Scientific Research Publishing

Open Journal of Gastroenterology, 2024, 14, 125-138
https://www.scirp.org/journal/ojgas
ISSN Online: 2163-9469
ISSN Print: 2163-9450

Evaluation of Hepatic Fibrosis and Hepatic Steatosis by Pulse Elastography (FIBROSCAN/CAP) in Asymptomatic Patients about 170 Cases at the Donka CHU National Hospital in Conakry

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How to cite this paper: Diallo, M.S., Youssouf, O., Yaogo, A., Diallo, D., Diallo, K., Wann, T.A., Diallo, A.T., Bah, M.L.Y., Diakhaby, M., Kanté, M.A. and Sylla, D. (2024) Evaluation of Hepatic Fibrosis and Hepatic Steatosis by Pulse Elastography (FIBROSCAN/CAP) in Asymptomatic Patients about 170 Cases at the Donka CHU National Hospital in Conakry. *Open Journal of Gastroenterology*, **14**, 125-138.
https://doi.org/10.4236/ojgas.2024.144014

Received: February 29, 2024
Accepted: April 9, 2024
Published: April 12, 2024

Abstract

Introduction: Fibroscan is a recent, non-invasive and non-irradiating diagnostic method. It is based on the principle of ultrasound, which enables liver tissue elasticity to be quantified using a probe, and fibrosis to be assessed. Fibroscan measures both elasticity correlated with hepatic fibrosis and CAP correlated with steatosis. The aim of this study was to evaluate hepatic fibrosis and steatosis using pulse elastometry (Fibroscan/CAP). **Methods:** This was a descriptive and analytical cross-sectional study in which 170 patients were included. It was conducted from October 1 2021 to December 31 2023, *i.e.* 27 months, in an outpatient clinic in the hepato-gastroenterology department of the Donka national hospital of the CHU Conakry. **Results:** Of the 170 patients identified, 87 were male (51%) and 83 female (49%), giving a M/F sex ratio of 1.04. The average age of our patients was 40. The 30 - 50 age group was the most affected, with a frequency of 58.23% (n = 99), followed by the 50+ age group with a frequency of 29.41% (n = 50). Hepatomegaly, steatotic liver on ultrasonography, transaminase elevation and obesity were the main indications, respectively: (21.76%), (17.65%), (14.71%), and (13.53%). The examinations were requested by hepatogastroenterologists (47.06%), diabetologists (35.88%) and general practitioners (29%). Of the 170 patients, 100

patients (58.82%) had no significant fibrosis F0F1, 39 (22.94%) had moderate fibrosis F2, 20 patients (11.76%) had severe fibrosis F3 and 11 patients (6.47%) had fibrosis F4. Hepatic steatosis: 62 patients (36.47%) had no S0 steatosis; 29.41% had S1 steatosis, 20% had S2 steatosis and 24 patients (14.11%) had S3 steatosis. Abdominal ultrasound revealed a normal liver in 67.05% of patients, hepatic steatosis in 29.41% and non-decompensated cirrhosis in 6 cases. Thus, 108 patients had the parameters required to calculate the Fatty Liver Index (FLI), steatosis was present in 20% of our patients, while 29.41% had an undetermined status and 24 14.11% had a normal FLI. **Conclusion:** Identifying subjects at risk of metabolic steatopathy, diagnosing and managing these patients is a public health issue and one of the future challenges of hepato-gastroenterology. Fibroscan is an increasingly popular screening tool for hepatic fibrosis and steatosis. The fight against obesity must be a priority.

Keywords

Cirrhosis, Fibrosis, Fibroscan/CAP, Non-Alcoholic Hepatic Steatosis, Steatosis, CHU Conakry

1. Introduction

Hepatic fibrosis is the main complication of chronic liver disease. Progression of fibrosis ultimately leads to cirrhosis, a source of high morbidity and mortality. The quantification of fibrosis is clinically important, as it conditions both prognosis and therapeutic indications [1]. Hepatic steatosis corresponds to an accumulation of triglycerides in hepatocytes (>5% of affected hepatocytes on histology), while non-alcoholic steatohepatitis (NASH) is defined by the association of hepatocyte ballooning and lobular inflammation with steatosis. These hepatic lesions are likely to progress to hepatic fibrosis and then to cirrhosis. Indeed, even if simple steatosis is not associated in the short term with increased morbidity, the progression of the disease to NASH significantly increases the risk of cirrhosis, liver failure and ultimately hepatocellular carcinoma (HCC) [2].

NASH is part of the NON Alcoholic Fatty Liver Disease (NAFLD) group, which covers a spectrum of liver diseases ranging from simple steatosis to NASH. The diagnosis of NAFLD requires, on the one hand, the exclusion of secondary causes (intake of drugs responsible for hepatic steatosis, Wilson's disease, intestinal microbial overgrowth, parenteral nutrition, severe undernutrition or hypothyroidism), on the other hand, a daily alcohol consumption of less than or equal to 30g per day in men and less than or equal to 20 g per day in women [3].

