

Review Article

## Burkitt's Lymphoma in Cameroon: A Review of 300 Cases in Two Referral Health Facilities in Yaoundé

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**Abstract** In this descriptive retrospective study, we reviewed 300 cases of Burkitt's lymphoma (BL) diagnosed within 10 years from January 1, 2000 to December 31, 2010. The study took place in the pathology laboratories of the Central Hospital and the General Hospital in Yaoundé, Cameroon. The aim was to review the anatomic-clinical and epidemiological aspects of the disease, especially with respect to its localization. We found that BL affected mostly children aged 5–14 years with peaks at 4 and 12 years. A slight male predominance was observed. The abdomino-pelvic site was more frequent (57.7%). Diagnosis of the tumor was mainly by fine-needle aspiration cytology (FNAC). About 6% of our patients tested positive for the human immunodeficiency virus (HIV). We recommend further in-depth studies to find out if there are any emerging factors that influence the localization of the disease in endemic areas or if our finding is incidental.

**Keywords** Burkitt; lymphoma; localization; abdomen; pelvic; oral; facial

### 1. Introduction

Malignant disease has been increasingly recognized in the past two decades to be emerging as a public health problem in near equal proportions to infectious diseases and malnutrition in developing countries [2]. In Cameroon, about 15,000 new cases are diagnosed annually throughout the country as compared to 10,000 cases a decade ago, and childhood cancer constitutes about 10% of all malignancy [9]. In most previous studies, Burkitt's lymphoma (BL) has often been cited as an important disease with a prevalence of about 10/1,000 children. Reports indicate it as the commonest childhood malignancy in Cameroon [20]. There has equally been an improvement in therapeutic outcome and disease-free survival in BL in recent years in Cameroon [10].

BL is a highly aggressive childhood lymphoma often presenting in extra nodal sites or as an acute leukemia [7]. It is composed of monomorphic medium-sized B lymphocytes with basophilic cytoplasm and numerous

mitotic figures. Translocation involving Myc (c-Myc) a regulator proto-oncogene that codes for a transcription factor is a constant genetic feature [7]. The disease presents in two forms, sporadic or endemic. The sporadic type occurs in western countries and is located in the oro-facial region. In both types, mainly children are affected. Epstein-Barr virus is found in a variable proportion of cases [17], and the endemic type is prevalent in areas that correspond to endemic malaria [11, 18].

Three clinical variants of BL are recognized, each manifesting differences clinically, morphologically and biologically endemic, sporadic, and immunodeficiency-associated. BL is among the few malignancies with a very favorable prognosis in spite of its aggressive evolution. Given its high prevalence in our environment and the late presentation of our patients with a consequently poor outcome, the disease deserves attention. In order to find out the anatomic-clinical and epidemiological aspects of the disease, especially with respect to its localization in our community, we carried out this review of 300 cases of BL in two hospital facilities in Yaoundé.

### 2. Materials and methods

We identified 300 cases of BL by reviewing the registers of the pathology service of the General and Central hospitals, Yaoundé, Cameroon, respectively. All cases diagnosed between January 1, 2000 to December 31, 2010, a period of 10 years, were recruited. The corresponding slides were reviewed by two pathologists. For all cases recruited, clinical files were retrieved from the archives and data extracted.

### 3. Results

Data analysis was done on age, sex, and site of BL among our patients. The results are shown in Tables 1, 2, 3, and 4. A total of 300 cases of BL were recorded in 10 years

**Table 1:** Site distribution of BL among 300 patients seen in Cameroon.

| Site           | Number of cases | %          |
|----------------|-----------------|------------|
| Abdomen/pelvic | 173             | 57.7       |
| Oral/facial    | 110             | 36.7       |
| Others         | 14              | 4.6        |
| Unstated       | 3               | 1.0        |
| <b>Total</b>   | <b>300</b>      | <b>100</b> |

**Table 2:** Sex distribution of patients with BL.

| Sex          | Number of cases | %          |
|--------------|-----------------|------------|
| Males        | 160             | 53.3       |
| Females      | 138             | 46.0       |
| Unstated     | 2               | 1.7        |
| <b>Total</b> | <b>300</b>      | <b>100</b> |

