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Case Report

The case of a liver adenoma that looked like a hemangioma ^{☆,☆☆}

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ABSTRACT

Benign focal liver lesions are among the most frequent findings on ultrasound. Liver hemangiomas are often easily recognizable on ultrasound examination and are characterized by a clear benign prognosis. In some cases, hemangiomas display an atypical appearance both on B-mode and on contrast-enhanced ultrasound, thus raising concerns for differential diagnosis both with adenomas and with lesions of malignant nature. We report here the case of a patient who presented with a liver lesion with all signs suggestive for hemangioma on B-mode, but it showed atypical features on contrast-enhanced ultrasound examination and final diagnosis of liver adenoma.

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Introduction

Benign focal liver lesions are among the most frequent findings on ultrasound. Liver hemangiomas and cysts are often easily recognizable on ultrasound examination and are characterized by a clear benign prognosis. On the other hand, in some cases hemangiomas display an atypical appearance both on B-mode and on contrast-enhanced ultrasound (CEUS), thus raising concerns for differential diagnosis both with ade-

nomas and with lesions of malignant nature. We report here the case of a patient who presented with a liver lesion with all signs suggestive for hemangioma in B-mode, but who showed atypical features on CEUS examination Fig. 1.

Case presentation

A 42-year-old woman came to our ultrasound unit asking for an opinion regarding a liver lesion found on a previous ex-

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Fig. 1 – At the VI liver segment, there is a hyperechoic round lesion with regular margins, compatible in the first hypothesis with hemangioma. The white arrow indicates the lesion.

amination performed in another hospital. The report of the first ultrasound exam performed 2 years ago showed a hyper-echoic round lesion in the VI liver segment of the size of 1 cm as for liver hemangioma and a further millimetric lesion in the VII segment with the same ultrasound features. Subsequently, the patient performed a second ultrasound exam one year later, which confirmed the hemangioma reported in the

VI liver segment with a size of 2 cm and the other lesion with a size of 6-7 mm.

The patient did not report relevant diseases in her past medical history, and she did not take home therapy except for estrogen therapy for contraceptive purposes. Furthermore, the patient did not report specific symptoms.

At our ultrasound examination, the liver had dimensions within the limits, regular margins, homogeneous echostructure and the presence of multiple hyperechoic round lesions, one in the II segment with dimension of 8 mm, one in the IV subcapsular segment of 10 mm, one in the IV segment of 8 mm, one on the VI segment with dimensions of 25 × 19 mm, a further subcapsular lesion to the VI of 13 mm (Figs. 1 and 2).

On CEUS, the lesion detected on the VI segment showed a substantially homogeneous wash in comparable to the surrounding parenchyma during arterial phase (no hyperenhancement; no clear globular centripetal appearance; no clear central INF vessel) with a mild late-phase wash out (Fig. 3). Therefore, CEUS examination was not conclusive for hemangioma, rather for atypical hemangioma or adenoma.

Subsequently, the patient performed an abdomen computed tomography (CT) which confirmed the presence of a round lesion with regular margins in the VI liver segment (19 × 20 × 19 mm), which appears hypodense in the basal scans and with poor impregnation after administration of contrast medium (Fig. 4).

Furthermore, the presence of other similar millimetric and sub centimeter lesions was confirmed in correspondence with