Assessment of fibrosis is an important element in the management of chronic liver disease [4]. Liver biopsy is the "gold standard" for investigating liver pathologies, but its morbidity and cost limit its use to specific indications [5].

On the other hand, Fibroscan, an examination based on pulse elastometry of

the liver, is non-invasive and has a good indication both for chronic viral hepatitis B and C and for steatosis [6].

Fibroscan is an innovative technology for measuring liver hardness non-invasively, painlessly and immediately [7]. An ultrasound transducer generates a low-amplitude shock wave by vibration, and then measures the wave's propagation velocity through the liver parenchyma. The elasticity of the liver is calculated from the measurement of the wave propagation velocity. The harder the medium in which the wave propagates, the greater the velocity and hence the elasticity. The volume explored (a cylinder 1 cm in diameter by 4 cm long) is 100 times greater than that of a liver biopsy. It provides a reliable assessment of the severity of liver damage in patients with NASH, and is currently the first-line diagnostic test for this disease [7].

Various studies have demonstrated a very good correlation between liver elasticity and the degree of fibrosis assessed by the Metavir score. Threshold values have been determined for each stage of fibrosis. When elasticity is below 7 kPa, fibrosis is absent or minimal. When elasticity exceeds 12 kPa, cirrhosis is highly probable [8].

Fibroscan is used to monitor the evolution of fibrosis over time. It can be used to assess the evolution of fibrosis after antiviral treatment. A greater reduction in elasticity is observed in responders than in relapsers or non-responders to treatment [9].

In sub-Saharan Africa, there is little research on the evaluation of hepatic fibrosis and steatosis.

In Guinea, to our knowledge, no study has been carried out on this subject, and it was with this in mind that we undertook this study, the aim of which was to assess hepatic fibrosis and steatosis using pulse elastometry (Fibroscan/CAP).

2. Materials and Methods

We conducted a descriptive and analytical cross-sectional study in which 170 patients were included. It was conducted from October 1er 2021 to December 31 2023, *i.e.* 27 months, in the hepato-gastroenterology department of the Donka national hospital of Conakry University Hospital.

Patients of either sex, of any age, seen in consultation in the department presenting clinical and/or biological signs of liver disease requiring FIBROSCAN, such as: hepatomegaly, steatotic liver on ultrasound, transaminase elevation, obesity, dyslipidemia, icterus splenomegaly and also patients referred by doctors from other health facilities with an examination bulletin for FIBROSCAN on which the indication is clearly written. An IBROSCAN register was used to record all necessary information. Informed consent was obtained from patients.

The criteria for non-inclusion of patients were:

- Patients with alcohol consumption exceeding 30 grams per day in men and 20 grams per day in women;
- Patients with viral hepatitis: viral hepatitis B, C, D, HIV, as well as autoimmune hepatitis;

- Patients with a secondary cause of hepatic steatosis (extensive small-bowel resection, prolonged parenteral nutrition);
- Steatosis induced by the following drugs: Cordarone, methotrexate, corticoids, nifedipine or isoniazid);
- Other causes of liver disease (cholestatic, hereditary hemochromatosis and Wilson's disease);
- Patients who refused to participate in the study;
- All decompensated cirrhotic patients;
- Pregnancy.

Sociodemographic, clinical and ultrasound parameters:

- Age: 18 to 80;
- The sex;
- Personal history: diabetes, arterial hypertension (HTA in mmHg), dyslipidemia;
- Alcohol consumption;
- Regular physical exercise;
- The weight was taken in kilograms for a patient with no heel.
- Size;
- Waist circumference measured with a tape measure in cm;
- Body mass index (BMI): (kg/m^2) defined by the ratio of weight to height squared.

BMI between 18 - 24.5 = normal BMI between 25 - 29.9 = overweight;

BMI between 30 - 34.9 = Grade I obesity BMI between 35 - 39.9 = Grade II obesity BMI over 40 = Grade III or morbid obesity;

- Hepatic steatosis on ultrasonography with increased echogenicity of the liver parenchyma compared to the right renal cortex.

CAP measurement of hepatic steatosis with Fibroscan:

- S0 steatosis or absence of steatosis if CAP for values below 248 dB/m (0 - 10%);
- Stage I or S 1 steatosis for values between 248 and 260 dB/m (11% -3 3%);
- Stage S 2 steatosis for values between 260 and 280 dB/m (34% - 66%);
- Stage S 3 steatosis for values above 280 dB/m (>67%);

We considered stages S3 and S4 as significant steatosis requiring follow-up.