**Table 3:** Age distribution of patients with BL.

| Age group (years) | Number of cases | %          |
|-------------------|-----------------|------------|
| 0–4               | 36              | 12.0       |
| 5–9               | 82              | 27.3       |
| 10–14             | 50              | 16.7       |
| 15–19             | 39              | 13.0       |
| 20–24             | 27              | 9.0        |
| 25–29             | 13              | 4.3        |
| 30–34             | 13              | 4.3        |
| 35–39             | 12              | 4.0        |
| 40–44             | 6               | 2.0        |
| ≥ 45              | 14              | 4.7        |
| Age unstated      | 8               | 2.7        |
| <b>Total</b>      | <b>300</b>      | <b>100</b> |

in the two referral health facilities in Yaoundé (Table 1), giving an annual average of 30 cases. The sex ratio was 1.8, with 53.3% males against 46% females. In 1.7% of cases, the sex was not stated. There was no statistical difference ( $P > .5$ ) in sex distribution of the tumor (Table 2). The tumor was mainly localized in the abdominal/pelvic and oral/facial regions with a statistically significant ( $P < 1$ ) abdomino-pelvic tumor localization (57.7%) compared to the oral/facial site (36.7%) (Table 1). The main organ sites for the tumor were the abdominal lymph nodes (23%), maxilla (16%), mandible (10%), spleen (9.6%), and the ovary (6%) (Table 4). The ages of patients ranged between 11 months and 64 years, at an average of  $6 \pm 1$  year with peaks at 5–9 years (Table 3).

Table 1 shows a significant abdominal/pelvic localization of BL (57.7%) against the oral/facial site (36.7%) among 300 patients.

No significant difference was observed in the distribution of the disease among males and females (Table 2).

The ages of patients ranged between 11 months and 64 years, at an average of  $6 \pm 1$  year with peaks at 5–9 years.

As shown in Table 4, the main organ sites for the tumor were the abdominal lymph nodes (23%), maxilla (16%), mandible (10%), spleen (9.6%), and the ovary (6%).

**Table 4:** Age distribution of patients with BL.

| Site/sex            | Male       | Female     | Sex unknown | Total      | %          |
|---------------------|------------|------------|-------------|------------|------------|
| Cervico-oro-facial  |            |            |             |            |            |
| Mandible            | 17         | 12         | 1           | 30         | 10         |
| Maxilla             | 25         | 18         | —           | 48         | 16         |
| Jaw (unspecified)   | 7          | 6          | —           | 13         | 4.3        |
| Neck                | 3          | 2          | —           | 5          | 1.7        |
| Gum                 | 2          | 1          | —           | 3          | 1.0        |
| Mouth (unspecified) | 4          | 2          | —           | 6          | 2.0        |
| Nasopharynx         | 4          | 2          | —           | 6          | 2.0        |
| Abdomino-pelvic     |            |            |             |            |            |
| Ovary               | —          | 19         | —           | 19         | 6.3        |
| Abdominal nodes     | 31         | 38         | —           | 69         | 23         |
| Mesentery           | 5          | 2          | —           | 7          | 2.3        |
| Spleen              | 12         | 17         | —           | 29         | 9.6        |
| Liver               | 25         | 14         | 1           | 39         | 13         |
| Retroperitoneum     | 3          | 5          | —           | 8          | 2.6        |
| Kidney              | 2          | 0          | —           | 2          | 0.6        |
| Others              |            |            |             |            |            |
| Testes              | 3          | —          | —           | 3          | 1.0        |
| Skin/subcutaneous   | 0          | 1          | —           | 1          | 0.3        |
| CSF                 | 3          | 2          | —           | 5          | 1.7        |
| Pleura              | 1          | 2          | —           | 3          | 1.0        |
| Bone                | 2          | 0          | —           | 2          | 0.6        |
| Site unstated       | 1          | 2          | —           | 3          | 1          |
| <b>Total</b>        | <b>160</b> | <b>138</b> | <b>2</b>    | <b>300</b> | <b>100</b> |

#### 4. Discussion

BL is a common childhood malignancy [7]. In Cameroon, an endemic area for the disease, it has been the focus of many previous studies [1, 10, 20]. BL is not rare in our community, and this has been reported by many earlier workers [10]. At an annual incidence rate of 30 in this series, with ages ranging between 11 months and 64 years at an average of  $6 \pm 1$  year, a sex ratio of 1.8 and a statistically significant ( $P < 1$ ) abdomino-pelvic tumor localization (57.7%), BL is a common malignancy in children in this community. This rate however is a gross underestimation, representing just about 10% of cases seen in hospital and who have a pathological diagnosis [21]. This rate is nonetheless similar to the 21 reported by Rain and Tea in Abidjan [24]. Enow-Orock et al. found BL to be the commonest childhood malignancy (73%) in a series of 225 children in Yaoundé [13].

