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Epidemiologic Characteristics and Clinical Presentation of Primary Liver Cancer: A Single-Center Observational Study at Tengandogo University Hospital, Burkina Faso

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Abstract

Objective: To describe the epidemiologic characteristics and clinical presentation of Primary liver cancer (PLC) at Tengandogo University Hospital (Centre Hospitalier Universitaire of Tengandogo, CHU-T) in Ouagadougou, Burkina Faso. Methods: This was a retrospective observational study conducted at CHU-T, from 1 May 2013 to September 30, 2023. All patients seen for PLC in outpatient consultation or inpatient hospitalization were included. Results: One hundred and twenty-four (124) cases of PLC were included, representing an annual average of 11.8 cases. The mean age was 49.6 years, with the age group of 40 - 50 years most commonly represented. The male-to-female sex ratio was 4.2. The majority of patients (56.5%, n = 70) had a WHO performance status score of 3 (patient confined to bed or a wheelchair > 50% of waking hours). Abdominal pain (64.5%, n = 80) and hepatomegaly (85.5%, n = 106) were the most common clinical signs. The main etiological factor was hepatitis B virus infection (59.7%, n = 74). An alpha-fetoprotein (AFP) level greater than or equal to 400 ng/ml was observed in 51.3% of patients (n = 59). In the majority

of cases, radiological examinations revealed large masses involving the right lobe of the liver, with a significant proportion of multinodular tumors (45.7%, n = 21). Masses were larger than 3 cm in 80.4% of cases (n = 37). Portal hypertension and portal vein thrombosis were associated with these lesions in 23.5% (n = 16) and 22.0% (n = 15) of cases, respectively. The most common histological type of PLC (85.7%, n = 18) was hepatocellular carcinoma (HCC). The Barcelona Clinic for Liver Cancer (BCLC) classification identified advanced stage in 35.6% of cases (n = 42) and terminal stage in 34% of cases (n = 40). Conclusion: The clinical presentation and diagnosis of PLC are often delayed at CHU-T. The predominant histological type observed was HCC, most commonly associated with hepatitis B virus. Emphasis should be placed on viral hepatitis awareness and screening campaigns as well as hepatitis B vaccination to reduce the incidence of this fatal disease. Further research regarding the treatment of PLC and patient outcomes in the study setting is also needed.

Keywords

Cancer, Liver, Hepatitis B/C, Burkina Faso

1. Introduction

Primary liver cancer (PLC) is a malignant tumor that develops from hepatocytes. It is a major public health problem worldwide, ranking sixth among the most frequently-diagnosed cancers and third among the causes of cancer-related mortality [1]. The severity of PLC is related to a range of factors including late clinical presentation and diagnosis, as well as limited treatment options in many resource-constrained settings. Hepatocellular carcinoma (HCC), which accounts for approximately 90% of PLC [2] [3], most often occurs in association with liver disease, particularly cirrhosis of any etiology. However, cases of PLC in non-cirrhotic livers have also been reported [4]. The main risk factors for PLC include chronic infection with hepatitis B and C viruses, excessive alcohol consumption, and other causes of chronic liver disease [5]-[7]. In Sub-Saharan Africa, and particularly in West Africa, PLC remains one of the most common cancers due to factors including the high prevalence of hepatitis B, aflatoxin exposure, and difficulties in accessing screening and subspecialty care [8]. In Burkina Faso, available data indicate a high incidence of HCC often diagnosed at an advanced stage, limiting therapeutic options and worsening the prognosis [4] [5]. In this context, since 2013, the Tengandogo University Hospital (Centre Hospitalier Universitaire of Tengandogo, CHU-T) in Ouagadougou, Burkina Faso, has been committed to establishing a medical-surgical unit dedicated to the management of hepatobiliary and pancreatic diseases. This unit has gradually become a national reference center for the management of PLC.

To address the lack of primary clinical data describing the epidemiology of PLC

in Burkina Faso and Sub-Saharan African more broadly, we conducted a retrospective observational study with the objective of presenting the epidemiologic and clinical characteristics of PLC through the experience of a single tertiary center, CHU-T. The findings from this report may help guide screening and prevention efforts, as well as benchmark the impact of future interventions designed to reduce the incidence of PLC in the study setting.