Hepatic fibrosis is graded using the result in kPa:

- No or minimal fibrosis = F0 F1, when liver elasticity is less than 7 kPa;
- Presence of F2 fibrosis when liver elasticity is between 7 and 9.5 kPa;
- Presence of severe fibrosis F3, when liver elasticity is between 9.5 and 12 kPa;
- Presence of F4 cirrhosis, when liver elasticity exceeds 12.5 kPa;

Fibroscan/CAP measures both elasticity correlated with hepatic fibrosis and CAP correlated with steatosis. Results are expressed in kPa for elasticity and correspond to the median of 1 to valid measurements. The CAP measurement, which is guided by the elasticity measurement, is expressed in dB/m and corresponds to ultrasound attenuation. It describes the decay of the ultrasound signal

as a function of depth. This decay is all the greater as the liver is loaded with steatosis, and is only calculated if the elasticity measurement is valid.

In order to interpret the results, the following two elements must be taken into account: the variability of valid measurements, assessed by the value of the interquartile range (IQR = displayed by the machine and which must be less than 30% of the median, and the success rate (number of measurements in relation to the number of measurements carried out), which must be greater than 60% to be considered satisfactory.

The fibroscan was performed in patients who had been fasting for 3 hours prior to the examination. Patients were positioned supine, torso undressed, right arm folded under the head in extension to clear the intercostal spaces. The probe was placed perpendicular to the skin between the 9ème and 11ème right intercostal space on the mid-clavicular line, and measurements were acquired.

Fibroscan/CAP is a painless examination that is very well accepted by the patient, and can therefore be easily repeated, making it possible to monitor the evolution of fibrosis over time. It is performed rapidly (less than 5 minutes) at the patient's bedside or in consultation, with immediate results.

The M probe was used for patients with a BMI below 30 kg/m^2 and the XL probe for patients with a BMI ≥ 30 kg/m^2 or in patients we had difficulty obtaining valid measurements with the M probe; We did not have the S probe on our tray.

The examination was performed with the Fibroscan 502 Touch (SN F60782) Echosens, France. All examinations were performed by a senior and by the same physician.

The biological parameters studied were: fasting blood glucose, transaminase levels: Alanine aminotransferase (ALAT in IU/l) and aspartate aminotransferase (ASAT in IU/l), HDL cholesterol in g/l, LDL cholesterol, total cholesterol, TG triglycerides, albumin (g/l), hemoglobin (g/dl), mean corpuscular volume (VGM fl), platelet count, total and conjugated bilirubin in mg/l, alkaline phosphates (PAL in IU/l), gamma glutamyl transpeptidases (GGT in IU/l).

According to the International Dibates Federations (IDF) in 2005, metabolic syndrome is defined by several clinical and biological criteria:

- Blood pressure equal to or greater than 130/85 mmHg or antihypertensive treatment,
- Triglyceride (TG) levels greater than or equal to 1.5g/l,
- A fasting blood glucose level of 5.6mmol/l or higher, or known type 2 diabetes,
- HDL cholesterol below 0.50g/l in men and below 0.40g/l in women,
- Waist circumference greater than 80 cm in women and greater than 94 cm in men.

Metabolic syndrome is defined as the presence of at least 3 of the 5 elements listed above.

Fatty Liver Index (FLI): waist circumference, BMI, GGT, triglycerides (Medicalcul application).

- Steatosis present if FLI > 60;
- Steatosis absent if FLI < 30;
- Indefinite steatosis when the value is between 30 and 60.

Data was collected using a specially designed individual survey form.

In this study, we respected ethical considerations, in particular: the moral and physical integrity of the person, the free and voluntary consent of the person, the confidentiality of the results and the anonymity of the interviewees, and the possible wish of the interviewee to withdraw without prejudice. The hospital has consented to the use of the data of patients who have been consulted in the department.

Data analysis was performed using Epi info 7.1.0.6. Comparisons of variables were made using Pearson's Chi^2 test and Fisher's exact test. The threshold for significance was 5%.

3. Results

Of the 170 patients included in our study, 87 were men (51%) and 83 women (49%), giving a M/F sex ratio of 1.04.

The average age of our patients was 40, with extremes ranging from 18 to 80 years. The 30 - 50 age group was the most affected, with a frequency of 58.23% (n = 99), followed by the 50+ age group with a frequency of 29.41% (n = 50).

Hepatomegaly, steatotic liver on ultrasound, transaminase elevation, obesity, dyslipidemia, jaundice and splenomegaly were the indications recorded, respectively: (21.76%), (17.65%), (14.71%), (13.53%), (11.18%), jaundice (9.41%) and (11.76%).Examinations were requested by hepatogastroenterologists (47.06%), diabetologists (35.88%) and general practitioners (29%).

Our patients' histories are presented in the table below (Table 1).

