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FAT HEPATOCELLULAR CARCINOMA IN PATIENTS WITH CIRRHOSIS: A NEW DIAGNOSTIC ALGORITHM PROPOSAL

LE CARCINOME HEPATOCELLULAIRE A COMPOSANTE GRAISSEUSE EN IRM CHEZ LES PATIENTS CIRRHOTIQUES : PROPOSITION D'UN NOUVEL ALGORITHME DE DIAGNOSTIC

DELAGNES Anaïs
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Liste des abréviations

MR	magnetic resonance imaging
HCC	hepatocellular carcinoma
EASL	European Association for the Study of the Liver
LiRADS	Liver Imaging Reporting and Data System
NAFLD	nonalcoholic fatty liver disease
HBV, HCV	hepatitis B, C virus
SH-HCC	steatohepatitic hepatocellular carcinoma
APHE	arterial phase hyper enhancement
WO	wash-out
DW	diffusion-weighted
APV	arterial phase vascularization
AE	arterial enhancement
TACE	transarterial percutaneous chemoembolization
PPV	predictive positive value
NPV	negative predictive value

Summary

FAT HEPATOCELLULAR CARCINOMA IN PATIENTS WITH CIRRHOSIS : A NEW DIAGNOSTIC ALGORITHM PROPOSAL

Anaïs Delagnes[1], Marine Roux[2], Valérie Vilgrain[3,4,5], Boris Guiu[6], Valérie Laurent[7], Olivier Sutter[8], Ivan Bricault[9,10], Hervé Trillaud[11,12], Christophe Aubé[1,2], Anita Paisant[1,2]

Authors affiliations:

1. Radiology Department, Angers University Hospital, 49933, Angers, France
2. HIFIH Laboratory, EA 3859, UNIV Angers, 49045 Angers, France
3. Department of Radiology, APHP, University Hospitals Paris Nord Val de Seine, Beaujon, Clichy, France
4. University of Paris, Paris, France
5. INSERM U1149, CRI, Paris, France
6. Centre Hospitalier Universitaire Montpellier, Montpellier, France
7. Department of Radiology, Nancy University Hospital, Lorraine University, 54500 Vandœuvre-lès-Nancy, France
8. Functional Interventional Radiology Unit, Avicenne Hospital, Paris-Seine-Saint-Denis University Hospitals, Assistance-Publique Hôpitaux de Paris, 93000 Bobigny
9. Laboratory of Techniques for Biomedical Engineering and Complexity Management, University Grenoble Alpes, National Center for Scientific Research, Grenoble, France
10. Department of Radiology and Medical Imaging, University Hospital, Grenoble, La Tronche, France
11. Department of Diagnostic and Interventional Radiology, CHU Bordeaux, Bordeaux, France
12. EA Imotion, University of Bordeaux, Bordeaux, France

ABSTRACT

Background & Aims: Fat in MR inside the HCC limits its non-invasive diagnosis and biopsy is often necessary. The aim of this study was to describe the characteristics of these HCCs with fat in MR. The second aim was to define new MR criteria for the non-invasive diagnosis of fat-HCC and to propose a related diagnosis algorithm.

Approach & Results: 84 patients with 77 fat-HCCs and 11 non-HCC fat nodules in cirrhosis were retrospectively included as an ancillary study of a prospective multi-centric study. All MR were reviewed with nodules characteristics on each sequence, as well as EASL and LiRADS classification. The follow-up was at least 3 years.

Fat-HCCs presented arterial phase hyperenhancement in 54 patients (70.1%), arterial phase vascularization (enhancement in the arterial phase compared to the nodule itself on T1 with unenhancement) in 62 (80.5%), wash-out in 43 (55.8%) and capsule in 20 (26.0%). For the diagnosis of fat-HCC, EASL and LiRADS have a sensitivity of 37.7% and 36.4% respectively and a specificity of 100%. A new suggested fat-LiRADS algorithm increased sensitivity to 50.6%, with a specificity of 100%. Overall survival was at 1 year and at 3 years 87.2% and 67.2% respectively, recurrence-free survival was 83.9% and 48.9%.

Conclusion: We suggest a slight change from the classic LiRADS, dedicated to HCC with fat content on imaging, which improves sensitivity without degrading specificity and thus could reduce the need for biopsies for fatty HCCs.

INTRODUCTION

HCC is one of the main complications of liver cirrhosis with one-third of cirrhotic patients developing HCC during their life (1,2). HCC with steatosis, including steatohepatitic HCC (SH-HCC) as defined by Chan et al. (3), is an histologic subgroup of HCC representing 14-36% of HCC (3–9). It is defined by the histological presence of fat in the tumor. These HCCs with steatosis haves been reported to be associated with metabolic syndrome and NAFLD (3,4,8,10–12), with a growing incidence worldwide (prevalence of NAFLD increased from 15% to 25% between 2005 and 2010 (11,13)). In some studies, HCC with steatosis has been presented as having a better prognosis than conventional HCC (14,15).