2. Methods

2.1. Study Design

We conducted a single-center retrospective observational study of all patients presenting to CHU-T with PLC over a period of 10 years and 5 months (convenience sample), ranging from 1 May 2013 to 30 September 2023.

2.2. Study Setting

CHU-T is a tertiary teaching hospital in Burkina Faso's public healthcare system, with a capacity of 600 beds. It covers an area of 16 hectares. The hospital campus consists of the administrative wing and seven clinical departments, including the Department of Medicine and Medical Specialties, the Department of Surgery and Surgical Specialties, the Department of Emergency Medicine, Anesthesiology and Intensive Care, Burns, the Department of Laboratory and Hospital Pharmacy, the Department of Medical Imaging and Functional Testing, the Department of Maternal and Child Health, and the Department of Public Health. This study was conducted in the Hepatology/Gastroenterology and General Surgery Departments of CHU-T.

2.3. Eligibility Criteria

All patients seen for PLC in outpatient consultation or inpatient hospitalization were eligible for inclusion in this study. The diagnosis of PLC was based on either histological evidence from a liver biopsy, the combination of two independent radiographic examinations morphologically consistent with PLC (*i.e.*, typical lesion on ultrasound, CT scan or MRI), or the combination of a radiographic examination morphologically consistent with PLC and an elevation of alpha fetoprotein (AFP) greater than 400 ng/ml. Patients not meeting the above diagnostic criteria for PLC and patients with incomplete or unusable medical records were excluded from analysis.

2.4. Data Collection and Analysis

Data were extracted from the hospital's electronic medical record (EMR) system, in which diagnoses, including primary liver cancer (PLC), are recorded by attending physicians based on available clinical, laboratory, radiological, and histopathological findings when applicable. Cases of PLC were identified through a systematic review of the electronic database and corresponding medical records.

Data extraction was conducted under the supervision of faculty gastroenterologists and a hepatobiliary/general surgeon to ensure data quality and accuracy. Information was collected from outpatient and inpatient records, laboratory databases, and imaging reports. Variables of interest included demographic characteristics, clinical presentation, laboratory and radiological findings, and delay to presentation. Functional status at diagnosis was assessed using the World Health Organization (WHO)/Eastern Cooperative Oncology Group (ECOG) Performance Status scale [9] [10]. Prior to study initiation, authorization for data collection was obtained from the General Directorate of CHU-T and from the Department of University Hospital Planning and Cooperation, which currently serves as the institution's ethics review body. All data were anonymized before analysis, and patient confidentiality was strictly maintained throughout the study. The research was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki.

3. Results

3.1. Demographic Characteristics

One hundred and twenty-four cases of PLC were documented over the study period. The process for selecting patient records of those with primary liver cancer included is shown in Figure 1.

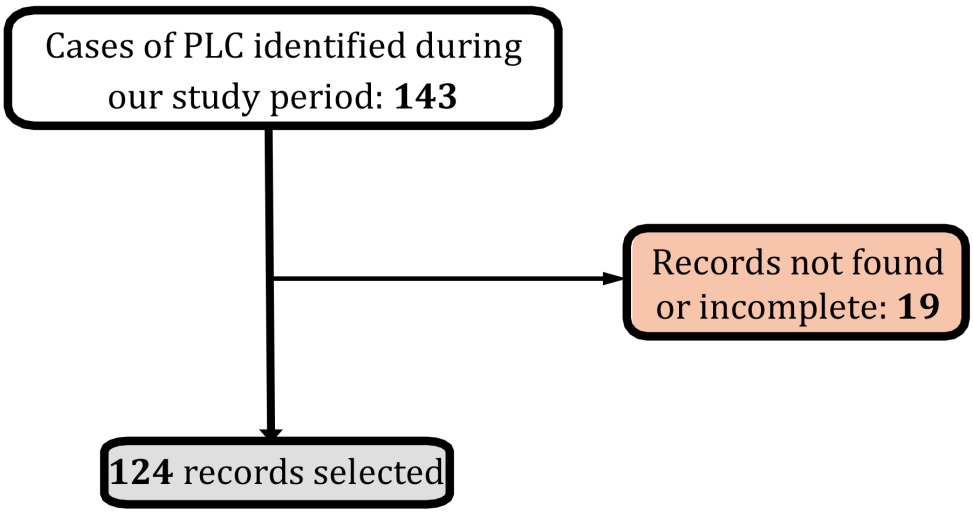


Figure 1. Flowchart of the study population.

