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Changes in some haematological parameters in Nigeria children with Burkitt's lymphoma

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ABSTRACT: In order to investigate the prevalence of anaemia and related haematological disorders, fifty-seven Nigerian children with Burkitt's Lymphoma, (BL) between the ages of 4-14 years were randomly selected from the paediatric Ward, Ahmadu Bello University Teaching Hospital, Zaria and Kaduna. Twenty-eight age-matched children in apparent good health were included as control subjects. Results show that BL patients had significant ($p<0.05$) reduction in haemoglobin content compared to control values. Differential white blood cell (WBC) counts were not significantly different in the values for neutrophils and lymphocytes, when compared with control values, but the eosinophil count was significantly ($p<0.05$) different when compared with values obtained from the control subjects. Evidence available from the data of this investigation suggest that some Nigerian children with BL had mild to moderate anaemia and higher eosinophilic response during the course of BL pathogenesis. Thus, any plan to treat BL patients should recognize these conditions. @JASEM

Burkitt's lymphoma (BL) was the most common childhood cancer in Africa. Most prevalent in areas endemic for malaria. The Disease, a malignant growth of lymphoid tissue, usually presents itself as a large tumour of the jaw, when first characterized in the 1950s, the lymphoma was thought to spread by some infections agents. Subsequent research indicates that the frequent involvement of an infectious agent is but one factors in a more complex aetiology. Today, Burkitt's lymphoma is considered an example of multistep carcinogenesis (Burkutt's 1958, Golstein et al 1990, Zieglar et al 1985). BL is the most common childhood cancer usually at the rate of 1:10,000 children, boys are more prone to the disease than girls with the male/female ratio of 2.1:1 without jaw lesions Edington (1970). The age of infection is often dependent upon prevailing living condition and is commonest in very low socio-economic group living in a crowed and poor hygienic environment as in the developing nations (Goldstein et al 1990, Edington. 1978)

BL is a form of chronic cancer, yet its effect on some haematological parameters in Nigeria has remained scarce in literature. This study attempts to report the relationship between the different clinical stages of BL and some haematological parameters. This is important in order to establish the prevalence of anaemia among BL patients in Nigeria.

MATERIAL AND METHODS

Patients Selection: Fifty-seven BL patients (4-14 yrs) attending the Paediatric Ward of Ahamadu Bello University Teaching Hoppital (ABUTH) between 1994 and 1996 were randomly selected. These cases were diagnosed clinically and histologically using the established WHO criteria for diagnosis (Bernard, et al 1969). The 57 patients were grouped into the four clinical stages of BL (Ziegler et al, 1970), twenty-eight apparently healthy children between the same age bracket were included as control subjects. Human experimentation conduct protocol was approved by the Ahmadu Bello University Ethical Committee (Ref, No. F–Med/Com.19 of 16/6/1995 and project number was ESC/95/00075.

Analysis of haematological parameters: *Haematocrit (Hct):* using Hawksly micro-capillary centrifugation; Haemoglobin level (Hb) using the cyanomathmoglobin method white blood counts was estimated using the improved Neubauer counting chambers all these method are used routinely in haematology laboratories on daily basis.

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RESULTS AND DISCUSSION

The result obtained is presented in Table 1 and Figs 1-3.

Table 1: Mean of some haematological parameters for BL patients and control subjects.

Test	Stage I (n = 22)	Stage II (n-11)	Stage III (n = 20)	Stage IV (n = 4)	Control (n = 28)	Level of significances
Hb (g/ldl)	6.10 ±1.75	9.16 ±1.9	9.80 ±1.68	9.58 ±1.40	12.03 ±1.4	P < 0.05
WBC (10^a/L)	6.42 ±2.40	6.38 ±3.02	5.76 ±2.84	10.13±5.36	7.39 ±3.66	NS
*Neutrophile ($X10^9$/L)	3.28 ±1.99	3.26± 2.20	2.44 ±2.12	4.31± 0.70	3.76 ±2.6	NS
Eosinophils ($X10^a$/L)	0.49 ±0.57	0.35 ±0.25	0.32 ±0.29	1.09 ±0.28	0.47 ±0.48	P < 0.05
Lymph (10^9/L)	2.64 ±1.96	2.54 ±1.08	1.95 ±1.07	3.94 ±1.33	3.27 ±1.33	P < 0.05

Values are expressed as mean ± SD.