In imaging, a fat component is seen in 9-14% of all HCCs (16,17). Because a small amount of tumoral fat is undetectable in imaging it is important to distinguish the imaging feature (we will call it fat-HCC) from the histologic feature (HCC with steatosis). Although it has been shown that the presence of fat in a nodule in cirrhosis leads to a strong suspicion of HCC (18,19), only a few studies with a low number of patients have analyzed imaging of fat-HCCs in cirrhosis.

Non-invasive diagnosis of HCC can be made in cirrhotic patients by MR based on defined hallmarks. Two of the main guidelines are edited by the European Association for the Study of the Liver (EASL) and the American Association for the Study of Liver Diseases (AASLD, LiRADS) (19,20). In both guidelines the main features for HCC diagnosis are similar for a nodule ≥ 1 cm: an arterial phase hyper enhancement (APHE) and a wash-out (WO) in portal and/or delayed phases. However, the presence of fat in HCC may hide the typical APHE. Indeed, the MR image formation process is based on an average signal intensity of each voxel. As the enhanced sequences are based on fat-saturated sequences, the presence of fat in a lesion causes the

signal to drop out and can hide the enhancement, according to the predominant component in the voxel. Thus, the non-invasive diagnosis of fat-HCC is challenging. Some previous studies tried to define radiological discriminant findings for benignant and malignant fatty liver nodules (21,22), but to our knowledge, reliable criteria have still not been defined as of yet. Biopsy therefore remains necessary for most suspected fat-HCCs.

The aim of our study was to describe the characteristics of fat-HCCs. The second aim was to define MR criteria for the non-invasive diagnosis of small fat-HCCs (<30mm) and to propose a related diagnostic algorithm.

Finally, we paid attention to the follow-up of these small fatty HCCs, especially those treated curatively (surgical resection, percutaneous ablation).

MATERIALS AND METHODS

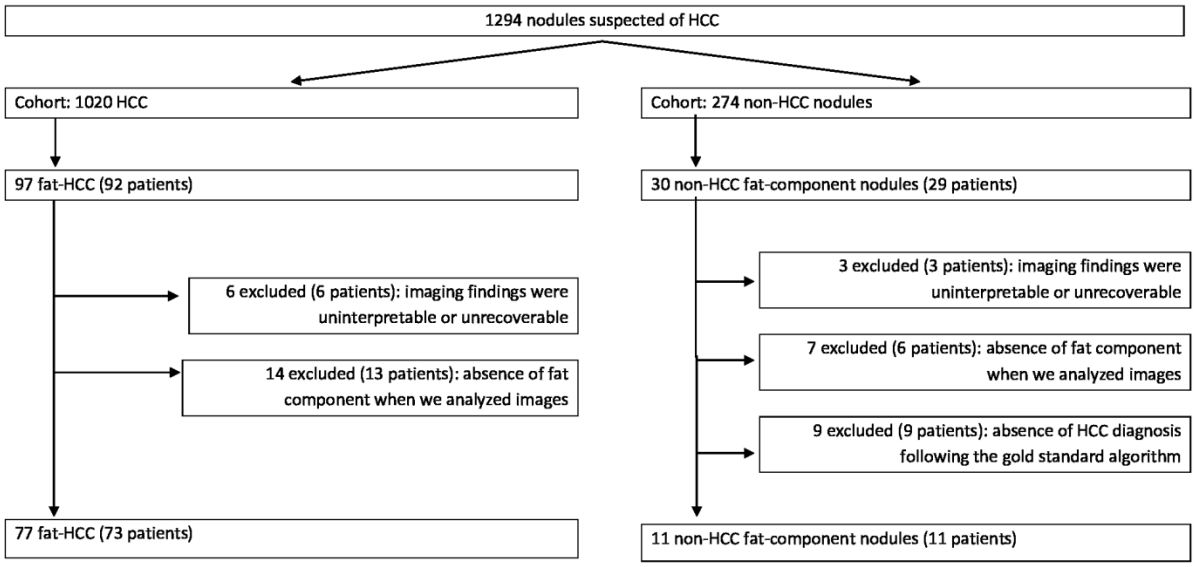
This study is an ancillary study of a large prospective multicentric study (16 centers) registered under NCT00848952 (23,24). Inclusions took place prospectively from 2010 to 2018. All patients gave written informed consent. A complementary local ethics committee was required for this ancillary study (registered under 2021-004).

Patients

Inclusion criteria were: patients with Child-Pugh A or B cirrhosis; up to three focal liver lesion(s) with suspicion of HCC between 10 and 30 mm. Non-inclusion criteria were: patients with a history of chemoembolization; contraindication to contrast-enhanced MR, patients with more than 3 lesions or with lesions larger than 3 cm. Patients with a history of treated HCC were not excluded unless the recurrence was within 2 cm of the initially treated HCC.

