

Clinico-Pathological Profile of Malignant Abdominal Tumors in Children: Experience of the Pediatric Oncology Unit in Bamako

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Abstract

Introduction: the objective was to describe the epidemiological and histological aspects of malignant abdominal tumors in children. **Methodology:** This was a descriptive, cross-sectional study conducted from January 1, 2017 to December 31, 2018. We included all patients aged 0 to 15 years with histologically confirmed abdominal malignancies. **Results:** We collected 46 files of malignant tumors of the abdomen (35% of pediatric cancers). The majority of patients were under 5 years old (65%). The sex ratio was 1.7. They were generally from disadvantaged socio-economic backgrounds (67%). The average consultation time was 50 days. The main reasons for consultation were abdominal mass (48%), pain (17%) or distension (9%). The mass was large, hard (89%), immobile (71%) and painful (46%). Malnutrition was found in 80% of patients. The mass was retro-peritoneal in 63% of cases and renal in 54%. It was solid in 94% of cases and heterogeneous in 76% of cases. The assay for tumor markers was not performed. Anemia was present in all patients. Fine needle aspiration was performed in 43%, biopsy in 37% and myelogram in 15% of cases. spinal cord involvement was observed in 28% of Burkitt's cases. The main cancers diagnosed were nephroblastoma (52%), Burkitt's lymphoma (26%) and neuroblastoma (13%). Stage 1 and stage 2 were frequent in 20% and 22% of cases, respectively; 36% of cases were not staged. The average duration of chemotherapy was 11 weeks. Total resection was

performed in 30% of cases. The outcome of the patients was marked by total remission in 65%. **Conclusion:** Abdominal malignancies are very common in children. The diagnosis of certainty is late in our context.

Keywords

Cancer, Abdomen, Child, Sub-Saharan Africa

1. Introduction

Abdominal tumor requires rapid and precise diagnosis for effective management [1]. Malignant abdominal tumors in children represent the set of expansive malignant processes that develop in the abdominal cavity [2]. They are often discovered incidentally by a parent, during a physical examination or detected on abdominal imaging [3]. They usually present in the form of an abdominal mass or an increase in abdominal volume, or by non-specific signs: digestive and voiding disorders (by compression), arterial hypertension, hematoma, general signs (fever, weight loss), rarely a complication (acute intussusception) [2].

Patient age, gender and tumor topography are fundamental to diagnostic guidance. Between 1 and 6 years of age, the majority of the masses are of a malignant nature, mainly neuroblastoma and nephroblastoma [4]. The discovery of an abdominal mass in the child leads to the performance of additional radiological, biological and pathological examinations. These examinations are best carried out in a specialized environment with the aim of rapidly leading to the aetiological diagnosis and the initiation of effective treatment.

Imaging has greatly contributed to improving the diagnosis of abdominopelvic cancers and monitoring the effectiveness of treatment. Conventional ultrasound is often the first-line examination, but overall has a limited role in the diagnosis and classification of abdominopelvic cancer [3] [4]. Computed tomography is currently the main diagnostic tool used in oncological radiology. MRI is generally used as a second-line due to its cost and relatively limited availability [4]. Imaging can locate the tumor, study its relationships, determine if possible the nature and highlight vascular lesions. The choice of technique is determined according to the organ studied, the suspected pathology, the clinical condition of the patient and the experience of the radiologist and endoscopist [4]. According to the literature, about two-thirds of malignant abdominal tumors are retro-peritoneal. The majority of these retroperitoneal tumors are intra-renal [5]. Biology, in particular the dosage of markers (tumor markers), retains an important place in the diagnostic process. We can look for an increase in alpha-fetoprotein in dysembryoma, an increase in gonadotropic chorionic hormone (beta-HCG) in chorio-carcinomatous tumors.

Surgery helps both diagnosis and treatment. The definitive diagnosis depends on the pathologist. A multidisciplinary consultation (oncologist, radiologist, surge-

on, pathologist) makes it possible to plan the treatment, the first step of which is often, but not necessarily, chemotherapy.

In Mali, the exact incidence of pediatric cancers and malignant abdominal tumors remains unknown. The aim of this study was to describe the demographic, clinical, pathological and evolutionary aspects of malignant abdominal tumors in children in the pediatric oncology unit in Bamako.

2. Methodology

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

- Ten (10) individual hospital rooms;
- One (1) room for the preparation of chemotherapy;
- One (1) infirmary;
- Three (3) offices.
- An outpatient room commonly called “day hospital also serving as a gesture room (cyto-puncture, myelogram, lumbar puncture).

The staff of the UOP consists of:

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

The unit’s activities are mainly 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 visits to the unit. The treatments are administered by the day hospital or in hospital according to the protocols.

URENI staff is made up of:

- A supervising pediatrician;
- A senior health technician;
- A health technician;
- Two caregivers.

The study took place over a 2-year period from January 1, 2017 to December 31, 2018. We recruited all cases of malignant abdominal tumors followed by the OPU and having a well-completed and well-maintained medical record. The patients included in this study were children aged 0 to 15 years who presented an abdominal tumor explored by ultrasound and/or computed tomography (CT) and confirmed by the pathologist.