Our patients were aged 11 months to 64 years at an average of  $6 \pm 1$  year with peaks at 5–9 years. This is similar to Wright [25] who found a mean age of 4 to 7 and Diop's 5 years reported in a series of 33 cases in Senegal [8]. Mbakop et al. had found non-Hodgkin's lymphoma to be the commonest malignancy in Cameroonian children aged 0–15 years, and in this group, BL was most frequent [21]. We found a slight male predominance (53.3%) over females, like Doumbé et al., who reported a sex ratio of 1.8, [12] as well as other authors [24].

Unlike earlier reports [7, 12], our patients had a statistically significant ( $P < 1$ ) abdomino-pelvic tumor localization (57.7%) in contrast to the oro-facial site (36.7%) (Table 1). Majority of patients with an oro-facial tumor were males, while those with an abdomino-pelvic tumor were females. This can be explained by the predilection of the tumor for the young ovary as reported by Belley Priso et al. [3]. Many workers had for a long time indicated the predominance of an oral/facial localization of the tumor in endemic areas, like Cameroon [25]. In these regions, there is a correlation between the geographical occurrence and some climatic factors like rainfall and altitude, which correspond to the geographical distribution of endemic malaria [6, 15, 25]. This is unlike the sporadic type with a low prevalence of about 1–2% of all lymphomas. This latter is found mostly in Europe and the USA and affects children and young adults of 30 years average, with a male predominant sex ratio of about 2-3:1. Like in this report, Ndjolo et al. found only 19.5% of BL located in the jaw in a study of tumors at this site among 155 patients in an ear, nose, and throat unit [22].

As a single organ, the intra abdominal lymph nodes were the commonest site for BL in our study (23%). This was followed by the maxilla (16%), liver (13%), mandible (10%), Spleen (9.3%), and ovary (6.3%). The breast, kidney, and ovary are sites that had been the focus of many studies and found, like in this study, to be common sites for the disease [3, 19]. All patients with a breast tumor in our series were females. This has been the finding in all studies as a breast lymphoma in a male has not been reported in literature to the best of our knowledge.

The patients in this study presented clinically with a localized tumor and constitutional signs like fever, weight loss, anemia, etc. These are known clinical signs in malignant disease [18]. Our diagnosis was mostly by fine-needle aspiration cytology (FNAC) (86%). This procedure has proved to be safe, reliable, cheap, and rapid in the diagnosis of malignant disease [4] and the diagnosis of BL in particular [5]. Up to about 93% of Doumbé et al.'s series were diagnosed by this method [12]. The procedure has proved very useful in the management of cancer. Used sensibly, FNAC offers a relatively cheap, rapid, and accurate tool for the diagnosis and follow-up of cancer patients [5]. We recorded 18 patients of our series of 300 (6%) who were seropositive for the human immunodeficiency virus (HIV). HIV/AIDS is less often seen in endemic BL, though there is an immunodeficiency-associated BL variant. In this type, the disease occurs as an initial manifestation of the acquired immunodeficiency syndrome (AIDS) [16].

Histologically, monotonous sheets of deeply basophilic cells with round nuclei almost completely occupying the cytoplasm were seen. These solid sheets were punctuated by large macrophages with abundant, clear cytoplasm, and small central nuclei. This gave the typical "starry-sky"

appearance on low magnification in hematoxylin and eosin preparations. The tumor has an extremely high proliferation rate, with many mitotic figures as well as high rate of spontaneous cell death. These findings are similar to those reported in literature [7]. We did not carry out any immunohistochemical studies in our series to find out if the cells were of B or T origin. However, it is generally known that BL cells are of B origin [23].

## 5. Conclusion

At an annual average of 30, BL is not rare in our community. Clinical and pathological characteristics remain similar to those described in literature. Contrary to what has been usually reported, we found a statistically significant abdomino-pelvic localization predominant over the maxillo-facial. Other clinical, biological, epidemiological, and pathological aspects are similar to what has been reported in literature [14]. It is the focus of our recommendations that more prospective studies be carried out to find out if there are any factors influencing the change in localization of the disease in endemic areas or if our finding is incidental. Also, it would be interesting to find out if there is any difference in prognosis according to the site of the disease.

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