The mean age of the patients was 49.6 ± 13.5 years, with a range of 16 to 83 years. The age group of 40 - 50 years represented 29.84% of cases (n = 37). There were 100 male patients, representing 80.7% of cases, and 24 female patients (19.3%) with a male-to-female sex ratio of 4.2. The mean age for men was 48.9 ± 11.9 and for women 52.3 ± 18.8. Figure 2 represents the demographic distribution of patients by age and sex.

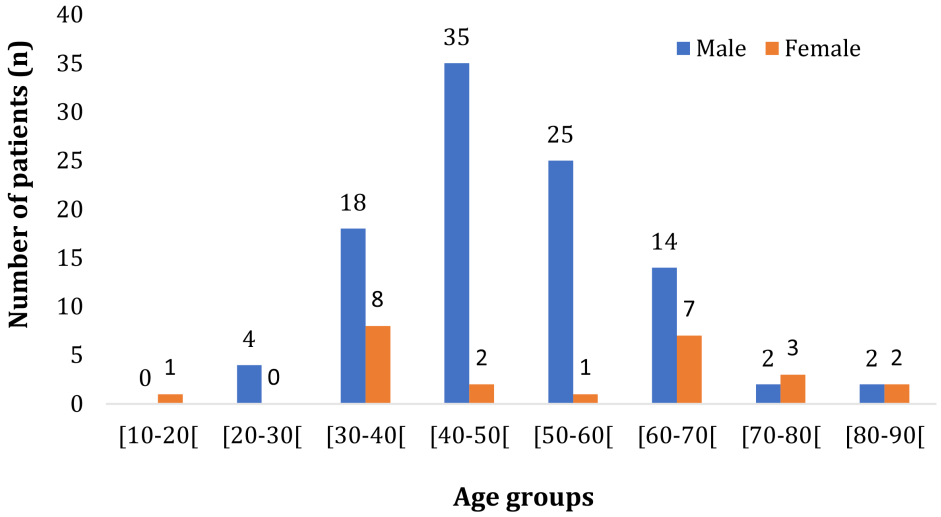


Figure 2. Demographic distribution of patients with PLC by age and sex.

3.2. Clinical Presentation

The delay from onset of symptoms to presentation at CHU-T was defined as the interval between the date of onset of the first symptoms as reported by the patient. It was between 1 - 30 days in 49 patients (39.0%), between 30 - 90 days in 42 patients (34.0%) and greater than 90 days in 33 patients (27.0%). The most common clinical sign leading to presentation was abdominal pain, which was reported in 80 cases (64.5%). In 26 cases (21%), patients presented with a palpable abdominal mass. Generalized pruritus was reported in six cases (4.8%). A history of positive Hepatitis B virus (HBsAg) antigen testing was found in 38 patients (30.6%), all of whom were receiving treatment with tenofovir. Seventeen patients (13.7%) were also infected with Hepatitis C virus, four of whom were receiving unspecified treatment. Alcohol consumption was noted in 22 cases (17.7%), without specifying the type or quantity. Table 1 illustrates the distribution of patients according to general condition and state of consciousness.

Table 1. Distribution of patients according to WHO performance index and level of hepatic encephalopathy.

