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## The Assessment of Methods Used to diagnose Hepatocellular Carcinoma to the 396 decompensated cirrhotic patients at the Bertoua Regional Hospital

Olivier Lieuga<sup>a</sup>, Tatiana Jiengoué<sup>a</sup> and Augustine Nji Asakizi<sup>aa</sup>

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### ABSTRACT

**Introduction:** Hepatocellular carcinoma (HCC) is diagnosed primarily through non-invasive, contrast-enhanced imaging techniques based on tumor vascularity. These methods include multiphase contrast-enhanced MRI (preferred for high sensitivity) and CT scans, along with contrast-enhanced ultrasound (CEUS). Diagnostic algorithms often incorporate blood biomarkers like Alpha-fetoprotein (AFP) and liver biopsy for atypical cases, often categorized using the LI-RADS system.

**Methods:** It is descriptive cross-sectional study done on 396 patients living with decompensated cirrhosis recorded at the Intensive Care Unit of Bertoua Regional Hospital from June to October 2025 to diagnose Hepatocellular Carcinoma, after receiving ethical clearance and Research Authorization from Est Public Health Delegation – Cameroon. Convenience sampling was done. The analysis included the methods such as GALAD Score, Fibrotest – Actitest Score, CT Scans, LFTs, APHE, LIRADS, Multiphase CT Scan and Dicckof – 1.

**Results:** Out to 396 Cirrhosis patients, the prevalence rate of HCC obtained was 68,43%.

**Conclusions:** At the end of our studies, 68.63% of the 396 patients with liver cirrhosis underwent the following examinations: multiphase computed tomography (CT) scan, multiphase magnetic resonance imaging (MRI), FibroScan, FibroTest, Actitest, and AFP testing to confirm the diagnosis of hepatocellular carcinoma (HCC). The absence of other examinations, such as AFP-L3, DCP, Dickkoff-1, and BCLC liver biopsy, does not always allow for the determination of the cancer stage (stage 0, stage A, stage B, stage C, and stage D) and raises concerns about the quality of treatment.

**Keywords :** *Hepatocellular Carcinoma, Liver Cirrhosis, Hepatitis B, Hepatitis C*

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## 1. INTRODUCTION

Hepatocellular Carcinoma (HCC) is a higher aggressive malignancy with global impact, especially in the context of the rising epidemic of metabolic dysfunction associated with chronic hepatitis, Emily Kinsey and Hannah M. Lee (2024). It is noted that liver cancer is the sixth most common cancer, but its aggressive nature and poor prognosis raise it to the third highest cause of cancer related deaths. Hepatocellular Carcinoma (HCC) makes up approximately 75% of primary liver cancer cases, with a smaller proportion due to Cholangiocarcinoma, Baffy G (2016).

Hepatocellular Carcinoma (HCC) is the fourth leading cause of cancer related mortality Worldwide and a leading cause of death in cirrhosis, Previn Ganesan and Laura M.Kulik (2023).The prognosis in HCC is poor, with mortalities approximating incidence rates Worldwide. The second leading cause of cancer death after lung cancer in men is HCC, Jemal A, Ward EM, Johnson CJ et al (2014). Considered as a primary tumor of the liver, HCC occurs in approximately 85% of patients diagnosed with cirrhosis caused either by viral hepatitis infection, or metabolic dysfunction, Semmler G and Mandofer (2022). The Global burden of HCC is highest in Asia and Sub-Saharan Africa due to the high prevalence of chronic hepatitis in those regions. Men are more commonly affected and have a higher mortality than Women, with liver cancer being the leading cause of cancer death among men in over 20 countries, Emily Kinsey and Hannah M. Lee (2024)

HCC account for one third of total cancer incidence and mortality in developing countries, Ahmad Zia Shms and Ulrike Haug (2017). To date, there is no systematic synthesis of evidence regarding strategies to prevent HCC in

developing countries. The epidemiology of HCC is rapidly evolving with chronic liver disease becoming an increasing cause of fibrosis, cirrhosis and HCC, Previn Ganesan and Laura M. Kulik (2022). Most patients develop HCC in the setting of Cirrhosis, and the risk factors for HCC include Hepatitis B (HBV), Hepatitis C (HCV), alcohol related liver disease (ALD), and excess body weight, and type 2 diabetes, with is often associated metabolic dysfunction associated with steatotic liver disease (MASLD), as well as aflatoxin exposure, Ahmad Zia Shms (2023). The prevalence of various risk factors for HCC is region specific with viral causes being more common in the East and non - viral etiologies in the West. In Japan and Egypt, HCV is the primary driver of HCC, Venook AP, Papandreou et al (2010). In Asia and Africa, Chronic HBV is a primary cause of HCC.