127 fat nodules with suspected HCC were identified in the data base. A fat-component nodule was defined by a signal intensity drop on the out-of-phase image compared to the in-phase image for all or part of the tumor. There were 97 cases of HCC and 30 cases of non-HCC. Twenty nodules had to be excluded for different reason detailed in Figure 1. The final study population included 77 fat-HCCs in 73 patients (Figure 1). This corresponds to 7.5% of fat-HCCs of the 1020 HCCs in the database.

Figure 1 - Flow chart of the recruitment process



Imaging analysis and interpretation

MR was performed on a 1.5-T or 3-T MR system using a phased-array coil for signal detection. All patients underwent fat-suppressed fast spin echo T2-weighted imaging, diffusion-weighted (DW) imaging using at least one b-value (>600 s/mms2), in- and out-of phase T1-weighted gradient-echo sequence, fat-suppressed imaging T1-weighted gradient-echo sequence without enhancement, and arterial phase, portal venous phase and delayed phase after injection of extracellular gadolinium chelates.

All imaging data were reviewed by two radiologists (with 3 and 30 years of experience) and the following features were recorded: lesion location, lesion size, signal intensity on each sequence, capsule and rim sign. The proportion of the fat component in each nodule was also evaluated through visual assessment (<75%, ≥75%).

Specific terms are defined as:

- APHE: non-rim-like enhancement in arterial phase unequivocally greater in whole or in part than surrounding liver. Enhancing part must be higher in intensity than surrounding liver in arterial phase.
- APV (arterial phase vascularization): enhancement in the arterial phase compared to the nodule itself in T1 without enhancement. This included nodules with APHE and nodules with hypointensity in the unenhanced phase then isointensity in the arterial phase.
- WO: temporal reduction in enhancement in whole or in part relative to composite liver tissue from earlier to late phase resulting in hypoenhancement in the portal or delayed phase. It can apply to any enhancing observation, even if there is no APHE.
- Capsule: smooth, uniform, sharp border around most or all of an observation, unequivocally thicker or more conspicuous than fibrotic tissue around background nodules, and visible as enhancing rim in portal or delayed phase.
- Rim sign: spatially defined subtype of APHE in which arterial phase enhancement is most pronounced in observation periphery.

Algorithm evaluation

EASL and LiRADS algorithms were assessed on each nodule. Then, we modified the APHE criteria of the classical LiRADS algorithm to define a new classification called fat-LiRADS (Table I), applicable in the case of fat content in the nodule. In this one, the APHE criterion was replaced by a criterion including APV (which includes APHE) and rim signs, called arterial enhancement (AE).

Table I - Fat-LiRADS

	AE		
Observation size	10-19 mm		20-30 mm
Count additional major features :	one	LR4/LR5*	LR5
-enhancing capsule -wash-out	two	LR5	LR5

*LR5 if wash-out, LR4 if capsule

Diagnosis reference

The algorithm built to reach the final diagnosis used a step-by-step algorithm described in previous publications (23,24) combining surgery, biopsy, typical imaging, serum alpha-fetoprotein, and follow-up. 56 of the 77 fat-HCCs were histologically proven.

Follow-up and management

Clinical and laboratory data were retrieved from patient medical records.

Treatments were detailed: surgical excision, liver transplantation, percutaneous ablation methods, transarterial percutaneous chemoembolization (TACE), systemic therapies (Sorafenib). For curative therapies, occurrence of recurrence was reported. Data on the survival and death of patients with fat-HCC were collected until March 2020.

Statistics

Quantitative variables were described as means (standard error) or median (interquartile range). Categorical variables were described as total numbers (percentages).

The performances of the diagnostic algorithms with respect to nodules were assessed through sensitivity, specificity, Predictive Positive Value (PPV), Negative Predictive Value (NPV), and

diagnostic accuracy. Cochran's Q tests were performed to compare them and then McNemar's tests were employed for post hoc pairwise comparison with a Bonferroni correction.

Logistic regressions were used to identify factors predictive of overall, or 1-year and 3-year recurrence respectively. Candidate variables were etiology, Child Pugh, history of HCC, presence of multifocal HCC, alpha-fetoprotein, size, fat proportion, capsule, rim sign, treatment and WO. The variables identified by the univariate analysis ($p<0.20$) were then introduced in a multivariate analysis (stepwise backward logistic regression using AIC for model selection) whose regression formula allowed for the identification of factors independently associated with recurrence ($p<0.05$). Furthermore, survival curves were determined using the Kaplan-Meier method.

Statistical analyses were performed using R version 3.6.2 software.

RESULTS

1. Patients and nodules

Patients' characteristics were summarized in Table II.

Of the 88 nodules, there were 77 fat-HCC (88%) and 11 non-HCC fat-component nodules (12%).

In pathology, fat-HCC were classified as well differentiated in 34/48 (71%) nodules, moderately differentiated in 13/48 (27%) and poorly differentiated in 1/48 (2%).