	Number of patients (n)	Percentage (%)
General condition (by WHO performance status)		
- Stage II	34	27.4
- Stage III	70	56.5
- Stage IV	20	16.1
Hepatic encephalopathy (by Simplified WEST Haven Classification)		
- Absent	96	77.4
- Stage I	1	0.8
- Stage II	16	12.9
- Stage III	11	8.9

On physical examination, hepatomegaly was found in 106 patients (85.5%). Clinically evident ascites, splenomegaly, and collateral venous circulation based on physical examination findings were noted in 40 (32.3%), 4 (3.2%), and 17 (13.7%) of cases, respectively. Clinically evident anemia (conjunctival pallor) was noted in 27 patients (21.8%). Jaundice was observed in 53.2% of patients (n = 66). Lower extremity edema was present in 31.5% of patients (n = 39).

3.3. Staging Classification

Cirrhosis was suspected in all patients based on a combination of clinical, laboratory, and radiological findings, including signs of portal hypertension, a dysmorphic liver on imaging, thrombocytopenia, and/or impaired liver function. The Child-Pugh classification was performed on 118 patients and revealed Child-Pugh Class A in 11 patients (9.3%), Class B in 67 patients (56.8%) and Class C in the remaining 40 (33.9%). The Barcelona Clinic for Liver Cancer (BCLC) classification was used to define the stage of PLC progression, which demonstrated early-stage PLC in 27 patients (22.8%). BCLC stage was identified as intermediate, advanced, and terminal in nine (7.6%), 42 (35.6%), and 40 (34.0%) of patients, respectively.

3.4. Laboratory Studies

Liver function tests including serum transaminases (alanine aminotransferase [ALT] and aspartate aminotransferase [AST]) were available for 108 patients (87.1%), and were elevated in 80.6% (n = 87) of these cases. Total conjugated bilirubin was available for 80 patients (64.5%) and was elevated in 50 (62.5%) of these cases. Gamma-glutamyl transferase (GGT) levels were available for 46 patients (37.1%), of whom 30 cases (65.2%) had an elevated GGT level. Alkaline phosphatase levels were available for 20 patients (16.1%) and were elevated in 13 of these cases (65%). Of 64 patients for whom albumin level was available (51.6%), the level was less than 35 g/L in 37 cases (57.8%). Prothrombin time (PT) was measured in 117 patients (94.4%), among whom the PT level was decreased in 69 patients (59.0%) and below 50% in 35 patients (30.0%). Alpha-fetoprotein (AFP) level was available for 115 patients (92.7%), as displayed in Table 2.

Table 2. Distribution of patients by AFP level.

AFP	Number of patients (n = 115)	Percentage (%)
≥400 ng/ml	59	51.3
[200 - 400[	17	14.8
[10 - 200[	24	20.9
<10 ng/ml	15	13.0

Results of a complete blood count (CBC) were available for 122 patients (98.4%). Of these patients, CBC demonstrated anemia in 73 cases (59.7%), of which seven (5.7%) were severe. Leukocytosis was present in 52 cases (42.6%) and leu-

kopenia in five cases (4.1%). Thrombocytopenia was present in 34 cases (27.9%) and thrombocytosis in 16 cases (13.1%). Basic chemistry panels were available for 114 patients (91.9%), of which hyponatremia was present in 37 patients (32.5%) and hypernatremia in 3 patients (2.6%). Hypokalemia and hyperkalemia were found in 13 cases (11.4%) and 21 cases (18.4%), respectively. Serum calcium levels were low in 38 patients (33.3%) and high in nine patients (7.9%). Serum creatinine was available for 120 patients (96.8%), and was greater than 115 µmol/l in 33 of these patients (27.5%). Blood glucose level was available for 110 patients (88.7%). Hypoglycemia was noted in 38 patients (34.5%) and hyperglycemia in 19 patients (17.3%), five of whom (26.3% of hyperglycemia cases) were patients known to have previously diagnosed diabetes mellitus. Viral tests were ordered for all patients upon admission. These tests were performed on some patients, and the results are presented in Table 3.

Table 3. Distribution of patients according to the results of hepatitis virus tests.