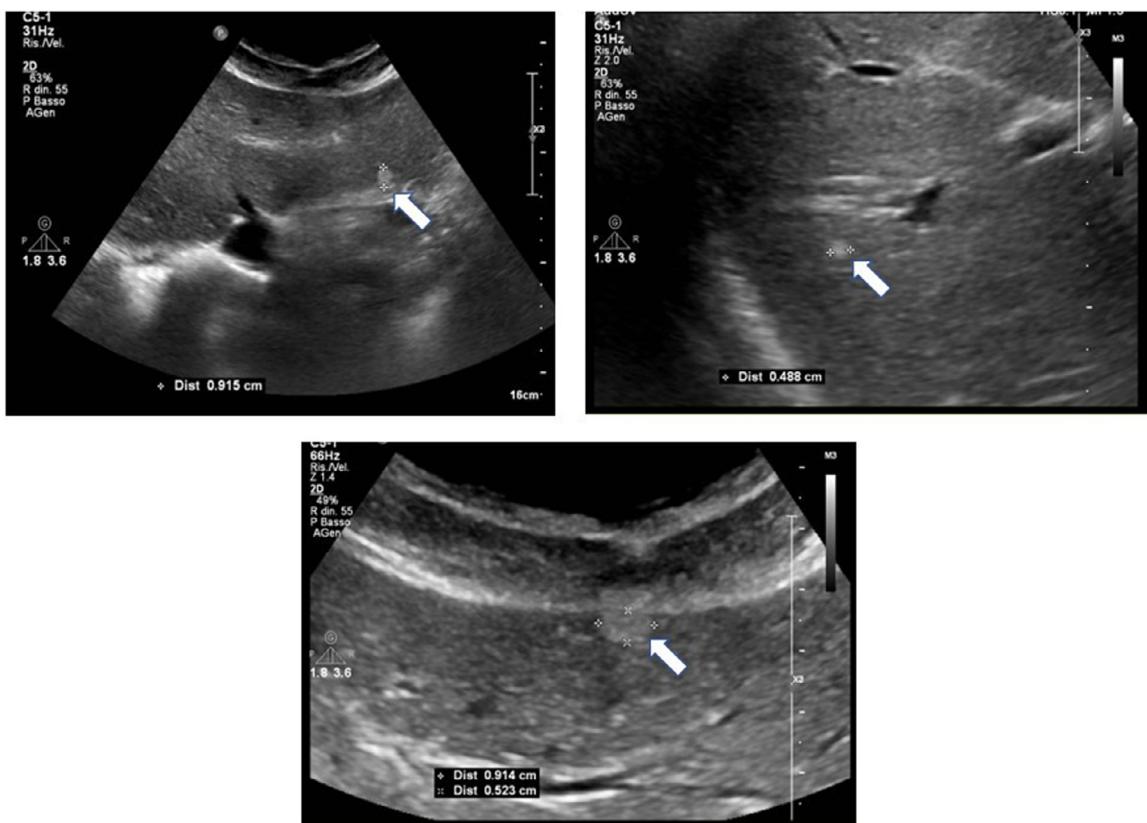


Fig. 2 – Inhomogeneous hepatic echo structure due to the presence of multiple hyperechoic round lesions. The white arrows indicate the lesions.

