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Early Management of Nephroblastoma: A Single-Center Study in a Sub-Saharan African Country

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Abstract

Introduction: Nephroblastoma is the most common renal cancer in pediatrics. The aim of this study was to describe the epidemiological, clinical, histological characteristics and the immediate outcome of patients with nephroblastoma. **Methodology:** This was a cross-sectional study of 18 cases of unilateral nephroblastoma, carried out in the pediatric oncology unit (UOP) of the CHU Gabriel Touré from January 2015 to December 2016. **Results:** The mean age of the patients was 33 months old. The sex ratio was 0.63. The average consultation time was 3 months. A case of malformation syndrome (aniridia and mental retardation) had been observed. The main reason for consultation was abdominal mass (100%) associated with deterioration of general condition (44%), pain (44%) and fever (17%). Stage I accounted for 61% and stage II 39%. The postoperative histological classification made it possible to find the high-risk blastematous type (33%), the regressive type of intermediate risk (11%) and the stromal type of intermediate risk (45%). Toxicities (haematological and digestive) were minimal. The 3-year overall survival was 90%. **Conclusion:** This study is characterized by the predominance of stages I and II and the fairly large percentage of histology at intermediate risk. These results are above all the result of multidisciplinary collaboration.

Keywords

Cancer, Child, Nephroblastoma, Diagnosis, Prognosis, Mali

1. Introduction

Nephroblastoma (or Wilms tumor) is the most common malignant kidney tumor in children [1]. It represents about 5% to 14% of all pediatric cancers depending on the series and constitutes more than 90% of kidney tumors in children. Its annual incidence is 8 new cases per million children under the age of 15 [1] [2] [3]. In Mali, it ranks fourth among pediatric cancers [4]. The preferred age is between 1 and 5 years with an equal distribution between the two sexes [1] [2]. Most often only one kidney is involved (95%) [1] [3].

Clinically, it presents as a rapidly developing abdominal mass for which management is an emergency [1] [2]. In its classic form, it has 3 types of tissue (blastematous, epithelial and mesenchymal) [1] [2]. Bilateral forms occur mainly in very young children and represent 6.5% of all cases [3] [5]. Nephroblastoma can occur in a multi-malformative setting and 1% of cases are familial [1] [5] [6].

It is curable cancer in most cases and its treatment follows strict rules. Surgery supervised by chemotherapy is the essential treatment for this condition whatever the stage of its development [2] [6].

The prognosis of nephroblastomas of so-called "favorable" histology and localized forms has steadily improved thanks to the considerable progress made in its management [2]. Poor results are attributed to late consultation, poverty, and unavailability of medications [4] [7].

Having available, thanks to the GFAOP, anti-cancer drugs since 2005 to treat our children with cancer, we have initiated this work in order to study the epidemiological and clinical characteristics of patients and the results of treatment.

2. Methodology

This was a cross-sectional study conducted in the pediatric oncology unit in Bamako from January 1, 2014 to December 31, 2015.

This was a cross-sectional study, which took place in the pediatric oncology unit (UOP) and the intensive nutritional recovery and education unit (URENI) of the CHU Gabriel Touré in Bamako. The UOP was the only center for the care of children with cancer in Mali. It includes:

- Ten (10) individual hospitalization rooms;
- One (1) room for the preparation of chemotherapy;
- One (1) infirmary;
- Three (3) offices.
- An outpatient room commonly known as the "day hospital" which also serves as a procedure room (cytopuncture, myelogram, lumbar puncture).

The staff of the UOP is composed of:

- Four (4) pediatric oncologists;
- One (1) general practitioner;
- Five (5) nurses trained in cancer care.

The activities of the unit are essentially the diagnosis, treatment and follow-up of children with cancer. The Day Hospital receives patients at the diagnostic stage

and those who come for follow-up consultations in the unit. Treatments are administered through the Day Hospital or as inpatients according to protocols.

All children aged 0 - 15 years with documented and treated nephroblastoma were included. Records of patients admitted in the terminal phase and those who discontinued or stopped treatment were excluded from the study.

The diagnosis of nephroblastoma was made on the basis of anatomical examination of the surgical specimen. The treatment protocol used was that of the Franco-African Pediatric Oncology Group.

The tumor extension stage and histopathological classification had been made according to the recommendations of the International Society of Pediatric Oncology (SIOP).

The GFA-Nephro 2005 protocol of the GFAOP includes primary chemotherapy adapted to the initial extent of the tumor. Patients with localized unilateral renal tumor received 4 courses of Vincristine and Actinomycin D. Patients with metastases had received a 6-week preoperative regimen of Vincristine, Actinomycin D and Doxorubicin. An enlarged ureteronephrectomy had been performed one week after the last course of chemotherapy. Postoperative chemotherapy was according to stage and histological type.

Data collection was done on file after drawing up a survey form while guaranteeing the anonymity of the patients and the confidentiality of the data. Statistical analysis of the results was carried out using SPSS software. We used the following documents: patients' medical records, operative reports and anatomopathological reports.

The data studied included age, sex, clinical, biological and histological characteristics, treatment modalities, occurrence of an event (relapse, discontinuation of treatment, death) and also the last news of the patients (complete remission, relapse).

3. Results

1) Epidemiological data

During the study period, 18 cases of histologically proven nephroblastoma meeting the inclusion criteria had been included in the study. The sex ratio was 0.63 (7 boys and 11 girls). The mean age of the patients was 33 months with extremes of 12 months and 60 months. Table 1 shows the demographic profile of the patients. The patients resided in the capital city in 68% of the cases. In 73% of the cases, they lived in poor socioeconomic conditions.