Serologic profile	Number of patients	Percentage (%)
- **Viral serology Hepatitis B**		
• HBs Ag* positive	74	59.7
• HBe Ag** positive	1	0.8
• anti-Hbe antibody*** positive	4	3.2
• anti-HBc antibody**** positive	26	21.0
- **Viral serology Hepatitis C**		
• anti-HCV antibody***** positive	18	14.5

*: Hepatitis B surface antigen; ****: antibody to hepatis B core antigen; **: Hepatitis B e antigen; *****: antibody to hepatitis C virus; ***: antibody to hepatitis B e antigen.

A history of HBsAg carriage was found in 38 patients, representing 30.6% of the study population. In addition, 17 patients (13.7%) had a history of positive anti-HCV antibodies. Serological tests performed during the study period (including follow-up tests for certain patients whose serological status for hepatitis B and/or C viruses was already known) identified 74 patients who were HBsAg-positive (59.7%), and 18 patients who were anti-HCV antibody-positive (14.5%). Among the 74 patients who were HBsAg-positive, HBV infection was diagnosed at the time of diagnosis of PLC in 36 patients (48.6%). One patient (5.6%, n = 18) was diagnosed with HCV infection at the time of diagnosis of PLC.

3.5. Radiographic, Endoscopic and Histopathologic Studies

Ultrasound

Abdominal ultrasound was performed in 68 patients (54.8%). Hepatomegaly was noted in 64 of these patients (94.1%). The number, location, and size of the nodules were specified in 67.6% (n = 46) of the ultrasound reports. Nodules were found in the right lobe of the liver in 21 cases (45.7%), in the left lobe in 11 cases (23.9%), and in a bilobar distribution in 14 cases (30.4%). Ultrasound results are presented in Table 4.

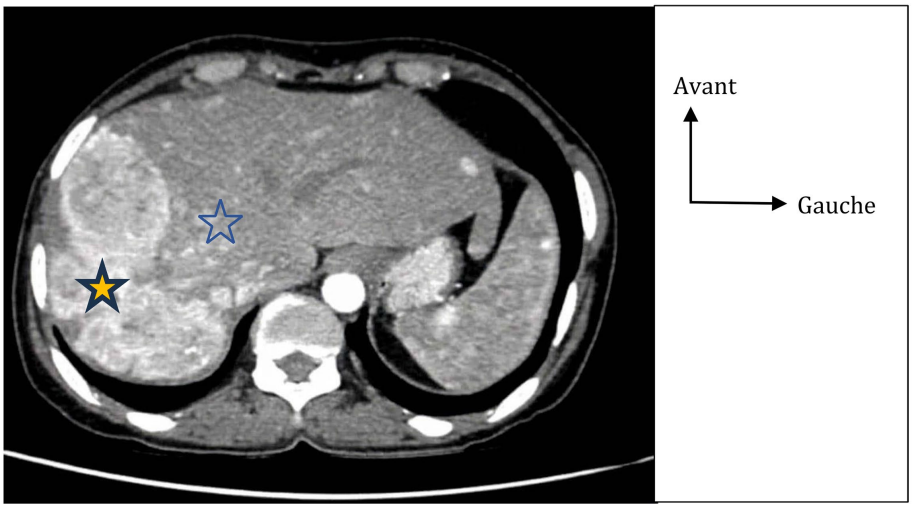
Table 4. Ultrasound results.

Features	Number of patients (n)	Percentage (%)
Number of nodules*		
Single	16	34.8
2 to 3 nodules	9	19,6
>3 nodules	21	45.7
Nodule size*		
<2 cm	2	4.3
2 - 3 cm	7	15.3
>3 cm	37	80.4
Ascites**	32	47.0
Portal vein thrombosis**	15	22.
Portal hypertension**	16	23.5
Splenomegaly**	9	13.2

*: N = 46; **: N = 68.

CT scan

Abdominal CT scans were performed in 95 patients (76.6%), 39 (41.0%) of whom had already undergone abdominal ultrasound. These scans predominantly revealed hypodense nodules with hyperenhancement in the arterial phase and "wash-out" in the portal venous phase. Nodules were visualized in 94.7% of cases (n = 90). Nodule location based on CT findings was specified in 81 patients (85.3%), with the tumor located in the right lobe of the liver in 45.7% of cases (Figure 3). Results of abdominal CT scans are presented in Table 5.



