

EPIDEMIOLOGICAL AND HISTOLOGICAL PROFILE OF CANCERS AT THE UNIVERSITY CLINICS OF LUBUMBASHI IN THE DEMOCRATIC REPUBLIC OF CONGO

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Abstract

Introduction: Cancers in children under the age of 17 have specific epidemiological and management aspects. The objective of this study was to determine the epidemiological and histological profile of childhood cancers in Lubumbashi. **Method:** A cross-sectional descriptive study conducted at the University Clinics of Lubumbashi over a lap of two-year. The data collection was done using a form with a number of parameters. **Results:** We noted a prevalence of (3.27%) childhood cancer in Lubumbashi and the percentage had increased in 2018 (53.5%) comparing to the previous years. The average time between the onset of the disease and the first consultation was 33.5-7.1 weeks and only (71%) cases had consulted a general practitioner at first sign of the disease. From the histological point of view retinoblastoma led the way with 29.2%, followed by Nephroblastoma (23.3%), lymphomas of all forms (13.2%). Other types of cancers were repeated, representing 28.3%. **Conclusion:** This pathology is a reality that is experienced in large numbers in our environment diagnosis and early treatment remain essential to the reduction of the mortality rate

1. Introduction

Cancer is a constant concern in the world [1-2], it is one of the leading causes of death of adults [3], but relatively rare in children under the age of 15 years [4] and accounts for only 1 to 4% of tumors in population [5]. One in ten deaths is attributable to cancer worldwide [6,7]. Long considered the evil of developed countries, cancer has now become a public health problem in developing countries. In 2000 alone, global statistics showed the following figures for cancer: 22.4 million people suffered from cancer, 10.1 million new cases, 6.2 million deaths were attributable to it (12% of the 56 million deaths). Forecasts for 2030 indicate a 50% increase in cancer rates, with 15 million new cases per year and an annual lethality of 10 million in all age groups [5,8,9]. In Brazzaville, a study case shows that the incidence of childhood cancers was 6.4 cases per 10,000 inhabitants [10]. In Europe childhood cancers are leukemia (40-45%), brain tumors (20%), nephroblastomas and other kidney tumours (8%) monitoring of soft tissue tumours (7%), bone tumors (5%) [11]. Mortality decreases significantly in developed countries and remains high in developing countries [7]. In the coming decades, cancer will be a major cause of morbidity and mortality over infectious and parasitic diseases if health and hygiene measures improve [12]. In Lubumbashi, little is known about epidemiological data. A relative frequency study of childhood cancers was conducted using data from the pediatric oncology unit of University Clinics of Lubumbashi 2018 and 2019. During this period, 99 cases of childhood tumours were reported [13]. It is useful to determine in the coming years the prevalence of cancers in Lubumbashi, risk factors, treatment method, survival especially for the most frequently encountered cancers. This requires

a systematic and forward-looking collection of data. This study aims to determine the epidemiological and histological profile of childhood cancers and to take stock of the current state of cancers encountered at the university clinics in Lubumbashi (CUL) in order to propose the relaunch of a national registry of childhood cancers in DR Congo.

2. Methods

A cross-sectional descriptive study was conducted at the CUL from January 2018 to December 31, 2019. It involved 99 cases of children with cancer who performed a consultation for a tumor in the pediatric oncology unit of the CUL during our study period. Prospectively, we evaluated patients selected from our cohort of 99 cancer-having children who met the following inclusion criteria: (i) a diagnosis selected at the oncology unit level after para-clinical or histological examinations, (ii) the informed consent of parents or guardians duly signed for them for participation in the study. The data was collected using a form that included a number of elements: age, gender, age at the onset of the first sign of the disease, and family history. The socioeconomic level was categorized into three levels: low, medium and high according to the classification of (Traissac et al., 1997) In order to define coherent entities, a grouping of different types of cancers was carried out on the basis of the location of the tumor according to the international classification of childhood cancer 3rd edition (ICCC 3) [6]. The para-clinical diagnosis of the tumor was established on the basis of the operational definition of the pathology anatomy unit of the CUL. We calculated the gross incidence rates (TIB) in the two age groups of young children (0-9 years) and adolescents of (9 to 17) that were estimated by reporting the number of cases observed to the number of person-years, calculated from the approximate annual population data of Upper Katanga provided by the Lubumbashi Bio statistical institute. The study protocol was approved by the Medical Ethics Committee of the University of Lubumbashi (UNILU/CEM/135/2018). The data was entered using Excel software and their analysis was done using the STATA software version 12.1 (STACORP LP, TX, USA).