Table II - Patients' characteristics

	Patients with fat-HCC (n = 73)	Patients with non HCC fat component nodules (n=11)
Age at diagnosis (years)		
- Mean (sd)	65.1 (9.0)	56.8 (9.2)
Sex :		
- Male	63 (86.3%)	8 (72.8%)
- Female	10 (13.7%)	3 (27.2%)
Etiology of cirrhosis :		
- alcohol	19 (26.0%)	3 (27.2%)
- NAFLD	5 (6.8%)	1 (9.2%)
- alcohol + NAFLD	15 (20.6%)	3 (27.2%)
- VHB	3 (4.1%)	1 (9.2%)
- VHC	18 (24.7%)	-
- alcohol + VHC	1 (1.4%)	-
- other	12 (16.4%)	3 (27.2%)
Child-Pugh score :		
- A	56 (83.6%)	10 (90.9%)
- B	9 (13.4%)	1 (9.1%)
- C	2 (3%)	-
- missing data	6	-
History of HCC :		
- No	59 (80.8%)	10(90.9%)
- Yes	14 (19.2%)	1 (9.1%)
Multiple HCC :		
- No	45 (61.6%)	9 (81.8%)
- Yes	28 (38.4%)	2 (18.2%)

2. MR characteristics of fat-HCC nodules

The mean size of the fat-HCCs was 20.8 (+/-6.9) mm.

Of the fat-HCCs, 30 contained <75% fat and 47 ≥75% (Table III). 54/77 (70.1%) had APHE and 62/77 (80.5%) had APV (Table III). WO was observed in 43/77 (55.8%) nodules, 28 (36.4%) in the portal phase and 42 (54.5%) in the delayed phase. A capsule was present in 20/77 (26.0%) and a rim sign in 6/77 (7.8%) (Table III, Figure 2).

For nodules containing more than 75% fat, the signal was so low that the T2 and DW signal could not be analyzed. Of the 30 nodules with less than 75% fat, 24/30 (80.0%) were hyperintense on T2-weighted and 15/21 (71.4%) hyperintense on DW. The DWI sequence was missing for 9 nodules.

The presence of APHE, WO, capsule and rim sign with respect to the amount of fat (< or ≥75%) in fat-HCCs are reported in the Table III.

Of the non-HCC fat nodules (n=11), 1 contained <75% fat and 10 ≥75% (Table III).

Table III - MR characteristics

	HCC (n = 77)		Non HCC (n = 11)	
Fat as a %	<75% N=30 (39.0%)	≥75% N=47 (61.0%)	<75% N=1 (9.1%)	≥75% N=10 (90.9%)
APHE	25 (83.3%)	29 (61.7%)	0 (0.0%)	2 (20.0%)
APV	28 (93.3%)	34 (72.3%)	0 (0.0%)	2 (20.0%)
Global WO	14 (46.7%)	29 (61.7%)	1 (100.0%)	4 (40.0%)
Portal WO	6 (20.0%)	22 (46.8%)	1 (100.0%)	4 (40.0%)
Delayed WO	14 (46.7%)	28 (59.6%)	1 (100.0%)	4 (40.0%)
Capsule	12 (40.0%)	8 (17.0%)	0 (0.0%)	0 (0.0%)
Rim sign	3 (10.0%)	3 (6.4%)	0 (0.0%)	1 (10.0%)

