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An Elderly Woman With a Presumed Giant Hepatic Chronic Expanding Hematoma Managed Conservatively With Imaging Surveillance

Authors' Contribution:
Study Design A
Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
Literature Search F
Funds Collection G

EF 1 Takuya Hiramoto
ABCDEF 1 Eiji Hiraoka
E 2 Tomohiro Yamaba
E 1 Jun Ehara

1 Department of Internal Medicine, Tokyo Bay Urayasu Ichikawa Medical Center, Urayasu, Chiba, Japan
2 Department of Gastroenterology, Tokyo Bay Urayasu Ichikawa Medical Center, Urayasu, Chiba, Japan

Corresponding Author: Eiji Hiraoka, Department of Internal Medicine, Tokyo Bay Urayasu Ichikawa Medical Center, 3-4-32 Todaijima, Urayasu, Chiba 279-0001, Japan
Phone: +81-47-351-3101, e-mail: eijih@jadecom.jp

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Patient: Female, 84-year-old
Final Diagnosis: Chronic expanding hematoma presumed
Symptoms: None
Clinical Procedure: —
Specialty: Gastroenterology and Hepatology

Objective: Rare disease

Background: Giant hepatic chronic expanding hematoma is a rare, benign liver condition in which blood forms a collection within the liver parenchyma or capsule that slowly increases in size for more than 1 month. Management may include biopsy to exclude malignancy and surgical resection, but imaging can identify the diagnostic features and monitor progression. This report describes the case of an older adult woman with a presumed giant hepatic chronic expanding hematoma managed conservatively with computed tomography (CT) imaging surveillance.

Case Report: An 84-year-old woman admitted for acute heart failure had a giant hepatic mass detected incidentally on contrast-enhanced CT. The absence of arterial-phase hyperenhancement and normal serum tumor markers made hepatocellular carcinoma unlikely. Contrast-enhanced magnetic resonance imaging showed a right-lobe lesion measuring 13 × 14 × 17 cm with heterogeneous T1 and T2 signal intensities (mosaic sign) and no internal contrast enhancement, favoring chronic expanding hematoma, although primary hepatic sarcoma and sarcomatoid carcinoma could not be completely excluded. Considering her age, concurrent heart failure, and preference, she was managed conservatively with CT imaging surveillance. Non-contrast CT at 3, 6, 9, and 12 months showed an unchanged maximum axial diameter of 16 cm, and she remained free of abdominal symptoms or hepatic complications.

Conclusions: Conservative management with CT imaging surveillance can be an individualized option for an older adult patient at high procedural risk with a presumed giant hepatic chronic expanding hematoma showing characteristic imaging features. Because the diagnosis was not confirmed histologically, predefined triggers for intervention and continued surveillance are required.

Keywords: Liver Neoplasms • Hematoma

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Introduction

Chronic expanding hematoma (CEH) usually develops following trauma or surgery [1,2]. The hematoma persists and gradually enlarges, driven by chronic inflammation and repeated microhemorrhage. Histologically, CEH consists of a central hemorrhagic core surrounded by granulation tissue and an outer fibrous capsule [1]. Its clinical and radiological features can closely resemble those of neoplastic lesions [1,2]. When a giant hepatic mass is incidentally discovered and CEH is suspected, differentiation from hepatocellular carcinoma (HCC), sarcoma, and other benign or malignant hemorrhagic tumors often poses a diagnostic challenge [3-5]. Hepatic CEH is extremely rare, and most previously reported cases have undergone surgical resection because of the difficulty in excluding malignancy as well as symptomatic enlargement or hemorrhagic and compressive complications [3-6]. Reported management has accordingly ranged from complete surgical resection including the capsule, through transcatheter arterial embolization or drainage for hemorrhagic or compressive complications, to a period of imaging observation preceding eventual operation [3,4,6-13]. Intervention has been favored when the lesion caused symptomatic mass effect or hemorrhage, when it enlarged or developed a new enhancing solid component on serial imaging, or when malignancy could not be excluded [3,4,7-13]; because these circumstances are derived from individual case reports rather than from comparative studies, they are best described as circumstances that have favored intervention rather than as established absolute or relative indications.