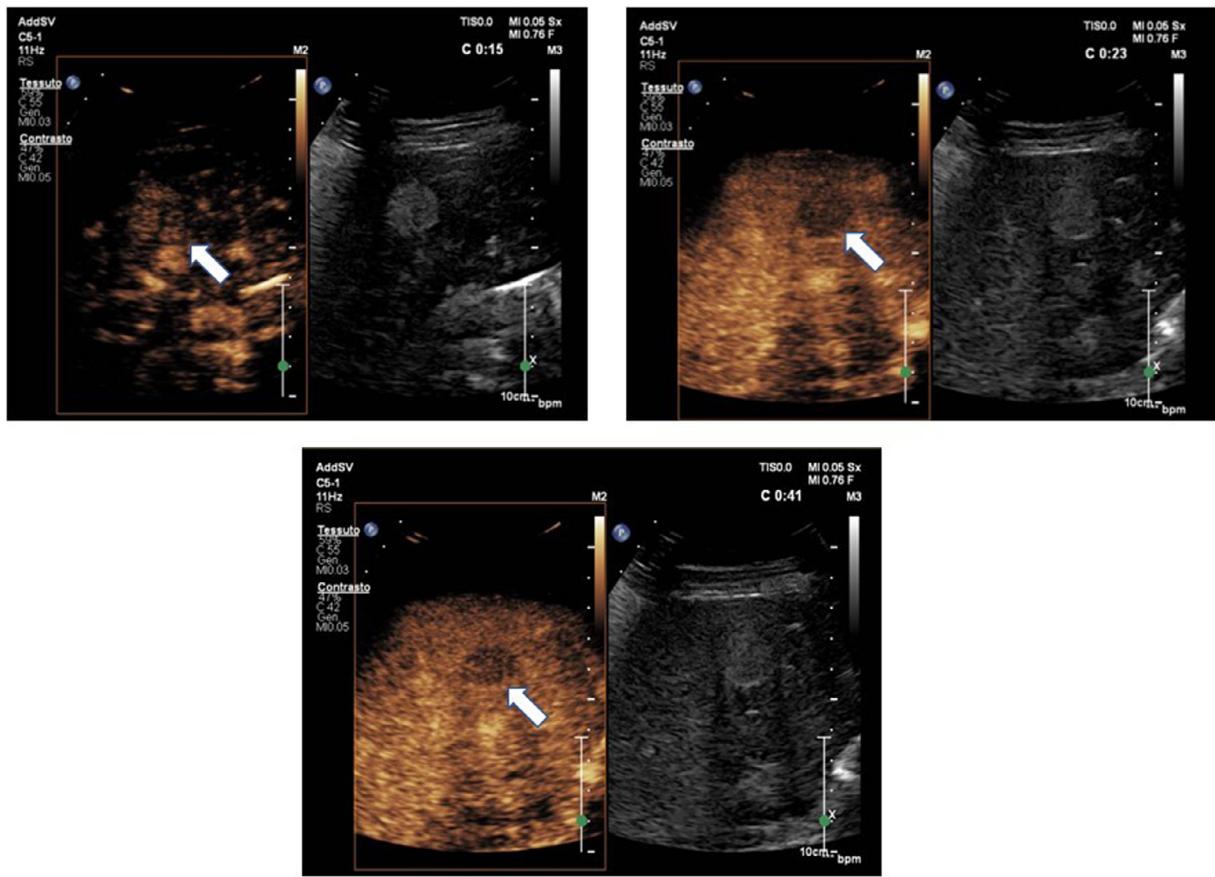


Fig. 3 – CEUS completion focused on the lesion of the VI liver segment showed a wash-in substantially homogeneous to the surrounding parenchyma in the arterial phase with a mild wash out evident as early as 20 seconds. The white arrow indicates the lesion.

the liver segments described on the previous CEUS examination. Those findings could be referable in the first hypothesis to atypical angiomas. However, re-evaluation with MR examination with hepatospecific contrast medium was recommended.

Magnetic resonance imaging (MRI) showed different nodular lesions with signal and enhancement features compatible with adenomas, of which 2 subcapsular of about 5 mm and 8 mm respectively in II segment, 2 subcapsular of about 6 mm in the IVa and IVb segments, 3 in the VI segment of which 2 subcapsulars of about 7 mm and 8 mm and the third of 19 mm in the central part (Fig. 5). There was no evidence of pathologically lymph nodes nor free fluid in the abdominal recesses.

Therefore, multiple liver adenomas were diagnosed and estrogen therapy was discontinued. The case was presented and discussed within a liver multidisciplinary team, which agreed not to perform the biopsy of the lesion but to limit itself to a 6-month follow-up.

Discussion

According to different international guidelines, in front of a hyperechoic round liver lesion with regular margins and

smaller than 3 cm, no further diagnostic investigations should be performed in healthy patients [1]. On the contrary, our clinical case demonstrates how a hyperechoic round lesion smaller than 3 cm with all features suggestive for typical hemangioma can be misdiagnosed with a liver adenoma. The main element of suspicion was the rapid growth of the lesion after 2 years, which could be detected with a follow-up only. A further element of suspicion was represented by the use of estrogen therapy; indeed, neither hemangiomas nor focal nodular hyperplasia have shown a clear relationship with estrogen therapy and their follow-up is not recommended in those subjects who take this therapy.