Patients with an uncertain diagnosis or an unusable or ill-informed medical record were not selected. Those who had not benefited from paraclinical exploration and whose etiology had not been clearly demonstrated were excluded from the study.

The data had been collected on individual survey forms from medical records and department records.

The management and monitoring of patients' patients were multidisciplinary (oncologists, surgeons, pathologists, anesthesiologists). The duration of the follow-up depended on the etiological diagnosis and the residence of the patients. The variables studied were socio-demographic, clinical, radiological (ultrasound and scanner), biological, diagnostic, evolutionary and therapeutic management data. Data entry and analysis were performed with Microsoft Word 2019 software and SPSS.20 software.

This study was carried out under the authorization of the management of CHU Gabriel Toure and with the supervision and collaboration of physicians from the general pediatrics department. The results of this work will help lay the foundations for early diagnosis and adequate management of malignant abdominal tumors in Mali.

3. Results

This study included 46 records of patients with a malignant abdominal tumor. The sex ratio was 1.7. Children under 5 made up 65% of the workforce. In this study, five patients (or 10%) were less than one year old, 54% of patients were between one and six years old, 20% were between six and 10 years old and 15% were between 10 and 15 years old. The mean age was 5.2 years with extremes of 4 months and 14 years (**Table 1**). The patients were educated in 20% of cases. The patients resided outside Bamako in 57% of cases. Patients were referred in 87% of cases for abdominal mass. They were referred for suspected

Table 1. Distribution of the number of patients by age.

Patient's age		Numbers (n = 46)		%	
	4 months	1		2	
1 to 12 months	8 months	1	5	2	10
	9 months	2		4	
	1 year	2		4	
1 to 5 years	2 years	3		7	
	3 years	9	25	20	55
	Four years	8		17	
	5 years	4		9	
6 to 10 years	6 years	2		4	
	7 years	2		4	
	8 years	1		2	20
	9 years	4		9	35
11 to 15 years old	12 years	4		9	
	13 years	1		2	15
	14 years old	2		4	

cancer in 35% of cases. The parents' socioeconomic level was unfavorable in 67% of cases. No notion of familial cancer was found. The tumor was discovered by the mother in 33% of cases. The patients consulted for mass in 48% of cases or for abdominal pain in 17% of cases (**Table 2**). They had been referred for suspected cancer in 35% of cases.

The average consultation time was 12 weeks with extremes of 2 and 52 weeks. The mean time to diagnosis was 8 days with extremes of 1 and 45 days. The tumor was most often hard (89%), immobile (72%) and painful (46%). The tumor was retro-peritoneal in 65% of cases (**Table 3**). The mass was localized in the flanks (left or right) in 35% of cases and diffuse in 19% of cases.

The clinical examination also observed weight loss (80%), lymphadenopathy (22%) and fever (17%) (**Table 4**).

The tumor was solid in 93% and heterogeneous in 76% of cases. The tumor was metastatic in 24% of cases. Metastases were localized to the lungs in 12%. The hemoglobin level was less than 8g/dl in 35% of cases. Platelet counts were lowered in 11% of cases and abnormally high in 35% of cases. The leukocyte count was elevated in 11% of cases. The cytopuncture was performed in 43%; a biopsy was performed in 37% of cases and a myelogram was performed in 15% of cases. Bone marrow invasion was observed in 3 out of 7 cases. **Table 5** shows

Table 2. Breakdown of the number of patients according to the reason for consultation or referral.

Reason for consultation	Numbers (n = 46)	%
Abdominal mass	22	48
Abdominal pain	8	17
Abdominal distension	4	9
Suspicion of lymphoma	3	7
Suspicion of nephroblastoma	3	7
Haematuria	2	4
AEG	1	2
Ascites	1	2
Subclavicular mass	1	2
Polyadenopathies	1	2

Table 3. Distribution of the number of patients according to the location of the tumor.

Location	Numbers (n = 46)	%
Retro peritoneal	Renal	25
	Extrarenal	5
Intraperitoneal	Hepatic	1
	Extrahepatic	13
Abdominopelvic	2	4

Table 4. Distribution of the number of patients according to the associated signs.

Associated signs	Numbers	%
Weight loss	37	80
Lumbar contact	24	63
Lymphadenopathy	10	22
Fever above 38°C	8	17
Respiratory distress	5	11
Ascites	5	11
Splenomegaly	5	11
Hepatomegaly	5	11
Skin lesions	2	4

Table 5. Distribution of the number of patients according to the etiological diagnosis.

Variables		Numbers (n = 46)	%
Types of cancers	Nephroblastoma	24	52
	Burkitt's lymphoma	12	26
	Hodgkin's disease	1	2
	Large B cell lymphoma	1	2
	Neuroblastoma	6	13
	Hepatoblastoma	1	2
	TGM	1	2
Stage of tumor	Not classified	16	35
	Stage 1	9	20
	Stage 2	10	22
	Stage 3	4	9
	Stage 4	6	13
	Stage 5	1	2

the different types of cancer observed during this study. Nephroblastoma was the most frequently diagnosed cancer (52%).