Observation before operation has also been reported, with intervals from initial diagnosis to resection ranging from 4 months to 16 years [8-12]; in all of those cases, however, the lesion was ultimately resected and the diagnosis was established histologically. We are not aware of a published report of hepatic CEH managed conservatively with imaging surveillance alone. The incremental contribution of this report is therefore an observation of radiological stability in the short-to-intermediate term in an imaging-suspected, pathologically unconfirmed lesion, together with a hypothesis to be tested by future case accumulation that the absence of internal contrast enhancement on contrast-enhanced magnetic resonance imaging (MRI) may lower suspicion of primary hepatic sarcoma and sarcomatoid carcinoma. This report describes the case of an older adult woman with a presumed giant hepatic CEH managed conservatively with computed tomography (CT) imaging surveillance.

Case Report

An 84-year-old woman with no significant past medical history presented with bilateral lower-extremity edema and exertional dyspnea. These symptoms had developed approximately 1 month earlier, and the edema had gradually extended to the upper extremities. On the day of presentation, she was brought to the emergency department by ambulance because of sudden worsening of dyspnea and inability to ambulate. On arrival, her vital signs were as follows: respiratory rate, 31 breaths/min; blood pressure, 154/97 mm Hg; heart rate, 107 beats/min; oxygen saturation, 100% on ambient air; and body temperature, 36.8 °C. Physical examination revealed bilateral edema of the lower and upper extremities and bilateral pulmonary crackles. The abdomen was flat, soft, and nontender. Chest X-ray showed bilateral pulmonary congestion. The diagnosis of congestive heart failure was made.

She had never smoked tobacco and had no history of alcohol use or substance abuse. She had no history of abdominal trauma, abdominal surgery, or antithrombotic therapy.

Laboratory findings showed hypoalbuminemia (albumin, 2.6 g/dL) and mildly elevated biliary enzymes (total bilirubin, 1.36 mg/dL; alkaline phosphatase, 191 IU/L; gamma-glutamyl transferase, 203 IU/L), without evidence of hepatocellular injury (aspartate aminotransferase, 29 IU/L; alanine aminotransferase, 25 IU/L). Renal function was mildly impaired (creatinine, 0.91 mg/dL; estimated glomerular filtration rate, 45 mL/min/1.73 m^2). Brain natriuretic peptide was markedly elevated at 2123 pg/mL.

Because the worsening of dyspnea was reported as sudden, contrast-enhanced CT was performed in the emergency department to evaluate for pulmonary embolism as a potential complication. CT demonstrated generalized subcutaneous edema, pleural effusions, and pulmonary congestion consistent with heart failure without evidence of pulmonary embolism. Incidentally, a well-demarcated mass with a maximum axial diameter of 16 cm was identified in the right hepatic lobe (**Figure 1**). The mass contained areas of fat density without definite early enhancement. There was no lymphadenopathy or evidence of distant metastasis.