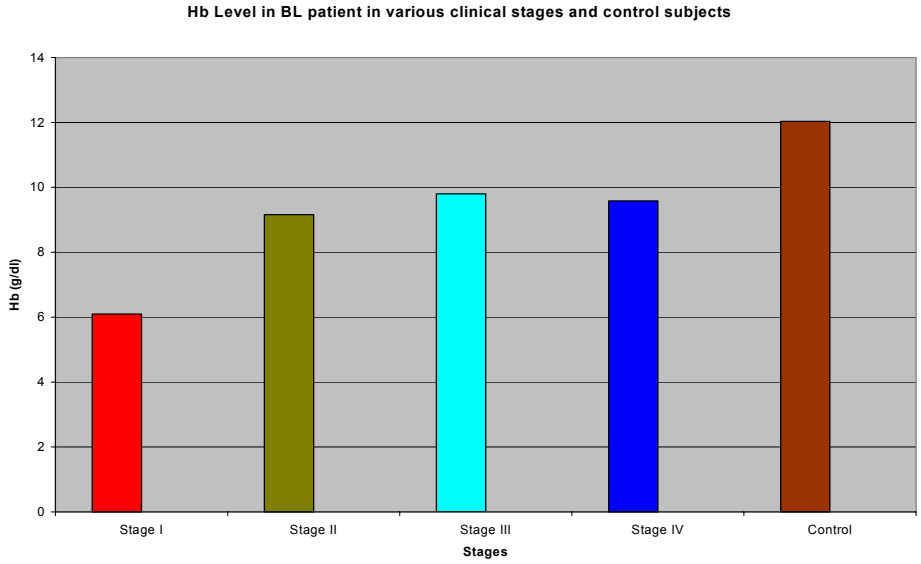

Fig. 1: Hb level in BL patient in various clinical stages and control subjects.

The haematological assessment of Burkitt's lymphoma (BL) patients with that of control subjects are presented in tabe 1 and figure 1. The Data shows that, the haemoglohin level of BL patients increased from stage I to state III and decreased slightly in stage IV. The level in the control group (12.03g/dl) was higher than all the clinical stages of BL investigated. There were significant difference ($p>0.05$) between the different clinical stages of BL and the control value. This signifies that all the clinical stages of BL showed some degree of anaemia (mild at stages II, III and IV and moderate of stages I). However the Hb levels of some BL children in Northern Nigeria have be reported to be within the reference range, and so were not clinically anaemic (Onwukeme et al., 1995).

Clinical examination of Oral BL, show a tumour involving Dental anarchy, and groosly pale looking gingiva. This observation, indicate anaemial manifestation and this condition was confirm by these laboratory findings, evident in the haematological parameters, especially Hb levels. The presence of anaemia in BL patients may be related to the activity of the associated disease(s) and this has led investigator to consider mediators of inflammatory response such as tumour necrotic factors (TNF) (Beutler and Carami 1987, Tracey et al 1989) interluekin-1 (IL-1) and interferon (IFN)

(Dinarello, 1989; Durun et al, 1985; Murray 1988; Vilcek et al, 1985) as mediators of anaemia in BL. It has been proposed that three processes are involved in the production of the anaemia of chronic disease; (1) a modest shortening in red cell survival creating a demand for increased cell production by the bone marrow (2) inability of the marrow to respond completely to this increased demand because of impaired erythroppoitin (EPO) Production or impaired ability of the erythiod progenitors to respond to EPO or both; and (3) impaired mobilization of iron release from the reticulo endothelial system (RES) (Robert 1994). TNF, IL- I and the IFNS, have all been reported to inhibit erytheopoiesis in vivo and invitro (Johnson et al 1990). Although, this study did not investigate these cytokines, however, they have been reported in many tumours and related diseases that would feature anaemia (Robert 1994).