The cancer was stage 1 in 20% of cases and stage 2 in 22% of cases. It was not classified 36% of the time. The patients had received chemotherapy in 98% of cases. The patients were treated according to the protocols proposed by the Franco-African pediatric oncology group (**Table 6**).

The average duration of chemotherapy was 11 weeks with extremes of 1 week and 42 weeks. Toxicities were observed in 80% of cases. Haematological toxicity was observed in 54% of cases and digestive toxicity in 56% of patients. Total resection was performed in 30% of patients. Remission was observed in 65% of patients and 56% of patients survived the disease (**Table 7**). The majority

Table 6. Breakdown of the number of patients according to the protocol used.

Protocol used	Numbers (n = 46)	%
GFA Nephro 2005	18	39
GFAOP	22	48
VP16/Carbo	2	4
VP16/Carbo/CO	2	4
Modified LMB	1	2
No protocol	1	2

Table 7. Distribution of the number of patients according to the evolution.

Evolution of the tumor	Numbers	%
Remission	30	65
Relapse	1	2
Lost view	13	28
Living	26	56
Deceased	9	20

of reported deaths (76%) occurred in a decompensated anemia picture.

4. Comments and Discussion

There are few epidemiological studies of malignant abdominal tumors in children. During the study period, childhood MAPs accounted for 16% of pediatric cancers. The incidence of cancer is difficult to assess in Mali because of the lack of hospital cancer registries. The majority of MAT occurred in children under 5 years of age with a predominance of men. This male predominance of pediatric tumors had been reported by many African authors without any precise explanation for this finding [6].

There was great heterogeneity in the socio-demographic distribution of our patients. The majority of patients came from rural areas (57%), where diagnostic facilities are even more limited. The average consultation time was relatively long (12 weeks). While a history, careful physical examination, basic laboratory and correct imaging studies can provide sufficient information to determine the diagnosis or refer to the appropriate specialists [7]. In France, where exercise conditions are better, rapidly growing embryonic tumors are diagnosed earlier, with a median duration of less than one month [8]. The long diagnostic delay could be explained by household poverty, customary practices and beliefs and the shortage or lack of qualified personnel [9].

In this study, the main way of revealing MAT was abdominal mass. The clinical manifestations were variable, depending mainly on the location, the size of the tumor and the existence of metastases. The majority of malignant abdominal tumors were retroperitoneally represented by nephroblastoma and neuroblastoma.

ma. In this study, the commonly diagnosed MAT were nephroblastoma (52%), lymphoma (30%), and neuroblastoma (13%). Our results were very close to those reported in the literature [10] [11] [12].

Nephroblastoma is an almost specific tumor in children, most commonly occurring between 1 and 5 years of age with a peak incidence around the age of 3.5 years [13]. It is an embryonic tumor with very heterogeneous histology characterized by epithelial, stromal and blastematos components [14].

In this study, non-Hodgkin lymphoma was the second leading cause of the malignant abdominal tumor. Burkitt's lymphoma is thought to be prevalent in sub-Saharan Africa because of the high frequency of Epstein-Barr virus (EBV) infection and *Plasmodium falciparum* malaria [9] [15] [16] [17].

Neuroblastoma is a tumor that develops from the sympathetic nervous system. It is the most common solid extracranial tumor in childhood [18]. In this study, it was the third leading cause of abdominal cancer in this study. According to the literature, it is the second most common solid tumor in children, after central nervous system tumors [18]. Stage, histologic type and age are the most important prognostic markers [19].

In this study, 98% of patients had received chemotherapy adapted according to the GFAOP protocol. Surgical excision was performed in 30% of cases; these were mainly cases of nephroblastoma. Surgical abstention was the rule in cases of lymphoma and whenever the tumor was huge with multifocal adhesions and metastases (neuroblastoma).

The evolution of the patients, with a mean follow-up of 12 months, was marked by complete remission in 65% of cases (30 patients), relapse in 2% of cases (1 patient), death in 19% of cases (9 patients). Discontinuation of treatment was observed in 28% of patients. Several causes could explain the unfavorable prognosis of abdominal cancer, including a lack of specialists, difficulties in the supply of anticancer drugs, lack of supportive care, and a lack of financial means [9]. These factors, associated with endemic malnutrition and recurrent infectious pathologies, constitute obstacles to obtaining cure and survival rates comparable to those in developed countries [9] [20].

5. Conclusion

This study allowed us to better understand the epidemiological, clinical and evolutionary characteristics of malignant abdominal tumors at the UOP of Bamako. The majority of patients were under 5 years old; the main etiologies of MAT were nephroblastoma (52%), lymphomas (30%) and neuroblastoma (13%). The diagnosis and management of abdominal cancers were most often late. Efforts must be made to strengthen the education of populations on pediatric cancers.

Conflicts of Interest

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

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