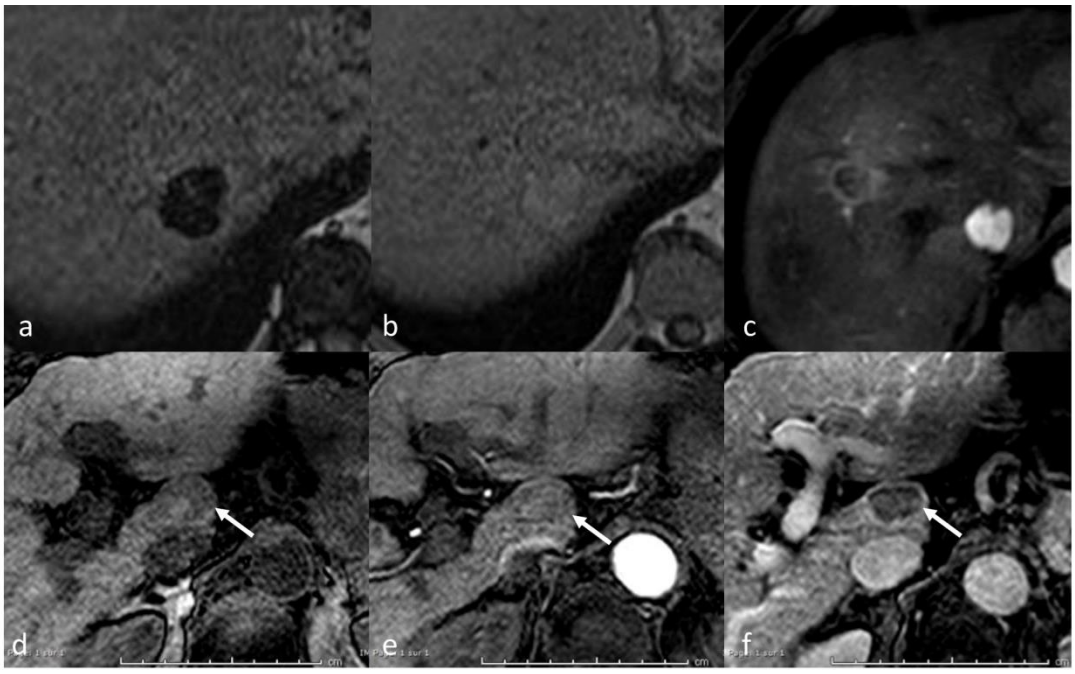


Figure 2 - Imaging features of fat-HCC

Fat-HCC containing ≥75% fat on in- and out-of phase T1-weighted gradient-echo sequence (a, b). Rim sign on arterial phase on fat-suppressed imaging T1-weighted gradient-echo sequence (c). APV on arterial phase (e) and delayed phase (f) of fat-suppressed imaging T1-weighted gradient-echo sequence.

3. Algorithm evaluation

Performances of EASL, LiRADS and fat-LiRADS are presented in Table IV. For the diagnosis of fat-HCC EASL and LiRADS have a sensitivity of 37.7% and 36.4% respectively and a specificity of 100%. The new fat-LiRADS algorithm increased sensitivity to 50.6%.

The sensitivity of LiRADS is 40% for HCCs containing <75% fat and 34% for those containing ≥75% fat, and the sensitivity of fat-LiRADS is 56.7% for <75% and 46.8% for ≥75%.

Table IV - Performances of diagnostic algorithms

	EASL	LiRADS	fat-LiRADS	P*	P**	P***
Sensitivity	37.7% [27.6; 47.8]	36.4% [26.3; 46.5]	50.6% [40.2; 61.0]	<0.001	0.02	0.02
Specificity	100.0%	100.0%	100.0%			
PPV	100.0%	100.0%	100.0%			
NPV	18.6% [10.5; 26.7]	18.3% [10.2; 26.4]	22.4% [13.7; 31.1]			
Accuracy diagnosis	45.5% [35.1; 55.9]	44.3% [33.9; 54.7]	56.8% [46.5; 67.1]			

*p-value resulting from global comparison

**adjusted p-value resulting from the comparison between sensitivity of EASL vs fat-LiRADS

*** adjusted p-value resulting from the comparison between sensitivity of LiRADS vs fat-LiRADS

4. Follow-up

Of 73 patients, 67 patients (71/77 fat-HCC) were treated, 5 patients (5 fat-HCC) were not treated (three had acute decompensation of cirrhosis and two died before treatment), and contact was lost with 1 between the point of diagnosis and intended treatment.

Of 67 patients (71 nodules), 10 (14.9%) underwent surgical excision, 2 (3.0%) transplantation, 38 (56.7%) percutaneous ablation and 17 (25.4%) TACE.

Contact was lost with 8 patients during the follow-up.

Using the Kaplan-Meier method, overall survival rates were 80.0% at 1 year after surgical excision and 97.5% after percutaneous ablation. Recurrence-free survival rates were 87.5% at 1 year and 72.9% at 3 years after surgical excision, 80.5% at 1 year and 41.9% at 3 years after percutaneous ablation. Table V and Figure 3 summarize overall survival and recurrence-free survival.

There was no significant difference in overall survival ($p=0.65$) and recurrence-free survival ($p=0.31$) between HCCs containing <75% fat and HCCs containing ≥75% fat.

We examined clinical, biological and radiological data to determine any factors predicative of recurrence. After multivariate logistic regression, a history of HCC was the only prognostic factor associated with recurrence at 1 year ($p=0.045$).

Table V - Survivals rates

	All treatment (n=73 patients)	Surgical excision (n=10)	Percutaneous ablation (n=38)
Overall survival at 1 year	87.2%	80.0%	97.1%
at 3 years	67.2%	60.0%	80.8%
Recurrence-free survival at 1 year	83.9%	87.5%	80.5%
at 3 years	48.9%	72.9%	41.9%