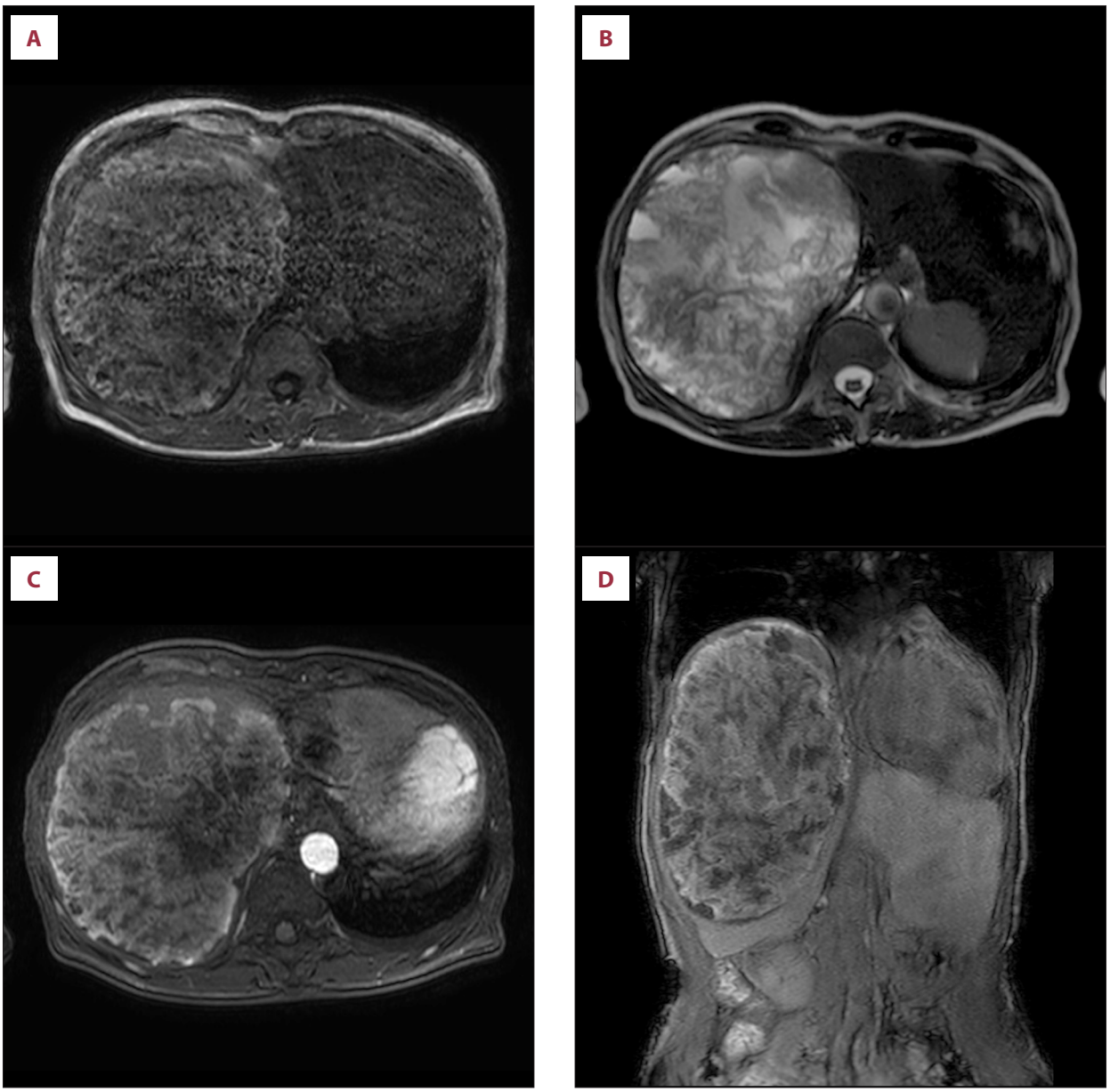
Given this incidental finding, tumor markers for HCC were subsequently measured during hospitalization and were within normal limits (alpha-fetoprotein, 3.45 ng/mL [reference, ≤10 ng/mL]; protein induced by vitamin K absence or antagonist-II, 9 mAU/mL [reference, ≤40 mAU/mL]). Hepatitis B surface antigen and hepatitis C antibody were both negative. The absence of arterial-phase hyperenhancement on contrast-enhanced CT together with normal serum tumor markers made HCC less likely. However, further characterization was required because other malignant tumors could not be excluded. Gadolinium ethoxybenzyl diethylenetriamine pentaacetic acid (Gd-EOB-DTPA)-enhanced MRI was performed electively. MRI revealed a space-occupying lesion measuring 13 × 14 × 17 cm in the right hepatic lobe with internal septation-like structures.

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Figure 1. Contrast-enhanced computed tomography. A well-demarcated mass with a maximum axial diameter of 16 cm is seen in the right hepatic lobe (white arrows), with internal areas of fat density and no definite early enhancement. This single axial image was selected as the representative CT panel because it demonstrates the maximum axial extent of the lesion together with its internal fat density.



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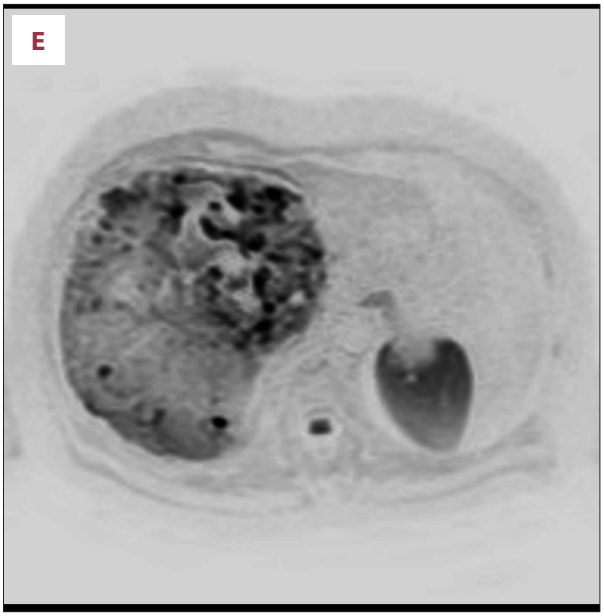