## 2. RELATED WORKS

Multiphase CT or MRI with contrast is used for definitive diagnosis of HCC; arterial phase enhancement (APHE); and washout on the portal venous phase. The Liver Reporting and Data System (LIRADS) allows for the classification of liver lesions in cirrhosis in a standardized manner, Marasco G, Alemanni LV, Colechia A, et al (2021). Multiphase MRI may have higher sensitivity but comparable specificity to CT. Imaging is often sufficient to definitively diagnose HCC (LIRADS-5), eliminating the need for a biopsy for diagnostic purposes, Allaire M, Goumard C, Lim C, Le cleach A, Wagner M and Sertton O (2020). However, when imaging findings are nondiagnostic but highly suspicious for HCC (LIRADS-4), clinicians may repeat an imaging study in 3 months, attempt the alternative imaging modality, or consider pursuing a biopsy for definitive diagnosis, Cittero D, Faccidrusso A, Sposito C, Rota R,

Ghouri S, and Mazzaferro V (2016). The advantages of CT include shorter duration of examination and lower cost. The disadvantages include exposure to radiation and iodinated contrast. This is especially relevant in individuals with advanced liver disease who can often have concurrent renal dysfunction, Azoulay D, Ramos E, Casellas – Robert M, et al (2020).

Hepatocellular carcinoma can be diagnosed on the basis of validated imaging criteria (in people who have liver cirrhosis) or tissue biopsy. Commonly used imaging modalities include multiphase CT or MRI, in which hepatocellular carcinoma typically shows enhancement (brightness compared with surrounding parenchyma) in the early arterial phase, and washout (temporal decrease in enhancement relative to surrounding parenchyma) in the delayed phase, Marasco G, Alemanni LV, Colechia A, et al (2021). The latter creates a peripheral rim of enhancement around the tumour, resulting in the formation of a capsule; an observation highly specific for hepatocellular carcinoma, Kabir T, Tan ZZ, Syn NL et al (2021). This imaging feature has been prospectively confirmed and universally adopted by guidelines.

Usually, solid hepatic nodules raise suspicion for hepatocellular carcinoma once they are  $\geq 1$  cm, especially in patients with liver cirrhosis. Lesions that are identified incidentally or through regular screening by ultrasound, dynamic contrast-enhanced CT or MRI of the abdomen should be obtained for further assessment, Lang H, Sotiropoulos GC, Domland M et al (2005). Pathological diagnosis of hepatocellular carcinoma is typically based on the examination of a resection or explant specimen, or from a biopsy sample.

Historically, biopsy has been reserved for lesions in which non-invasive imaging criteria for diagnosis are not met or are not applicable (for patients without cirrhosis), Reig M, Forner A, Rimola J et al (2022). The prognosis for hepatocellular carcinoma depends not only on tumour characteristics, such as tumour burden, extrahepatic spread, vascular infiltration, or tumour differentiation, but is heavily influenced by the underlying liver disease, Chen LT, Martinelli E, Cheng AL et al (2021). Additionally, higher levels of serum AFP are significantly associated with increased mortality, independent of demographic and clinical factors or treatment, and have been shown to predict the risk of tumour recurrence after resection and liver transplantation, Kudo M, Kawamura Y, Hasegawa K et al (2021).

### 3. MATERIALS & METHODS

It is descriptive cross – sectional study done on 396 patients living with decompensated cirrhosis recorded at the Intensive Care Unit of Bertoua Regional Hospital from June to October 2025 to diagnose Hepatocellular Carcinoma, after receiving ethical clearance and Research Authorization from Est Public Health Delegation – Cameroon. Convenience sampling was done. The analysis included the methods such as GALAD Score, Fibrotest – Actitest Score, CT Scans, LFTs, APHE, LIRADS, Multiphase CT Scan and Dicckof – 1.