Yellow star: Tumor mass in the right lobe of the liver with intense arterial enhancement. Star with blue outline: Multiple right and left satellite nodules indicating multifocal intrahepatic dissemination. Source: Hepatobiliary-Pancreatic Surgery Unit/Radiology of the University Hospital of Tengandogo.

Figure 3. Contrast-enhanced abdominal CT scan Axial section of the abdomen.

Table 5. Abdominal CT scan results.

Features	Number of patients (n)	Percentage (%)
Portal-phase enhancement pattern of the nodules (N = 95)		
▪ Hypodense	90	94.7
▪ Isodense	5	5.3
▪ Hyperdense	0	0
Location of nodules (N = 81)		
▪ Right liver	37	45.7
▪ Left liver	20	24.7
▪ Disseminated/bilobar	24	29.6

Upper endoscopy

Upper endoscopy was performed in 37 patients (29.8%), and revealed esophageal varices in 24 patients (64.9%). These varices were grade I, II, and III in six cases (25.0%), 11 cases (45.8%), and seven cases (29.2%), respectively. "Warning signs" (*i.e.*, endoscopic findings indicative of risk of bleeding from esophageal varices such as cherry-red spots or diffuse redness) were observed in nine patients (37.5%). Hypertensive portal gastropathy was found in 17 patients (45.9%).

Histopathology

Histopathologic confirmation of PLC by biopsy was performed in 21 patients (16.9%). Of these patients, biopsy results demonstrated 18 (85.7%) hepatocellular carcinomas and three (14.3%) cholangiocarcinomas.

4. Discussion

Liver cancer is a major public health problem worldwide. According to Global Cancer Observatory of International Agency for Research on Cancer (GLOBOCAN 2022) estimates, approximately 866,000 new cases and 759,000 deaths were recorded, making it the sixth most common cancer and the third leading cause of cancer death globally. After East Asia, Sub-Saharan Africa is among the most affected regions [1] [5] [11]. In Burkina Faso, PLC is among the most common and deadly cancers. It is a major cause of cancer death, particularly among women, where it ranks first with a standardized mortality rate of 13.8 per 100,000 inhabitants [1]. This heavy burden is attributable to a number of factors including the high prevalence of chronic HBV infection, exposure to aflatoxins, and the fact that diagnosis is often made at an advanced stage of the disease [5] [8] [11]. Chronic viral hepatitis was the main etiological factor of PLC in our study, with a clear predominance of HBV (59.7%, n = 74). This finding confirms the major role of chronic HBV infection in liver carcinogenesis in sub-Saharan Africa, a region with high endemicity. Bahri *et al.* in North Africa reported a 77.9% prevalence of HBV infection among patients with HCC [12]. The lower prevalence of HBV in our study compared with that reported by Bahri *et al.* may partly reflect an underestimation in our study, as some patients could not afford viral serological investiga-

tions. Missing virological data may therefore have resulted in an underdiagnosis of chronic viral hepatitis and an underestimation of its etiological role in PLC. Conversely, European studies report different etiological profiles. Park *et al.* found a predominance of HCV infection (46%) among viral causes [13], while Schütte *et al.* in Germany reported a much lower overall frequency of viral hepatitis (17.3%) [14]. These differences reflect the geographical disparities in the epidemiology of chronic liver diseases. In sub-Saharan Africa where HBV infection is often acquired in childhood, it remains the main determinant of HCC [8], whereas in Europe, other causes such as alcohol-associated liver disease, hepatic steatosis, and HCV infection play a more significant role [13]. The hepatitis B vaccine was introduced in Burkina Faso as part of the Expanded Program on Immunization in 2006, and may contribute to the reduction of virus transmission within the population in the future.

