fever confirmed by culture and / or serological tests, and 68 patients with non-typhoid febrile illnesses. All the patients were seen at the Murtala Muhammad Specialist Hospital and Aminu Kano Hospital, Kano.

Sample collection

Two millilitres (2cm³) of venous blood were collected from each subject using aseptic techniques (Dacie and Lewis, 1995). The blood samples were delivered into EDTA bottles. All samples were stored at 4°C and were processed within six hours of collection.

Total Leucocyte Count (TWBC)

The TWBC were carried out using the standard technique and results were expressed as the number of Leucocytes per litre, using the New Improved Neauber counting chamber.

Differential Leucocytes Count

Thin films were made and stained with Rowmanwosky stain. Differential Leucocyte Count were done in 100 white cells per slide.

Statistical Analysis

Student's t-test was used to compare the differences between the mean values of TWBC and differential neutrophil and lymphocyte counts (Kramer, 1988).

Results

The mean TWBC of $5.9 \pm 4.3 \times 10^9 / L$ and the mean differential neutrophil counts of $65 \pm 13.3\%$ obtained in patients with typhoid fever were higher than the corresponding mean TWBC of $4.93 \pm 1.3 \times 10^9 / L$ and mean neutrophil counts of $60.5 \pm 8.6\%$ obtained in non-typhoid patients and in turn higher than the mean TWBC of $4.06 \pm 1.3 \times 10^9 / L$ and mean neutrophil count of $59.55 \pm 8.7\%$ obtained in healthy individuals. However, reverse of this trend was the case for the mean lymphocyte counts in the three category of subjects. In general, lymphocyte counts were found to be higher in normal subjects than in the patients with typhoid fever and those with other febrile illnesses (Table 1).

The mean WBC, neutrophil and lymphocyte counts of patients with typhoid fever were found to have significant difference ($p < 0.05$) from the corresponding mean counts obtained in the healthy subjects. The mean differential neutrophil and lymphocyte counts of the patients with typhoid fever also showed significant difference ($p < 0.05$) from that of those with other febrile illnesses, while the mean total leucocyte counts did not show significant difference ($p > 0.05$).

Table 1: Comparison of the Mean WBC & Differential Counts in healthy individuals, typhoid and non-typhoid patients.

Count	Healthy Individuals (N = 80)	Typhoid Patients (N = 73)	Non-typhoid patients (N = 68)
TWBC (x 10 ⁹ /L)	4.06 ± 1.3 ^a	5.9 ± 4.3 ^a	4.93 ± 1.39 ^d
Neutrophiles (%)	59.55 ± 8.7 ^b	65.0 ± 13.3 ^b	60.5 ± 8.6 ^b
Lymphocytes (%)	39.8 ± 9.8 ^c	34.64 ± 13 ^c	38.88 ± 8.8 ^c
^a P < 0.05	^b P < 0.05	^c P < 0.05	^d P > 0.05

Discussion

Significant variations in the mean leucocytes, differential neutrophil and lymphocyte counts were observed between the patients with typhoid fever, and that of the healthy controls. However, the mean TWBC of $5.9 \pm 4.3 \times 10^9/L$ in typhoid patients is still within the normal range. Most typhoid patients have been reported to have TWBC between the mean counts in the healthy individuals and patient with non-typhoid febrile illness.

The mean TWBC and differential neutrophil counts were relatively higher in typhoid patients than in the normal subjects, even though the counts fell within the normal range in the minority. The mean lymphocyte count was higher in the normal subjects than in the typhoid patients.

From the above findings, typhoid could be defined by:

1. Normal total white cell counts or slightly elevated. Durrani and Rab (1996) also found majority of the TWBC of 240 typhoid patients in Quetta, Pakistan, to be within normal range.
2. Elevated neutrophils (neutrophilia), with relatively low lymphocyte counts (lymphopenia). Abdul-Gaffar, *et al.*, (1992) found a relatively high proportion of patients with typhoid fever in Durban South Africa, to have elevated neutrophil counts and a relatively lower lymphocyte counts. The involvement of neutrophils in the primary immune response to acute infection with *Salmonella typhi* is usually associated with neutrophilia and relative or absolute lymphopenia (Roitt *et al* 1993). This shows that changes in neutrophil count serve more as an index of typhoid diagnosis than changes in total leucocyte counts in the diagnosis of typhoid fever.

It therefore suggests, from the findings of this work, that in Kano, typhoid fever in adults is characterized by normal TWBC, neutrophilia and relative lymphopenia. This finding is subject to further investigation to establish its applicability as a routine.

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