The distribution of patients by BMI was as follows: BMI was normal in 47.06% (n = 80), overweight in 69 patients (40.59%) and obese in 12.35% (n = 21) (Table 2).

Table 1. Distribution of cases according to history.

History	Number of cases	%
HTA	54	31.8
Diabetes	22	12.9
Dyslipidemia	10	5.9
No information	54	31.76
Traditherapy	30	17.64

Table 2. Distribution of patients by body mass index (BMI).

BMI	Number of cases	%
Normal	80	47.06
Overweight	69	40.59
Obesity	21	12.35

Of the 170 patients, 106 patients (62.4%) exercised two hours a week, 52 patients (49.1%) exercised three hours a week, 16 patients (n = 15.1%) exercised four hours a week, and 08 patients (7.5%) exercised five hours or more a week.

Transaminases: ALAT > normal in 30% (n = 51), ASAT > normal in 36.47% (n = 62).

Regarding GGT levels, 37.05% had above-normal levels (normal GGT ≤ 50UI/L) and 62.5% (n = 107) had normal levels.

In our study population, 108 patients had the parameters to calculate the Fatty Liver Index (FLI), steatosis was present in 20% (n = 34) of our patients while 29.41% had an undetermined status and 24 (14.11%) had a normal FLI.

Of the 170 patients in our study, 60 (35.29%) had high cholesterol levels, 90 (52.94%) had normal levels and 17 patients (10%) had unknown values.

Hyperglycemia was observed in 26.47% (n = 45) (Table 3).

In our series, abdominal ultrasound revealed:

- Normal liver in 67.05% (n = 114);
- Hepatic steatosis in 29.41% (n = 50);
- Non-decompensated cirrhosis liver in 6 cases (n = 3.54%).

Of the 170 patients in our study, 100 patients (58.82%) had no significant fibrosis F0F1, 39 (22.94%) had moderate fibrosis F2, 20 patients (11.76%) had severe fibrosis F3 and 11 patients (6.47%) had fibrosis F4 (Figure 1).

Regarding hepatic steatosis, 62 patients (36.47%) had no S0 steatosis, 50 (29.41%) had S1 steatosis, 34 patients (20%) had S2 steatosis and 24 patients (14.11%) had S3 steatosis (Figure 2).

There was no correlation between ultrasound steatosis and steatosis on Fibroscan/CAP 57.80% (p-value 0.34).

There was no statistically significant relationship between hepatic steatosis and hepatic fibrosis. Patients with significant fibrosis (fibrosis ≥ F2) did not have more steatosis (p = 0.12).

Table 3. Distribution of patients according to biochemical parameters.

Parameters	Number of cases	%
Total bilirubin > normal	16	9.41
ALAT > normal	51	30.00
ASAT > normal	62	36.47
GGT > normal	63	37.05
PAL > normal	44	25.88
Total cholesterol > normal	60	35.29
Normal HDL	100	58.82
LDL > normal	45	26.47
TG > normal	25	14.70
Hyperglycemia 45		26.47

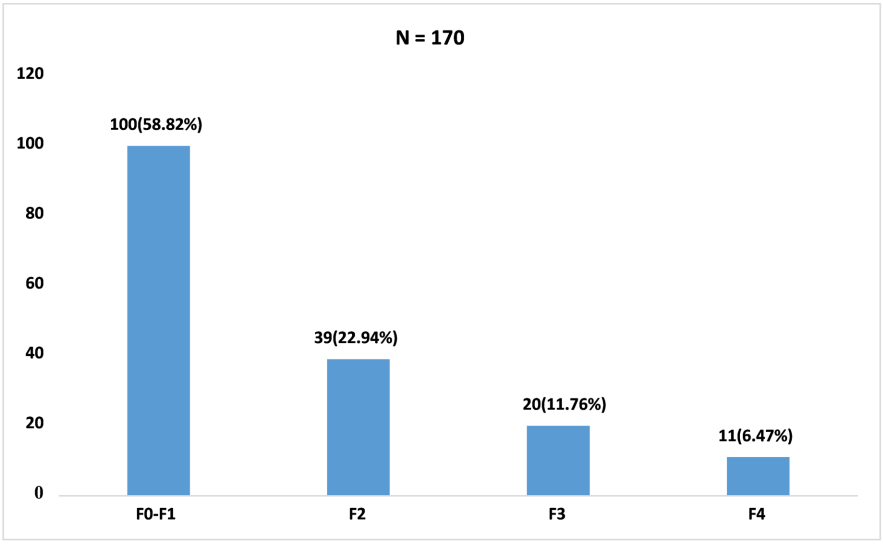

Figure 1. Distribution of patients by Fibrosis stage.