The delay to presentation exceeded 30 days in 60.5% of patients in our series (n = 75), with an often advanced stage of disease at the time of diagnosis. Although few studies specifically report consultation delays for patients with HCC, several African studies highlight a late presentation of the disease in the region, often characterized by large, multinodular, or metastatic tumors at the time of diagnosis [6] [8]. This situation is generally linked to factors including the lack of structured screening programs, limited access to laboratory and radiographic examinations as well as subspecialty care, and a lack of awareness of risk factors and early signs of the disease among the population. Abdominal pain was the main presenting symptom (64.5%), as also reported in Burkina Faso by Nikiema *et al.* (83.8%), in Senegal by Diallo *et al.* (91.7%), in Algeria by Harir *et al.* (67.8%), and in the Central African Republic by Bekondi *et al.* (100%) [15]-[17]. Abdominal pain is classically considered the dominant symptom of symptomatic HCC, resulting primarily from distension of Glisson's capsule induced by tumor growth and can be exacerbated by tumor necrosis, locoregional invasion, or vascular complications [8]. Its high frequency in African series contrasts with data from developed countries where tumors are often discovered at an asymptomatic stage through surveillance programs. The high frequency of general malaise observed in 72.6% of patients is close to that reported by several African authors [7] [16] [18]. This likely reflects the significant tumor burden and concomitant liver dysfunction observed in advanced stages of PLC. Similarly, hepatomegaly was the main sign identified on physical examination (85.5%, n = 106). Comparable frequencies were found by Somé *et al.* (97.9%), Diallo *et al.* (75.9%), Harir *et al.* (87.5%), and Bekondi *et al.* (100%) [7] [15] [16] [18]. Similar to abdominal pain, the high proportion of hepatomegaly in our sample may be explained by the often significant tumor growth at the time of diagnosis in our low-resource study setting. Further corroborating the advanced stage of disease at time of presentation, nearly half of the patients (49.2%, n = 61) in our sample presented with clinical signs of portal hypertension, a frequency comparable to those reported previously by Somé (48.1%), Diallo (62%), and Bekondi (61.2%) [7] [15] [18]. These manifestations are primarily related to

associated cirrhosis but can also be exacerbated by tumor invasion of the portal system. Their presence generally indicates an advanced stage of chronic liver disease and constitutes an indirect marker of severity.

The use of both the Child-Pugh and BCLC classifications further confirms the late diagnosis of hepatocellular carcinoma in our study setting. Indeed, according to the Child-Pugh classification, which assesses the stage of cirrhosis, 56.8% of patients were at stage B and 33.9% at stage C. Similarly, 69.6% of patients were classified as advanced or terminal according to the BCLC classification. These results contrast with those reported by Fenoglio *et al.* [19], who observed a predominance of patients at Child-Pugh stage A (62.1%) and a low proportion of advanced or terminal BCLC stages (15.3%), likely due to earlier diagnosis linked to regular surveillance of at-risk populations. Conversely, our results are similar to those reported in several African reports [15], where the majority of patients are diagnosed at advanced stages of the disease. This situation reflects the difficulties in accessing screening and monitoring of at-risk patients, thus limiting access to curative treatments and contributing to the poor prognosis of HCC. In Burkina Faso, the implementation of the Universal Health Insurance Scheme (Régime d'Assurance Maladie Universelle, RAMU) established by Law No. 060-2015/CNT of September 5, 2015 as well as the subsidy of various radiographic examinations are important developments that may reduce the population's financial barriers and facilitate earlier diagnosis and treatment.

The biological abnormalities observed in our series reflect both tumor activity and alteration of the underlying liver parenchyma and constitute another indicator of late diagnosis. Indeed, hepatic cytolysis was found in 80.6% of patients, a frequency close to those reported in other African series [7] [15] [18]. This cytolysis results from the destruction of hepatocytes linked to tumor infiltration and the inflammatory activity of associated chronic liver diseases. However, it remains a nonspecific marker of HCC. The majority of patients also presented with a cholestasis syndrome with elevated bilirubin (62.5%), alkaline phosphatase (65%), and gamma-glutamyl transferase (65.2%). Similar results were reported by Somé [7]. This cholestasis can result from compression or infiltration of the intrahepatic bile ducts by the tumor, but also from architectural disorganization of the liver related to advanced cirrhosis. Furthermore, hepatic synthesis parameters were frequently altered. Hypoalbuminemia was observed in 57.8% of patients and a decreased prothrombin level in 59%. Comparable results were reported by Somé and Bekondi [7] [18]. These abnormalities indicate associated hepatocellular insufficiency, a consequence of the reduction in functional hepatocyte mass due to both cirrhosis and tumor infiltration. Their high frequency confirms that the majority of patients were diagnosed at an advanced stage of their disease, with liver function already significantly compromised.