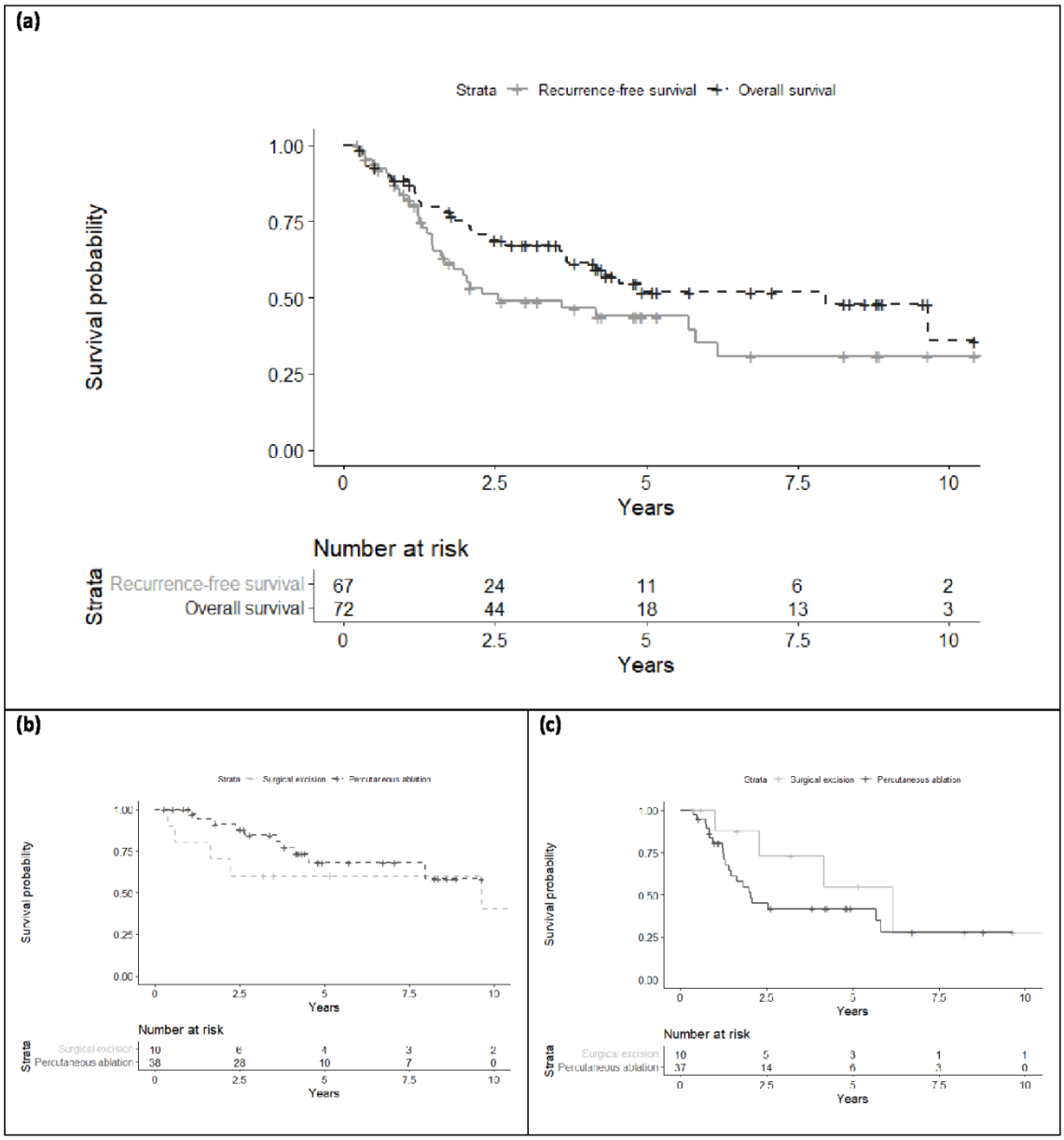


Figure 3 - Survival

(a) Recurrence-free survival (light grey) and overall survival (dark grey); (b) Overall survival stratified on treatment: percutaneous ablation (dark grey) and surgical excision (light grey); (c) Recurrence-free survival according to treatment: percutaneous ablation (dark grey) and surgical excision (light grey).

DISCUSSION AND CONCLUSION

Our study confirms the poor sensitivity of the classical algorithm for the non-invasive diagnosis of HCC. But we have shown that adapted algorithms could improve this algorithm.

The features of fat-HCC reported in this study are mainly consistent with the literature. Fat-HCC represents 7.5% of HCC in our cohort and 9-14% in previous studies (16,17). Again, it is important to distinguish between the epidemiology of fat-HCC on imaging with signal drop-out in out-of-phase and the histological presence of fat (4–9). NAFLD and metabolic syndrome are more frequent in patients with HCC with steatosis than in conventional HCC (3,4,8,10–12), but we did not find a predominance of NAFLD in the etiologies of the liver disease underlying the fat-HCC. This introduces the possibility of meeting fat-HCC in all liver disease etiologies.

Compared to conventional HCCs, fat-HCCs have the same epidemiologic characteristics (18,23), but the fat-HCCs are reported to be mostly well differentiated (14,15,25,26) and our results are comparable for these data. The main differences between the two can be found in the imaging features. Our study confirms these differences: the APHE, WO and capsule are less frequent in fat-HCCs than in conventional HCCs (70% versus 88%; 56% versus 78% and 26% versus 55% respectively HCC (18)). This explains the poor performances of classic non-invasive diagnostic algorithms. With a sensitivity of 37.7% and 36.4% respectively for the EASL and LiRADS algorithms, they appear to be insufficient for applying to the diagnosis of fat-HCCs in clinical practice. Caution must be applied in regard to the very high specificity reported in our study due to the small number of non-HCC fat nodules in the cohort. Logically, APHE is more frequent in HCCs containing <75% fat than those containing ≥75% and therefore slightly affect

the diagnosis, as in LiRADS the sensitivity is 34% for HCCs containing ≥75% fat and 40% for HCCs containing <75% fat.