A substantial proportion (15%-85%) of hepatocellular adenoma (HCA) shows mild wash-out on CEUS, which can be misdiagnosed with focal nodular hyperplasia or mimic malignant liver lesions such as hepatocellular carcinoma (HCC) [2]. However, the clinical factors and laboratory findings of HCC are distinctively different from HCA [2]. Nonetheless, liver masses with suggestive appearance of HCA usually require biopsy for pathologic confirmation and determining the subtype of HCA [2].

CEUS display a sensitivity and specificity for the diagnosis of HCA of 85% [3]. As evidenced by a recent work, the receiver operating characteristic (ROC) area under the curve value was

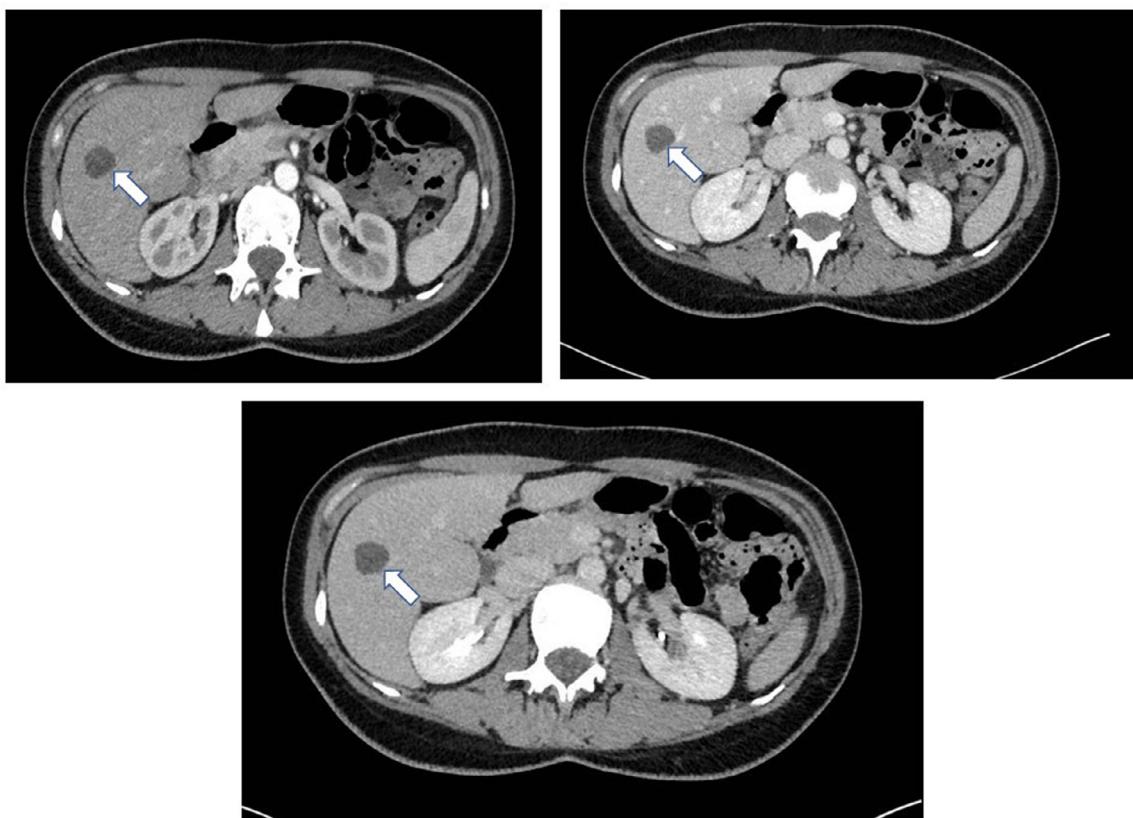


Fig. 4 – Computed tomography confirmed the presence, at the VI hepatic segment, of an oval formation with regular margins, of 19 × 20 × 19 mm, which appears hypodense in the basal scans and with poor impregnation after medium contrast infusion. The white arrow indicates the lesion.