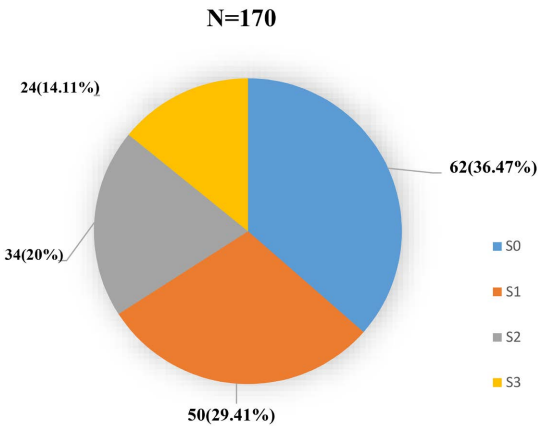

Figure 2. Distribution of patients by stage of steatosis (Fibroscan/CAP).

4. Discussion

Our small sample size, the high cost of pulse elastometry (Fibroscan/CAP) and the monocentric nature of the study were among the limitations of this study, which may explain the limited statistical relationship between fibrosis, hepatic steatosis and associated factors. Hepatomegaly, steatotic liver on ultrasonography, transaminase elevation and obesity accounted for 67.64% of FIBROSCAN indications. This can be explained by the fact that patients were mainly consulted by specialist physicians, namely hepatogastroenterologists (47.06%) and diabetologists (35.06%).

More than half our patients were male (51%; n = 87), with a M/F sex ratio of 1.04.

The mean age of our patients was 40 years old, with extremes ranging from 18 to 80 years old. According to the literature, male predominance has been reported in several studies [5] [10] [11].

The 30 - 50 age group was the most affected with a frequency of 58.23% (n = 99) followed by the 50+ age group with a frequency of 29.41% (n = 50).

Our results are similar to those of Iqbal *et al.* [11], who reported that the age of diagnosis of NAFLD is often between 40 and 50 years. Overweight and obesity affected (40.59%) and (12.35%) of our patients respectively. In 2012, they affected 60.77% of patients [12]; the role of obesity, especially visceral obesity, is well known. It is probably linked to a diet rich in fat and rapidly absorbed sugars, and aggravated by a sedentary lifestyle [13].

In our series, concerning hepatic steatosis, 62 (36.47%) of our patients were at stage S0, 29.41% at stage S1 (an absence of steatosis in 65.88% of cases; n = 112), 20% at stage S2 and 14.11% at stage S3 (hepatic steatosis in 34.11%; n = 58). The prevalence of steatosis in our series was 34.11%. Our results are similar to those reported by Wang *et al.* [14], who found 36.6% of patients in stage S0, 36.36% in stage S1, 19.05% in stage S2 and 9.09% in stage S3 in patients evaluated by liver biopsy. Sasso *et al.* [15] reported that WTP values were significantly associated with different grades of steatosis, except for grades S2 and S3, for which the difference was not significant.

Non-alcoholic steatohepatitis (NASH) is the most common liver disease in industrialized Western countries. Indeed, the worldwide prevalence of hepatic steatosis is estimated at 25%, with a clear preponderance in the Middle East (31.8%) and South America (30.5%). Conversely, it is 13.5% in Africa. What's more, prevalence seems to increase with age: from around 22% in the 30-39 age group, it rises to almost 34% in the 70 - 79 age group [2].

Like NAFLD, the prevalence of NASH increases with age, peaking between the ages of 40 and 60 [16].

As a result of the global obesity epidemic, NAFLD is likely to become the leading cause of chronic liver disease [17].

In our study, there was no statistically significant relationship between fibrosis and steatosis. Seto *et al.* [18] found that severe steatosis was correlated with severe fibrosis in both treated and untreated hepatitis B patients. But a high WTP was an independent factor significantly associated with severe fibrosis. Thus, a 10 dB increase in WTP represented a 15% risk of fibrosis.

In our study, hepatic fibrosis was distributed as follows: 58.82% (n = 100) had no or minimal fibrosis (F0F1), 22.94% (n = 39) moderate fibrosis (F2), 11.76% (n = 20) severe fibrosis (F3) and 6.47% (n = 11) fibrosis classified as F4. Our results are slightly lower than those reported by Seto *et al.* [18], who noted a prevalence of F3 and F4 fibrosis of 27.1% and 11.2% respectively in their population.

Fibroscan showed the best diagnostic performance for the non-invasive assessment of liver fibrosis in patients with NAFLD. Indeed, the sensitivities and specificities of Fibroscan for the diagnosis of significant fibrosis (F2 + F3 + F4 fibrosis) were 75.0% and 93.2% respectively. These results were better than those of the other two fibrosis scores, the Fibrometer NAFLD and NAFLD Fibrosis score (NFSA), which were 38.6% and 86.4%, and 52.3% and 88.6% respectively.

Fibroscan therefore presents itself as an alternative, reliable and reproducible method for diagnosing liver fibrosis in patients with non-alcoholic steatopathy [19].