3. Results

3.1. Socio-demographic characteristics

Out of a total of 3,024 cases of children who visited the Department of Pediatrics during the study period, we recorded 99 cases of childhood cancers combined, representing a hospital frequency of 3.72%. Male predominance was observed (57.7% male versus 41.3% female) with a sex ratio of (H/F) of 1.3. The year 2018 saw a large number of patients during the period of our study: 53 children (53.5%). The average age was 5.67 - 3.85 years (8 months-17 years). As many boys as girls were affected ages 0-9 and 10-17. We noted that nearly 57.6% was between 0 and 9 years old.

Most of the patients lived in the city of Lubumbashi (69.2%) and a significant number came from different provinces other than Lubumbashi or even from countries other than the DRC. In (89.1%) cases, the children's families had a low socio-economic level while households took care of the children at (96.04%).

It should also be noted that 58.2% of parents had a secondary education level and seventy-one households had consulted a general practitioner at first contact and among them, twenty-two (22.22%) had also consulted a traditional practitioner or see prior to the medical consultation (Table 1).

3.2. Time to diagnose and extend the disease

The diagnosis time of the disease was between 6 and 12 months with an average duration of 4.5 months. Most of the tumors in our series were located at the time of diagnosis at (52.5%) (31.7%) cancers had already metastasized. In the pediatric oncology department of the C.U.L. for (65.3%) cancer cases, their diagnosis was made within 48 hours of the first consultation.

During our study period, 99 cancers were recorded in children under 17 years of age and at diagnosis, 29.5% of cases were metastasized.

Retinoblastoma is the most common tumour in 29 cases (29.2%). Nephroblastoma comes in second place with 23 cases (23.3%) followed by Lymphomas of all forms with 17 cases (17.2%), leukemias (11.1), bone

tumours (5%), sarcoma (5%), Central Nervous System Tumors (3%), Neuroblastoma (3%), Undifferentiated carcinoma nasopharyngeal type (UCNT) (2%), Squamous cell carcinoma (1%) hepatocarcinoma (1%). (Figure 1)

It should be noted that not all patients had easy access to treatment but almost (88%) had easy access to chemotherapy. Among them, (71.7%) chemotherapy targeted curative and (28.3%) palliative aim.

In their evolution after initiation of treatment, tumors in children showed remission in (21.2%) with an average survival of 2-1 years, and almost (27.1%) remained under substantive treatment. It was noted, a significant number of patients lost sight of and who discontinued treatment (11.1%) which indicates that the lethality given in our study is very limited. In (8.4%) they are followed for palliative care and (4.7%) have been transferred to specialist units in Europe or elsewhere. Let's remember a large number of deaths from childhood cancer (35.3%) often due to the lack of financial means in the management and of cancers diagnosed in the terminal phase. (Table 2).

Table 1: Patient Socio-Demographic Settings (n=99)

Variables	Case number	Percentage (%)
Age		
0-8 ans	62	62,6
9-17 ans	37	37,3
Sex		
Male	56	56,6
Female	43	43,4
Socioeconomic level		
Low	69	69,7
Means	22	22,2
High	8	8,1
Origin		
Lubumbashi	52	52,5
outside Lubumbashi	47	47,5
Year of diagnosis		
2018	53	53,5
2019	46	46,5
First consultation		
General practitioner	71	71,7
Pediatric oncologist	6	6,1
Traditional healer	22	22,2

Table 2: management and development of children with cancer (n=99)

Variables	Case number	Percentage (%)
Chemotherapy		
Palliative	71	71,7
Curative	29	28,3
Evolution		
Remission	21	21,2
Death	35	35,3
Lost to follow-up	11	11,2
Under treatment	32	31,3

4. Discussion

Cancer is an abnormal cell proliferation that is beyond the regulatory mechanisms, invading and destroying the tissues in which they develop, capable of disseminating early in the body in children, and susceptible to recurrence after treatment [14]. In the absence of a national cancer registry in the Democratic Republic of Congo, data on cancer epidemiology and mortality in several developing countries, the incidence of this condition is expressed only in relative frequencies [15].

The number of cases per year in our study was lower than in the literature in general and particularly in the DRC capital [16].

The average age reported in our study was (5.2 - 3.9 years). In sub-Saharan Africa, the average age was 6.7-4.3 years, which is slightly higher than the age found in our environment (1) [17, 18]. The age group most affected is under 9 years of age and accounts for 57.6% of cases, but the age-related case-to-population curve indicates a gradual increase with age. The average age is 5.2 - 3.9 years, and it is slightly higher for men (5.2 years) than for women (4.9 years). This is approximately a decade younger than patients in developed countries, and similar to developing countries. This could be favored by a young population, the predominance of factors favoring such as infections, poor hygienic conditions etc. In 2013, Osama et al in Saudi Arabia found similar results [19]. The number of cancer cases in Lubumbashi appears to increase each year. It should be noted that histologically confirmed childhood cancers are still insufficient. The average age at the onset of the disease was (4.2-3.4 years). While the average age in the male sex was 5.2 years was statistically higher than the age of the girls (4.9 years; $p = 0.0237$).