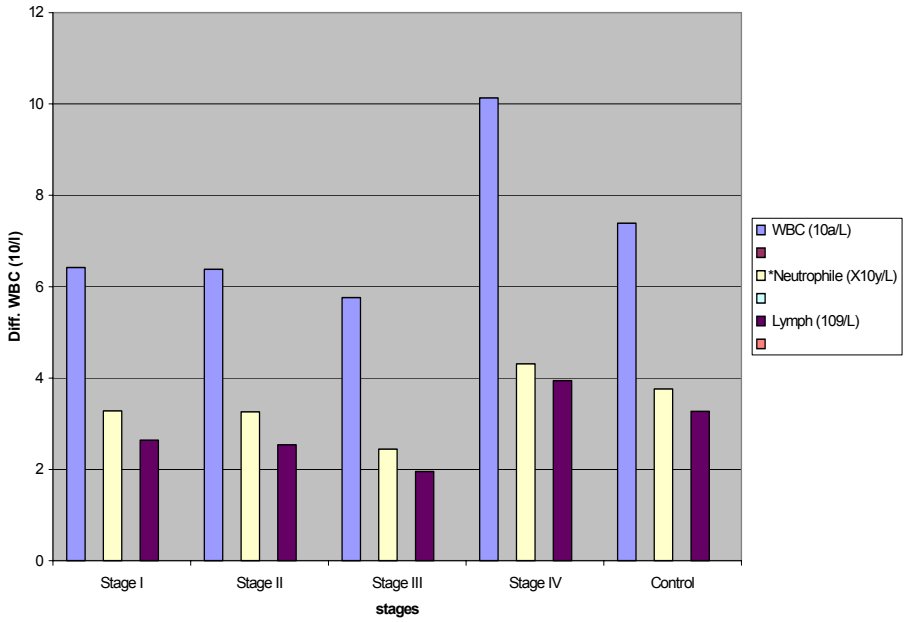

Fig. 2: Differential WBC count in BL patients according to clinical stages and control subjects.

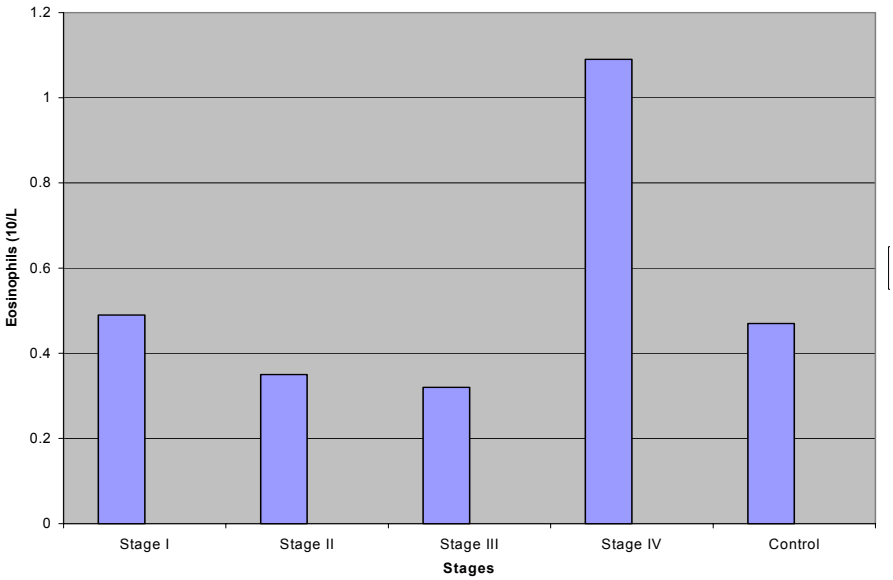

Fig. 3: Eosinophils levels in BL patients (clinical stages) and control subjects

The WBC and the differential WBC counts for all the clinical stages of BL were not significantly different ($p>0.0.5$), seen table 1 and figure II and III. The eosinophil count for all the clinical stages of BL however was significantly higher when compared with the control values ($p<0.05$). About 50% of the BL patients had malaria parasites in the blood to a level of (++). It is generally known that malarial parasite infestation and cancer are associated with eosinophilia. We suggest that the imflammatory cytokines already reported in anaemia of chromic disease should be studied in BL cases to ascertain their involvement. It will also be important to further study, BL in order to discover the roles of raised eosinophil level in the anaemic process.

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