0.856; and the positive predictive value and negative predictive value were 79% and 90%, respectively [3]. MRI with a liver-specific contrast agent was characterized by the sensitivity and specificity of 95% each, the ROC area under the curve value was 0.949, and the positive predictive value and negative predictive value were 92% for the diagnosis of HCA [3]. Therefore, MRI is actually the image method of choice to detect and evaluate liver hemangioma.

Therefore, our clinical case raises some concerns on the validity of the size limit of hyperechoic lesions and on the complete reliability to the suggested protocol [1]. On the one hand, a follow-up may be advisable in patients taking estrogen therapy, on the other hand it could be suggested that all newly found hyperechoic lesions are subjected to a CEUS study, not only in chronic liver disease or oncological patients.

The European Association for the Study of the Liver clinical practice guidelines on the management of benign liver tumors recommends CEUS or another contrast imaging method (CT, MR) when on B-mode ultrasound the appearance is atypical, or when the lesion occurs in cancer patients or those with underlying liver disease [4].

On the other hand, World Federation for Ultrasound in Medicine and Biology guidelines for CEUS in the liver—update 2020 recommends CEUS as the first line imaging technique for the characterization of incidentally, indeterminate focal liver

lesions at ultrasound in patients with non-cirrhotic liver and no history or clinical suspicion of malignancy [5].

From a clinical point of view, although the adenoma is classically included among the benign lesions of the liver, recent data show that some subtypes are related to an increased risk of bleeding or malignant transformation (the adenoma mutated in exon 3 presents a risk of 47% malignant transformation) [6].

The recent Italian intercompany guidelines recommend that in adult patients diagnosed with hepatocellular adenoma and with a histological subtype that cannot be characterized by imaging techniques, it is recommended to perform biopsy as it allows the identification of the mutated beta-catenin adenoma (exon 3), which represents the form at greatest risk of malignant transformation, and the identification of the sonic hedgehog adenoma, which is associated with a high risk of spontaneous bleeding [1]. Once the adenoma has been detected and diagnosed, estrogenic therapy must be withheld with subsequent follow up [1].

In female patients, surgical resection is suggested for lesions that remain equal to or greater than 5 cm after 6 months from the cessation of estrogen-progestogen drugs and for lesions with malignant characteristics on imaging techniques or with beta catenin mutation on histology. In male patients with hepatic adenoma, surgical resection is suggested regardless of the size of the lesion [1].