Convenience sampling was done, all the cases of elective HCC admitted during the study period were included. Age  $> 20$ , men and women, Cameroonians or not but residents in Cameroon. The simple size was 271 patients calculated was calculated using the formula  $n = (Z^2 \times p \times q) / e^2$  where  $n$  = minimum sample size,  $z$  = confidence interval,  $p$  = prevalence of decompensated cirrhosis,  $q = 1 - p$  and  $e$  = margin of error, 3%.

The data for this study were collected using structured questionnaires, entered and analysed in Microsoft Excel 2016, confidence interval was calculated along with frequency and percentages for binary data

#### 4. RESULTS & DISCUSSION

The Assessment of Methods Used to diagnose Hepatocellular Carcinoma to the 396 decompensated cirrhotic patients at the Bertoua Regional Hospital among which we analyzed these characteristics on each patient and are summarized them by the tables.

*[See Annex — Table 1: Hepatocellular Carcinoma Patient Characteristics]*

*[See Annex — Table 2 : Results of Exams/Tests done for the diagnostic of HCC]*

*[See Annex — Table 3 : Results of Exams/Tests done for the diagnostic of HCC]*

At the end of our studies, 68.63% of the 396 patients with liver cirrhosis underwent the following examinations: multiphase CT scan, multiphase MRI, FibroScan, FibroTest, Actitest, and AFP to confirm the diagnosis of HCC. The absence of other examinations such as AFP-L3, DCP, Dickkoff-1, and liver biopsy using the BCLC method does not always allow for the determination of the cancer stage (Stage 0, Stage A, Stage B, Stage C, and Stage D). This leaves some ambiguity regarding treatment. We also noted that the GALAD score remained unavailable due to the unavailability of two tests (AFP-L3 and DCP) in local laboratories. Another identified factor is the low income of some patients, who are unable to afford these expensive examinations in both local and foreign laboratories. Diagnosing hepatocellular carcinoma (HCC) in decompensated cirrhotic patients is a complex, high-stakes process that relies heavily on advanced, non-invasive

imaging, as liver function is too compromised for routine biopsies, Johnson PJ et al,...(2021). While conventional ultrasound is used for surveillance, it lacks the sensitivity needed for definitive diagnosis in advanced liver disease, often requiring follow-up with multiphase computed tomography (CT) or magnetic resonance imaging (MRI), Boyles TH et al,..(2011). It also involves using contrast-enhanced MRI or CT to identify arterial phase hyperenhancement and venous washout, with MRI offering superior sensitivity. Guidelines emphasize leveraging LI-RADS for standardized imaging, with liver biopsy reserved for inconclusive cases, Bruix J et al,..(2021).

#### 5. CONCLUSION

We recommended that the hospital improve its diagnostic equipment for HCC, seek funding from NGOs to provide free or subsidized care for underprivileged patients, and recruit specialists such as gastroenterologists, digestive surgeons, and digestive oncologists.

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#### CONFLICTS OF INTEREST

The authors declare no conflict of interest in relation to this work.

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## ANNEXES

**Annex I — Table 1: Hepatocellular Carcinoma Patient Characteristics**

Patient Characteristics	Cameroonians		Chadians		Nigerians		Centrafric Republic		Others Nationalities	
	n	%	n	%	n	%	n	%	n	%
Patient Characteristics	213	58,33	87	21,96	54	13,63	32	8,08	10	2,52
Age (Years Old)										
20 – 35	125	58,68	61	70,11	15	27,77	9	28,12	5	50
35 - 55	56	26,29	14	16,09	13	24,07	12	37,5	3	30
55 – Over	32	15,02	12	13,79	26	48,14	11	34,37	2	20

**Annex II — Table 2 : Results of Exams/Tests done for the diagnostic of HCC**

Imaging Tests	Multiphase CT Scan		Multiphase MRI		Arterial Phase Enhancement		Fibroscan		Liver Imaging Reporting and Data System	
	n	%	n	%	n	%	n	%	n	%
Patient	271	68,43	0	0	0	0	271	68,43	0	0

**Annex III — Table 3 : Results of Exams/Tests done for the diagnostic of HCC**

Liver Function Tests	Fibrotest – Actitest		GALAD Score		AFP Test	
	n	%	n	%	n	%
Patient	271	68,43	0	0	271	68,43