We observed a male predominance (sex ratio H/F of 1.3). According to Steliarova-Foucher et al. [4], this strong male representation is explained by the social impact of cancer in the male subject in the African environment who should be responsible for family than in the daughter. The H/F sex ratio noted in our study was slightly lower than that reported in the Algerian and French studies [16-17] but was consistent with that found by Aléine Budiongo et al. In Kinshasa 2020 and Newton et al in 1996 found similar results [20,21].

The study shows a large delay between the onset of the disease and the first consultation 33.5-7.1 weeks (11-day and 210-week interval). In Africa, childhood cancer is still too often stigmatized because of ignorance of the disease or an often-late diagnosis and beliefs around the disease. Childhood cancer is often taken as mystical, and a significant number of households in our community have brought children to traditional practitioners first.

In our study, the cancers frequently encountered in our environment were retinoblastoma which alone accounted for 29 (29.2%) nephroblastoma follow-up 23 (23.3%) lymphomas of all forms 13 (13.2%). Studies in Congo Brazzaville and Kinshasa have shown a predominance of Retinoblastoma (about 30%) [9]. Other types of cancers were presented but to a small extent, leukemias (7.1%); bone tumors (1.9%) and soft tissue sarcoma (0.9%). Of the histological type by sex in our environment, the male sex had retinoblastoma as the most common cancers (16.1%) followed by nephroblastoma (10.9%) leukemia (7.4%). In contrast, in the female sex, the most common cancers were retinoblastoma (13.1%) lymphoma (8.1%). There are cancers associated with other factors than the most incriminated factor in embryonic development by comparing it to developed countries. Other tumours that may be associated with lifestyle. Cancers of the nervous system are also relatively less common. This can be explained by a lack of state-of-the-art equipment (brain imaging) in our environment and also by a very small number of qualified personnel for the identification of early diagnosis and certainty. These results are similar to those of other developing countries [22]. In contrast, data from Abidjan (Ivory Coast), Niamey (Niger), Ibadan (Nigeria), and Gambia show a low incidence rate of leukemia per reported to European countries [16,23,24]. The histological type of lymphomas in our environment comes in third place with a large number of Burkitt lymphoma (8.8% of NLL), occupying the 1st rank among different types of lymphomas. Uwizeye et al in Rwanda in 2013 found Burkitt's lymphoma to be rare in Rwanda [25]. Ngendahayo et al in Rwanda, found that diffuse centroblastic-centrocytic lymphoma was the most common (35% of NHS) and burkitt lymphoma was very rare (5 cases) [25]. This situation is

different from our series. This is probably because in our community families have consulted more for Burkitt than the case observed in Rwanda.

A good number of children 81.9% had received curative chemotherapy during the period of our study. We recorded (35.4%) death toll. These results are almost similar to studies conducted in Africa [22], but remain far different from studies conducted in developed countries where mortality rates for childhood cancers is declining significantly [26]. This could be due to a delay in diagnosis, a lack of qualified staff for care, a lack of specialized oncology units and also access to care, which remain a great burden for most households.

5. Conclusion

This study allowed us to know the epidemiological profile and histological type of childhood cancers in Lubumbashi. This pathology is a reality that is experienced in large numbers in our environment diagnosis and early treatment remain essential to the reduction of the mortality rate. The presence of new cases is increasing, although other cases are under-diagnosed. The mortality rate is still very high with many children lost to sight. The study also highlights the need to properly manage case registration in a specific cancer registry that DR Congo lacks for good epidemiological follow-up. In-depth studies are useful to better understand the epidemiology of cancer in the city of Lubumbashi.

State of current knowledge on the subject

* Childhood cancer continues to lead to high mortality that goes unnoticed in Africa

* In Africa, the lack of qualified personnel, lack of equipment in hospitals and socio-economic factors are obstacles to good cancer care

Contribution of our study to knowledge

- This study allows to determine the epidemiological and histological profile of childhood cancers at the CUL
- To propose the relaunch of a national registry of childhood cancers in DR Congo.
- To encourage publications on the subject of paediatric cancer care in DR Congo to better understand the problem and reduce healthcare expenditures

Conflicts of interest

The authors do not declare any conflict of interest.

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Contributions from authors

All authors have approved the final article

Criss Koba, Chadrack Kabeya, Robert Lukamba Mbuli and Murielle Nkumuyaya: study design and planning

Benjamin Kabyla, Desire Mashinda and Oscar Luboya Numbi: supervision

Criss Koba and Chadrack Kabeya: statistical analysis and proofreading of the article

Criss Koba and Chadrack Kabeya: documentary research and formatting of the work

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Appendix A

Appendix A.1

Figure 1: Frequency of childhood cancer at Lubumbashi University Clinics

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