Our results of F3 (11.76%) and F4 (6.47%) fibrosis are close to those reported by Choi *et al.*. in a study comparing two populations of chronic hepatitis B virus (HBV) carriers with and without biopsy-diagnosed non-alcoholic steatohepatitis, who found a higher prevalence of F3 and F4 fibrosis in patients with NASH; respectively 14.7% and 9.9% in patients without NASH and 21.6% and 17.8% in those with NASH [20].

This higher prevalence of fibrosis in patients with NASH-VHB could explain the hypothesis that the coexistence of these two pathologies increases the risk of these patients progressing to cirrhosis and hepatocellular carcinoma [21].

In our study, ultrasonographic hepatic steatosis was found in 29.41% (n = 50). This result is similar to that reported by Bamouni *et al.* [12], who found ultrasound hepatic steatosis in 30.38%.

The results of ultrasound steatosis and Fibroscan were discordant in 57.80% of cases. This could be explained by the fact that ultrasound is very limited by its inter- and intra-operator variability [11]. According to current recommendations, Fibroscan is more sensitive than ultrasonography for the diagnosis of steatosis; it is useful for prognosis and also enables the stage of steatosis to be estimated [5] [11] [22].

Ultrasound is currently the simplest imaging method for non-invasive screening for hepatic steatosis. Its sensitivity ranges from 60% to 94%, and increases as the degree of steatosis increases. Specificity varies between 84% and 95% [23].

On the other hand, hepatic ultrasound can only reveal the presence of steatosis if it represents more than 30% of the liver parenchyma. At an advanced stage of fibrosis, abnormalities such as portal trunk enlargement, slowed portal flow, bumpy liver contours and splenomegaly are highly suggestive of cirrhosis. Magnetic resonance imaging (MRI) is the most effective way of detecting and quantifying hepatic steatosis. It explores a larger volume of the liver, and is not limited by the presence of ascites or the thickness of the abdominal wall. According to a 2008 study by Huwart *et al.*, MRI elastography assesses hepatic steatosis with sensitivity, specificity and reproducibility greater than or equal to those reported by Fibroscan. However, it remains difficult to access due to its high cost, which makes it unsuitable for widespread use as a steatosis quantification test [24].

The Fatty Liver Index is a simple algorithm for predicting hepatic steatosis, with values ranging from 0 to 100. Age and alcohol consumption are not associated with FLI, while gender loses its association with FLI after exclusion of insulin and skinfolds. In this algorithm, BMI and waist circumference are the parameters of greatest value in predicting FLI. GGT and triglycerides are independently predictive of steatosis. FLI is more useful for predicting the presence of steatosis than its severity [25].

In our study population, among the 108 patients who had the parameters to

calculate the Fatty Liver Index (FLI), steatosis was present in 20% (n = 34) of our patients. This result is close to that reported by Fonkoua in an outpatient population in Abidjan in 2019, who noted an FLI of 32.47% [26].

Transaminases: ALAT were normal in 70% of our patients (n = 119); cytolysis at the expense of ALAT in 30% (n = 51), normal ASAT in 62.53% (n = 108) and cytolysis at the expense of ASAT in 36.47% (n = 62) (**Table 3**). This high frequency of cytolysis in our study could be explained by the fact that in Black Africa the causes of hepatic cytolysis are numerous and intricate, and suggest viral, drug and toxic causes [27]. In our study, 17.64% (n = 30) were self-medicating with a traditherapy based on a combination of several decoctions, which could explain the hepatic cytolysis and the elevation of GGT, PAL and bilirubin in our context (**Table 1** and **Table 3**).

Overweight and obesity affected 52.94% of our patients (**Table 2**). Our result is close to that of Bamouni *et al.* in 2012 [12], affecting 60.77% of patients. The components of metabolic syndrome found in our series were: hypertension (31.8%; n = 54), dyslipidemia (5.9%; n = 10), hyperglycemia (26.47; n = 45) (**Table 1** and **Table 3**). These components were also found in other studies of black populations [10] [12] [13] [28].

Contribution of our study: Hepatic steatosis is very common (34.11%), as is fibrosis (18.23%). Chronic liver disease is often diagnosed late at the stage of hepatic complications, with poor short-term survival. In our context of countries with high B and C viral endemicity, and especially with the emergence of NASH, the use of non-invasive methods makes it possible to assess the severity of liver damage. Given the large number of patients to be assessed, the active participation of physicians caring for patients with risk factors is essential for screening and, above all, for the use of non-invasive tests such as Fibroscan/CAP.

5. Conclusion

Chronic liver disease is often diagnosed late at the stage of liver complications, with poor short-term survival. This study shows that Fibroscan assessment of hepatic fibrosis and steatosis can determine two physical parameters in the liver: liver hardness (fibrosis) and ultrasound attenuation (steatosis) and that obesity is a significant factor in chronic liver disease. We need to develop health policies to make FIBROSCAN available in all our country's major health facilities and to raise public awareness of the need to combat obesity.