2) Clinical data

The mean time to diagnosis was 40 days with extremes of 7 and 180 days. The clinical picture was dominated by abdominal mass (100%), abdominal pain (44%), fever (17%), and altered general condition (44%). A malformative syndrome (aniridia and mental retardation) was observed in one case (6%).

3) Paraclinical data

Imaging (ultrasound and abdominal CT scan) showed a localized non-metastatic

Table 1. Sociodemographic and clinical characteristics of nephroblastoma.

Epidemiological and clinical aspects			Number (n = 18)	(%)
Epidemiological characteristics	Age	[6 months - 36 months]	12	66%
		[36 months - 59 months]	6	34%
	Sex	Male	7	39%
		Female	11	61%
Clinical signs	Reason for consultation	Abdominal mass	11	61%
		Abdominal pain	2	11%
		Nephroblastoma	4	22%
		Renal tumor	1	06%
	Physical signs	Abdominal mass	18	100%
		Abdominal pain	8	44%
		Weight loss	8	44%
		Fever (temperature > 38˚C)	3	17%

kidney tumor in 94% of cases. The tumor was located on the left in 62% of cases and on the right in 38%. The blood count showed severe anemia (Hemoglobin < 8 g/dl) in 21% of patients. Renal function was preserved in all patients.

4) Histological characteristics

Histological examination after nephroureterectomy revealed three cytological types: blastematous type, high risk (33%), regressive type, intermediate risk (11%) and stromal type, intermediate risk (45%). According to the International Society of Pediatric Oncology (ISOP) classification, stage I accounted for 61% and stage II for 39%.

5) Therapeutic and evolutionary aspects

The average time between the first consultation and the first treatment was 7 days. The duration of preoperative chemotherapy depended on the radio-clinical stage and the side effects of the treatment. All patients underwent an extended total ureteronephrectomy. The average length of stay in the pediatric surgery department was one week with extremes of 1 and 22 weeks. The majority of patients presented hematological toxicity (most often severe anemia) which required a transfusion of concentrated red blood cells in 67% of cases. Digestive toxicities such as vomiting were observed in 73% of patients. Alopecia was observed in all patients. After 36 months of follow-up, one death and one case of pulmonary relapse were observed in the group.

4. Comments and Discussion

The total number of children in this study does not reflect the true incidence of nephroblastoma in our department. The lack of diagnostic means and the re-

trospective and monocentric character of this study did not allow appreciating the importance of nephroblastoma in our country. Many children, strongly suspected of having renal cancer, arrived at the hospital at the last stage of the disease and died before any paraclinical investigation.

According to a previous study performed in the UOP, nephroblastoma represented the 3rd most common pediatric cancer (15%) after non-Hodgkin's malignant lymphoma and retinoblastoma [4]. The majority of cases are not diagnosed. This is partly due to socio-cultural preferences and ignorance [1]. It is a tumor of early childhood, most often starting between 1 and 5 years of age (75%) [7]. In this study, the patients were relatively younger than in several African studies [6] [7] [8]. However, no study has shown a statistically significant relationship between prognosis and age of onset of the disease [8]. A female predominance was observed in this study, contrary to the results obtained by the Nigerian and Tunisian authors [7] [8]. In this study, only one case of congenital malformation (aniridia and psychomotor delay) was found. Familial forms are rarely described in the literature [1] [2].

The delay in consultation was particularly long in this observation. This late consultation is regularly reported in African studies. According to Nigerian authors, the delay in consultation could reach 9 months [1] [7]. This tendency to late consultation of patients has also been observed by other African authors [3] [7] [9]. Among the causes of late referral, they cited lack of knowledge of cancer, poverty of the parents, lack of equipment and qualified personnel, and cultural beliefs (witchcraft, bad spells). In our study, abdominal tumor was usually associated with severe malnutrition, which is endemic in sub-Saharan Africa [7] [10].

In this study, patients presented with stage I and II disease according to the SIOP classification, in contrast to the majority of African studies where stages III and IV were predominant [2] [7] [8]. This difference is essentially due to the methodology adopted without ignoring the efforts made by our multidisciplinary team to improve the working conditions.

Despite the poverty of the patients, the protocol was well followed. This GFAOP protocol is better adapted in African patients seen late with a large abdominal tumor in a context where supportive care is limited and radiotherapy unavailable [1] [2] [4] [11]. These good results in the management of nephroblastoma could be explained by the adherence of the patients included and a relatively short time to management. Chemotherapy-related toxicity was dominated by hematological abnormalities (anemia), digestive disorders (vomiting) and alopecia.

One death was noted after 36 months of follow-up. These results are similar to those of developed countries, despite the many poor prognostic factors observed in Africa (long delay in consultation, malnutrition, recurrent infections) [1] [2].

Short follow-up, small number of patients and lack of cytogenetic evaluation were the limitations of this study. Nevertheless, this study found that early diagnosed nephroblastoma had a good prognosis even in low-resource countries.

5. Conclusions

Nephroblastoma is a common renal tumor in children under 5 years of age. It usually presents with an abdominal mass, abdominal pain, malnutrition and fever.

These results seem encouraging and prove the effectiveness of the 2005 AFM-Nephro protocol. However, much effort remains to be made to improve the early diagnosis and overall management of nephroblastoma, which requires a multidisciplinary collaboration including oncologists, specialized surgeons, radiologists, pathologists, radiation oncologists and several other specialists.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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