Several studies agree with these characteristics of fat-HCCs (22,27,28), with the exception of one study that describes a high rate of APHE in fat-HCCs (95%) (25). Nevertheless, to our knowledge this study is the first one to report the performance of the EASL and LIRADS algorithms specifically in regard to fat-HCC.

Even if it is commonly accepted that the presence of fat inside a nodule in cirrhosis leads to a strong suspicion of HCC (18), we confirmed that specificity is not 100% and the presence of fat is not sufficient to diagnose HCC. No previous study has proposed a new algorithm thus far. Because of the low signal due to use of a fat-sat technique and lower arterial density in HCC with steatosis (27) at the voxel scale, the fat contained in the nodule tends to hide the hyper enhancement on the arterial phase. But even if it is hidden, it exists and even if there is not a hyper enhancement, there is an enhancement that we have expressed through the APV. In the same way, in the case of fat-HCC the nodule can display a particular kind of organization, with a central fat portion and peripheral non-fat enhanced portion, mimicking a rim sign. We therefore consider these two signs to reflect arterial hypervascularization of HCC and to be associated with the classical APHE, the APV and arterial ring enhancement. The new algorithm is based on the LiRADS CT/MR 2018 with a broadening of the APHE definition. Using this new algorithm when a nodule in cirrhosis displays fat content, the sensitivity improves significantly from 36.4% to 50.6%, without decreasing the specificity; even this data must be noted with caution due to the poor number of non-HCC fat nodules in our population. . This does not match the performance of the LiRADS when applied without distinction between fat- and non-fat-HCC, but it makes it suitable for use in clinical practice in cases of fat-HCC and could prevent the need for numerous biopsies. We could make reference to the risk of misdiagnosis

with metastasis or cholangiocarcinoma, which can display rim enhancement, but these two lesions are exceptionally fatty and are therefore not affected by the application of this "fat-LiRADS".

Only a few studies have specifically evaluated survival and recurrence of HCC with fat component. Our study is not a comparative study, but the survival rates (87.2% at 1 year and 67.2% at 3 years) are in line with the usual survival rates achieved through surgery or percutaneous ablation for small HCCs. This is supported by 4 studies which do not demonstrate any difference concerning overall or recurrence-free survival between HCC with steatosis and conventional HCC (3,4,8,12). One study reports a longer time to progression (15% tumor recurrence at 1 year and 33% at 3 years for fat-HCC, 37% and 59% for conventional HCC) (15). But the overall survival rate did not differ: 92% at 1 year and 50% at 3 years for fat-HCC, 82% and 59% for conventional HCC (15). Furthermore, another study reported late tumor relapse but always without an overall and recurrence-free survival rate difference (3).

There is no difference in survival rate for fat-HCC depending on the treatment (surgical resection versus percutaneous ablation).

Our study has some limitations. Firstly, even if it is the largest described series in the literature, the number of patients included in our study remains low. Secondly, we focused on small HCCs of 10 to 30mm in size. However, we can assume that for larger HCCs, the classical algorithm for the non-invasive diagnosis could have better performances, since it has been show that the number of small arteries increases with the size of the HCC with steatosis; the APHE should be more frequent. Our proposal should therefore be validated in a larger population, including larger HCCs. However, the focus on small HCCs reflects a daily concern in ensuring that a curative treatment can be offered.

Conclusion

Due to fat content, the features of fat-HCC differ from those of non-fat-HCC and the algorithm for the non-invasive diagnosis of HCC is poorly adapted to these fat-HCCs. We suggest a slight change from the classic LiRADS, dedicated to HCC with fat content on imaging, which improves sensitivity without degrading specificity and thus could prevent the need for biopsies for fat-HCCs.

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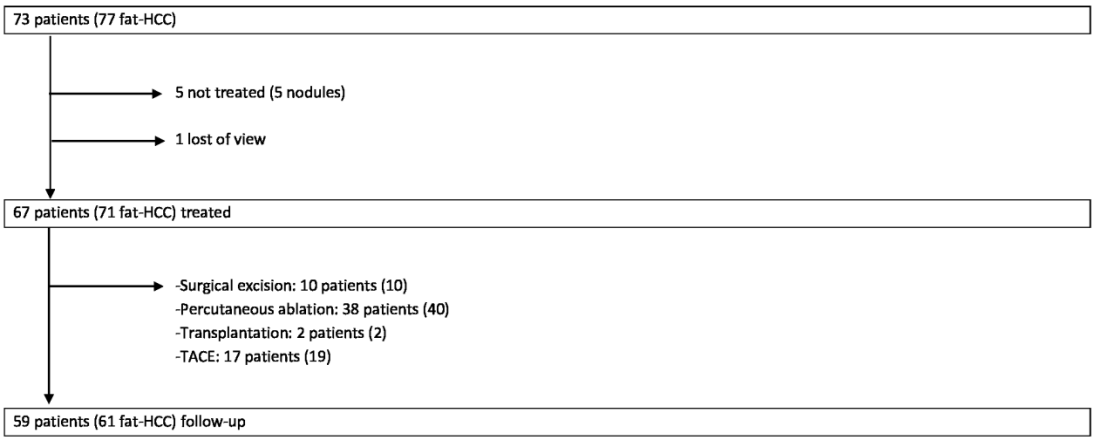
APPENDIX