Author Contributions

All authors contributed to the writing and validation of this article.

Ethical Approval

Declaration for Human Rights

The hospital consented to the use of data from patients who were seen in the department. The study was approved by the hospital's ethics committee, and the

principles of the Declaration of Helsinki were followed.

Conflicts of Interest

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

References

[1] Bravo, A., Shet, S.G., Chopra, S., *et al.* (2001) Liver Biopsy. *The New England Journal of Medicine*, **334**, 495-500. https://doi.org/10.1056/NEJM200102153440706

[2] Younossi, Z.M., Koenig, A.B., Abdelatif, D., Fazel, Y., Henry, L. and Wymer, M. (2016) Global Epidemiology of Non Alcoholic Fatty Liver Disease—Meta-Analytic Assessment of Prevalence, Incidence, and Outcomes. *Hepatology*, **64**, 73-84. https://doi.org/10.1002/hep.28431

[3] Ratziu, V., Bellentani, S., Cortez-Pinto, H., *et al.* (2010) A Position Statement on NAFLD/NASH Based on the EASL 2009 Special Conference. *Journal of Hepatology*, **53**, 372-384. https://doi.org/10.1016/j.jhep.2010.04.008

[4] Leroy, V. and Hilleret, M.N. (2005) Evaluation of Hepatic Fibrosis. *Hépato-Gastro & Oncologie Digestive*, **12**, 251-259.

[5] Chalasani, N., Younossi, Z.M., Lavine, J.E., Charlton, M., Cusi, K., Rinella, M., *et al.* (2018) The Diagnosis and Management of Non Alcoholic Fatty Liver Disease: Practice Guidance from the American Association for the Study of Liver Diseases. *Hepatology*, **67**, 328-357. https://doi.org/10.1002/hep.29367

[6] Brener, S. (2015) Transient Elastography for Assessment of Liver Fibrosis and Steatosis: An Evidence-Based Analysis. *Ontario Health Technology Assessment Series*, **15**, 1-45.

[7] Sandrin, L., Fourquet, B., Hasquenoph, J.M., Yon, S., Fournier, C., Mal, F., Christidis, C., *et al.* (2003) Transient Elastography: A New Non-Invasive Method for Assessment of Hepatic Fibrosis. *Ultrasound in Medicine and Biology*, **29**, 1705-1713. https://doi.org/10.1016/j.ultrasmedbio.2003.07.001

[8] Castera, L., Foucher, J., Bertet, J., *et al.* (2006) FibroScan and FibroTest to Assess Liver Fibrosis in HCV with Normal Aminotransferases. *Hepatology*, **43**, 373-374. https://doi.org/10.1002/hep.21019

[9] Hezode, C., Rosa, I. and Castera, L. (2006) Evolution of Liver Stifness Measurement during Antiviral Therapy in Patients with Chronic Hepatitis C. *Journal of Hepatology*, **44**, S226. https://doi.org/10.1016/S0168-8278(07)62195-3

[10] Milligo, G.R.C., Samandoulougou, A., Yaméogo, N.V., Yaméogo, A.R., Kologo, K.J., Toguyeni, J.Y., *et al.* (2014) Metabolic Syndrome in Hypertensive Patients in the Cardiology Service Yalgado Ouedraogo of Ouagadougou, Burkina Faso. *Pan African Medical Journal*, **19**, Article 290.

[11] Diendére, J., Kabore, J., Somé, J.W., Tourisme, G., Zeba, A.N. and Tintouin, H. (2019) Prevalence and Factors Associated with Overweight and Obesity among Rural and Urban Women in Burkina Fasso. *The Pan African Medical Journal*, **34**, Article 199. https://pubmed.ncbi.nlm.nih.gov/32180873/

[12] Iqbal, U., Perumpail, B., Akhtar, D., Kim, D. and Ahmed, A. (2019) The Epidemiology, Risk Profiling and Diagnostic Challenges of Nonalcoholic Fatty Liver Disease. *Medicines*. **6**, Article 41. https://doi.org/10.3390/medicines6010041

[13] Bamouni, Y.A., Cissé, R., Diallo, O., Lougue-Sorgho, L.C., Napon, A.M., Sermé, A.K., *et al.* (2012) Etiological Factors Associated with Hepatic Steatosis Discovered Accidentally by Ultrasound in Ouagadougou, Burkina Fasso. *Journal Africain*

D' Imagerie Médicale, **4**, 21-30.