In our study, the alpha-fetoprotein level (AFP) was greater than or equal to 400 ng/ml in 51.3% of patients. A comparable frequency was reported by Diallo in Senegal (68.6%), while Chassagne in Cambodia found a lower frequency of 42% [15]

[20].

In our study, abdominal CT was the most informative radiographic modality. It revealed a specific HCC profile characterized by arterial hypervascularization ("wash-in") associated with portal or delayed wash-out at the nodule level in 94.7% of cases. This high proportion of typical radiological features confirms the importance of dynamic imaging in the modern diagnosis of HCC. Advances in multiphasic computed tomography and magnetic resonance imaging have profoundly changed the diagnostic approach over the last two decades. The characteristic vascular profile of HCC has been shown to have excellent specificity in at-risk patients, particularly those with cirrhosis or chronic viral hepatitis [19] [21] [22]. According to current European Association for the study of the Liver EASL guidelines, HCC can be diagnosed without histological evidence when a liver lesion occurring in a high-risk liver presents these typical radiological criteria on high-quality dynamic imaging. This non-invasive approach is now a distinctive feature of HCC among solid cancers [21].

The histopathological examination revealed a predominance of hepatocellular carcinoma (85.7%) in our study. For a long time, liver biopsy was the essential diagnostic reference for primary liver cancer. Improvements in imaging techniques have gradually reduced the routine use of histology. However, biopsy still plays an important role in certain situations: atypical lesions, discrepancies between imaging studies, absence of known risk factors, suspicion of cholangiocarcinoma or mixed hepatocellular-cholangiocarcinoma tumors. It also allows for better molecular characterization of tumors in preparation for modern targeted therapies. Thus, far from being useless, biopsy is now reserved for complex or uncertain diagnostic situations [21].

Limitations

This study has certain limitations. Its single-center design and relatively small sample size limit the generalizability of the results. The retrospective design of the study may have introduced information bias due to incomplete or missing data in the medical records. Furthermore, the lack of specific funding, restrictions on access to certain specialized tests, and disruptions to operations at Tengandogo University Hospital following the fire in August 2023 may have affected the completeness of data collection and patient recruitment. Finally, recruitment at a referral center introduces a selection bias toward the most advanced forms of the disease.

5. Conclusion

We conducted a retrospective observational analysis of patients with PLC over a period of ten years at a tertiary hospital in Ouagadougou, Burkina Faso, to address the lack of primary clinical data on PLC in low-resource settings. Our findings demonstrate significant delay to diagnosis and advanced stage of disease at presentation for PLC in our study setting. Potential opportunities to both reduce the rates of PLC as well as improve early detection and treatment include strengthening

primary prevention measures based on awareness campaigns, screening for viral hepatitis, vaccination against HBV, access to treatment for chronic hepatitis, and mitigating environmental factors such as aflatoxin exposure. Furthermore, the implementation of systematic monitoring of at-risk individuals may promote the early detection of tumors and increase the likelihood of access to curative treatments. In light of our findings, a larger-scale prospective study on the epidemiological and clinical aspects of CPF would help confirm the trends observed.

Author Contributions

Beni Da H.N.: Conceptualization, Methodology, Data curation, Formal analysis, Investigation, Writing - Original Draft, Writing review and Editing.

Moumoula W.G.: Investigation, Data curation, Formal analysis, Data interpretation.

Doamba N.R.: Investigation, Data curation, Writing-Review and Editing.

Soudré Héma S.M.O.B., Wild H.B., Somda K.S., Sombié R. and Sanou A.: Supervision, Project administration, Writing-Review and Editing.

All authors have read and approved the final version of the manuscript.

Conflicts of Interest

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

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