Supplementary material - Flow chart of the follow-up process

DELAGNES Anaïs

LE CARCINOME HEPATOCELLULAIRE A COMPOSANTE GRAISSEUSE EN IRM CHEZ LES PATIENTS CIRRHOTIQUES : PROPOSITION D'UN NOUVEL ALGORITHME DE DIAGNOSTIC

RÉSUMÉ

Contexte et objectifs : La présence de graisse en IRM dans le CHC limite son diagnostic non invasif et rend ainsi la biopsie souvent nécessaire. Le but de cette étude était de décrire les caractéristiques des CHC contenant de la graisse en IRM (CHC gras). Le second objectif était de définir de nouveaux critères d'imagerie pour le diagnostic non invasif des CHC gras et de proposer un algorithme diagnostique correspondant.

Approche et résultats : 84 patients cirrhotiques avec 77 CHC gras et 11 nodules gras non-CHC ont été inclus rétrospectivement dans cette étude ancillaire d'une étude prospective multicentrique. Toutes les IRM ont été relues, évaluant les caractéristiques des nodules sur chaque séquence ainsi que les performances des algorithmes EASL et LiRADS. Les patients ont été suivis pendant au moins 3 ans.

Le CHC gras présentait une hypervascularisation à la phase artérielle dans 54 cas (70,1 %), une vascularisation à la phase artérielle (rehaussement à la phase artérielle par rapport au nodule lui-même sur le T1 non injectée) dans 62 cas (80,5 %), un lavage dans 43 cas (55,8 %) et une capsule dans 20 cas (26,0 %). Les algorithmes EASL et LiRADS présentaient respectivement pour le diagnostic du CHC gras une sensibilité de 37,7% et 36,4% et une spécificité de 100%. Un nouvel algorithme suggéré et dénommé fat-LiRADS augmentait la sensibilité à 50,6%, avec une spécificité de 100%. La survie globale était respectivement à 1 an et à 3 ans de 87,2% et 67,2%, la survie sans récidive de 83,9% et 48,9%.

Conclusion : Nous suggérons une modification du LiRADS classique, dédiée aux CHC contenant de la graisse en imagerie, qui améliore la sensibilité du diagnostic sans dégrader la spécificité et qui pourrait ainsi diminuer le recours à la biopsie pour les CHC gras.

Mots-clés : cancer du foie, IRM, diagnostic, graisse, cirrhose

FAT HEPATOCELLULAR CARCINOMA IN PATIENTS WITH CIRRHOSIS: A NEW DIAGNOSTIC ALGORITHM PROPOSAL

ABSTRACT

Background & Aims: Fat in MR inside the HCC limits its non-invasive diagnosis and biopsy is often necessary. The aim of this study was to describe the characteristics of these HCCs with fat in MR. The second aim was to define new MR criteria for the non-invasive diagnosis of fat-HCC and to propose a related diagnosis algorithm.

Approach & Results: 84 patients with 77 fat-HCCs and 11 non-HCC fat nodules in cirrhosis were retrospectively included as an ancillary study of a prospective multi-centric study. All MR were reviewed with nodules characteristics on each sequence, as well as EASL and LiRADS classification. The follow-up was at least 3 years.

Fat-HCCs presented arterial phase hyperenhancement in 54 patients (70.1%), arterial phase vascularization (enhancement in the arterial phase compared to the nodule itself on T1 with unenhancement) in 62 (80.5%), wash-out in 43 (55.8%) and capsule in 20 (26.0%). For the diagnosis of fat-HCC, EASL and LiRADS have a sensitivity of 37.7% and 36.4% respectively and a specificity of 100%. A new suggested fat-LiRADS algorithm increased sensitivity to 50.6%, with a specificity of 100%. Overall survival was at 1 year and at 3 years 87.2% and 67.2% respectively, recurrence-free survival was 83.9% and 48.9%.

Conclusion: We suggest a slight change from the classic LiRADS, dedicated to HCC with fat content on imaging, which improves sensitivity without degrading specificity and thus could reduce the need for biopsies for fatty HCCs.

Keywords : liver cancer, MRI, diagnosis, fat, cirrhosis

FACULTÉ DE SANTÉ
UNIVERSITÉ D'ANGERS