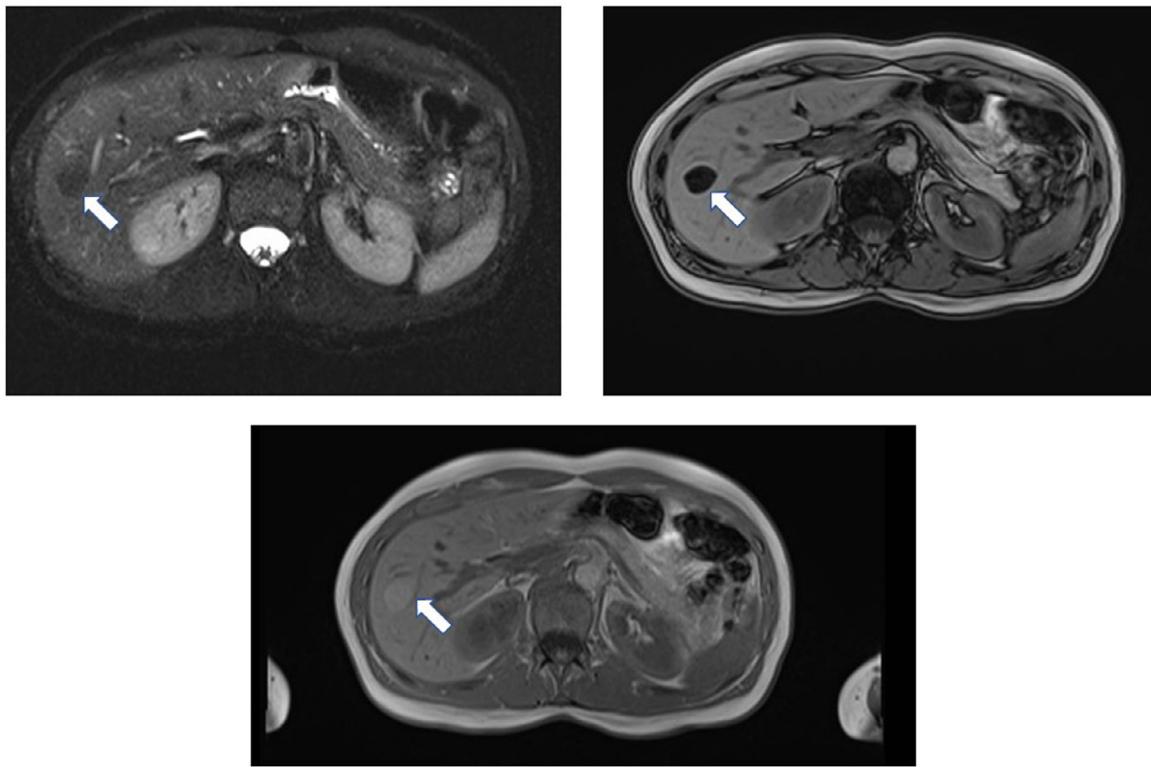


Fig. 5 – Magnetic resonance imaging showed different nodular lesions with signal and enhancement features compatible with adenomas. The white arrow indicates the lesion.

In the case of our patient it was decided to withdraw estrogen therapy and to perform a follow up and to not perform the biopsy at the time [1].

Conclusions

In our opinion, after the first finding of a liver lesion, albeit suggestive of hemangioma, at least one follow-up examination should be performed or immediately completed with a CEUS examination. In particular, women with additional risk factors such as the use of estrogen-based drugs should always be evaluated by a CEUS exam or at least a close follow up.

Patient consent

Informed consent was obtained by patient.

REFERENCES

- [1] Wang DC, Jang HJ, Kim TK. Characterization of indeterminate liver lesions on CT and MRI with contrast-enhanced ultrasound: what is the evidence? *AJR Am J Roentgenol* 2020;214(6):1295–304.
- [2] Bröker MEE, Taimr P, de Vries M, Braun LMM, de Man RA, Ijzermans JNM, et al. Performance of contrast-enhanced sonography versus MRI with a liver-specific contrast agent for diagnosis of hepatocellular adenoma and focal nodular hyperplasia. *AJR Am J Roentgenol* 2020;214(1):81–9.
- [3] Pompli M, Ardito F, Brunetti E, Cabibbo G, Calliada F, Cillo U, et al. Benign liver lesions 2022: guideline for clinical practice of Associazione Italiana Studio del Fegato (AISF), Società Italiana di Radiologia Medica e Interventistica (SIRM), Società Italiana di Chirurgia (SIC), Società Italiana di Ultrasonografia in Medicina e Biologia (SIUMB), Associazione Italiana di Chirurgia Epatobilio-Pancreatica (AICEP), Società Italiana Trapianti d'Organo (SITO), Società Italiana di Anatomia Patologica e Citologia Diagnostica (SIAPEC-IAP) - Part I - Cystic lesions. *Dig Liver Dis.* 2022;54(11):1469–78.
doi:10.1016/j.dld.2022.08.030.
- [4] Columbo M, Forner A, Ijzermans J, Paradis V, Reeves H, Vilgrain V, et al. EASL Clinical Practice Guidelines on the management of benign liver tumours. *J Hepatol* 2016;65(2):386–98.
- [5] Wilson SR, Feinstein SB. Introduction: 4th guidelines and good clinical practice recommendations for contrast enhanced ultrasound (CEUS) in the liver-update 2020 WFUMB in cooperation with EFSUMB, AFSUMB, AIUM and FLAUS. *Ultrasound Med Biol* 2020;46(12):3483–4.
- [6] Klompenhouwer AJ, de Man RA, Dioguardi Burgio M, Vilgrain V, Zucman-Rossi J, Ijzermans JNM. New insights in the management of hepatocellular adenoma. *Liver Int* 2020;40(7):1529–37.