[14] Younossi, Z., Anstee, Q.M., Marietti, M., Hardy, T., Henry, L., Eslam, M., *et al.* (2018) Global Burden of NAFLD and NASH: Trends, Predictions, Risk Factors and Prevention. *Nature Reviews Gastroenterology & Hepatology*, **15**, 11-20. https://doi.org/10.1038/nrgastro.2017.109

[15] Wang, C.Y., Lu, W., Hu, D.S., Wang, G.D. and Cheng, X.J. (2014) Diagnostic Value of Controlled Attenuation Parameter for Liver Steatosis in Patients with Chronic Hepatitis B. *World Journal of Gastroenterology*, **20**, 10585-10590. https://doi.org/10.3748/wjg.v20.i30.10585

[16] Sasso, M., Audière, S., Kemgang, A., Gaouar, F., Corpechot, C., Chazouillères, O., *et al.* (2016) Liver Steatosis Assessed by Controlled Attenuation Parameter (CAP) Measured with the XL Probe of the Fibroscan: A Pilot Study Assessing Diagnostic Accuracy. *Ultrasound in Medicine and Biology*, **42**, 92-103. https://doi.org/10.1016/j.ultrasmedbio.2015.08.008

[17] Reid, A.E. (2001) Nonalcoholic Steatohepatitis. *Gastroenterology*. **121**, 710-723. https://doi.org/10.1053/gast.2001.27126

[18] Younossi, Z.M., Stepanova, M., Afendy, M., *et al.* (2011) Changes in the Prevalence of the Most Common Causes of Chronic Liver Diseases in the United Sates from 1998 to 2008. *Clinical Gastroenterology and Hepatology*, **9**, 524-530. https://doi.org/10.1016/j.cgh.2011.03.020

[19] Seto, W.K., Hui, R.W.H., Mak, L.Y., Fung, J., Cheung, K.S., Liu, K.S.H., *et al.* (2018) Association between Hepatic Steatosis, Measured by Controlled Attenuation Parameter, and Fibrosis Burden in Chronic Hepatitis B. *Clinical Gastroenterology and Hepatology*, **16**, 575-583. https://doi.org/10.1016/j.cgh.2017.09.044

[20] Boursier, J., Konate, A., Guilluy, M., *et al.* (2008) Learning Curve and Interobserver Reproducibility Evaluation of Liver Stiffness Measurement by Transient Elastography. *European Journal of Gastroenterology & Hepatology*, **20**, 693-701. https://doi.org/10.1097/MEG.0b013e3282f51992

[21] Choi, H.S.J., Brouwer, W.P., Zanzjir, W.M.R., Man, R.A., Feld, J.J., Hansen, B.E., *et al.* (2020) Nonalcoholic Steatohepatitis Is Associated with Liver-Related Outcomes and All-Cause Mortality in Chronic Hepatitis B. *Hepatology*, **71**, 539-548. https://doi.org/10.1002/hep.30857

[22] Chen, Y., Fan, C., Chen, Y., Liu, H., Wang, S., Dong, P., *et al.* (2017) Effect of Hepatic Steatosis on the Progression of Chronic Hepatitis B: A Prospective Cohort and *in vitro* Study. *Oncotarget*, **8**, 58601-58610. https://doi.org/10.18632/oncotarget.17380

[23] Lanthier, N. (2018) Non-Alcoholic Steatohepatitis in 2018. *Louvain Médical*, **137**, 308-313.

[24] Joseph, A.E., Saverymutu, S.H., Al-Sam, S., Cook, M.G. and Maxwell, J.D. (1991) Comparison of Liver Histology with Ultrasonography in Assessing Diffuse Parenchymal Liver Disease. *Clinical Radiology*, **43**, 26-31. https://doi.org/10.1016/S0009-9260(05)80350-2

[25] Huwart, L., Sempoux, C., Vicaut, E., *et al.* (2008) Magnetic Resonance Elastography for the Noninvasive Staging of Liver Fibrosis. *Gastroenterology*, **135**, 32-40. https://doi.org/10.1053/j.gastro.2008.03.076

[26] Bedogni, G., Bellentani, S., Miglioli, L., Masutti, F., Passalacqua, M., Castiglione, A., *et al.* (2006) The Fatty Liver Index: A Simple and Accurate Predictor of Hepatic Steatosis in the General Population. *BMC Gastroenterology*, **6**, Article No. 33. https://doi.org/10.1186/1471-230X-6-33

[27] Fonkoua, S. (2019) Metabolic Risk Factors Associated with NAFLD. Abidjan Ph.D. Thesis, University Felix Houphouët Boigny of Abidjan, Ivory Coast.

[28] Diallo, M.S., Wann, T.A., Diallo, D., Diallo, K., Bah, M.L.Y., Sylla, S.M., *et al.* (2023) Autoimmune Hepatitis Complicated by Cirrhosis: About an Observation at the Conakry University Hospital. *Jaccr Africa*, **7**, 65-70.