Figure 2. Magnetic resonance imaging. (**A**) Axial T1-weighted image showing mixed low-to-high signal intensity within the lesion. (**B**) Axial T2-weighted image showing heterogeneous internal signal intensities consistent with the mosaic sign. (**C**) Fat-suppressed T1-weighted image demonstrating high signal intensity without contrast enhancement after gadolinium ethoxybenzyl diethylenetriamine pentaacetic acid (Gd-EOB-DTPA) administration. (**D**) Hepatobiliary-phase image showing absence of contrast uptake within the lesion. (**E**) Diffusion-weighted image showing focal areas of restricted diffusion. Each panel is retained for a distinct diagnostic purpose: (**A**) and (**B**) demonstrate the mosaic appearance, (**C**) and (**D**) demonstrate the absence of internal enhancement and of hepatobiliary-phase uptake, and (**E**) demonstrates the restricted diffusion that prevented malignancy from being excluded.

The 17-cm maximum diameter on MRI and the 16-cm maximum axial diameter on the contrast-enhanced CT obtained 1 week earlier refer to the same axial dimension of the lesion and do not represent interval growth. The 2 values differ because the CT was acquired with thinner sections than was the MRI, so that the maximum axial extent of the lesion was sampled more accurately on CT, whereas the thicker MRI sections were considered to have overestimated it by approximately 1 cm. Because every subsequent surveillance examination was performed with CT, the CT-derived maximum axial diameter of 16 cm, rather than the MRI value, was adopted as the surveillance baseline and as the consistently assessed dimension throughout follow-up. The lesion showed heterogeneous signal intensities ranging from low to high on both the T1- and T2-weighted images, consistent with the mosaic sign [2] (**Figure 2A and 2B**, respectively). Fat-suppressed T1-weighted images demonstrated high signal intensity without internal contrast enhancement (**Figure 2C**), and no uptake was observed in the hepatobiliary phase (**Figure 2D**). Diffusion-weighted imaging showed focal areas of restricted diffusion (**Figure 2E**). These imaging findings favored CEH, although primary hepatic sarcoma and sarcomatoid carcinoma could not be completely excluded.

Surgical resection was recommended by the consulting surgeon because sarcoma and sarcomatoid carcinoma could not be ruled out. However, the patient declined invasive diagnostic procedures and surgical treatment. Because no tissue diagnosis was obtained, the lesion is described throughout this report as a presumed CEH. Considering her age, concurrent heart failure, her preference, and the relatively benign MRI finding of absent internal contrast enhancement, conservative management with CT imaging surveillance was chosen after thorough explanation and informed consent.

The surveillance course was as follows. The lesion was first identified on the contrast-enhanced CT obtained at presentation, and the baseline characterization study was the Gd-EOB-DTPA-enhanced MRI performed 1 week later, on which the lesion measured 13 × 14 × 17 cm. Non-contrast CT was then performed at approximately 3-month intervals thereafter, giving 4 surveillance examinations over a total follow-up of 12 months. Non-contrast CT rather than repeat MRI was selected for serial surveillance for case-specific reasons. Because surveillance was planned to continue indefinitely, the imaging resources, examination time, and cost entailed by repeated Gd-EOB-DTPA-enhanced MRI were not considered justifiable for this patient. In addition, the questions that surveillance was intended to answer were whether the lesion enlarged, whether it compressed adjacent structures such as the inferior vena cava, and whether extrahepatic disease appeared; for these questions non-contrast CT provides reproducible cross-sectional measurements and wide anatomical coverage, and it was therefore judged the more suitable modality. We accepted, in exchange, that non-contrast CT cannot reassess internal contrast enhancement, so that the appearance of an enhancing solid component could not be excluded by surveillance imaging alone. Surveillance consequently relied on the maximum lesion diameter, on the appearance of any new soft-tissue or high-attenuation component on non-contrast images, and on clinical status, with any change in these to prompt contrast-enhanced imaging or intervention.

The chronological measurement record was as follows. The maximum axial diameter of the lesion was 16 cm on the contrast-enhanced CT at presentation (baseline), 16 cm on non-contrast CT at approximately 3 months, 16 cm at approximately 6 months, 16 cm at approximately 9 months, and 16 cm at

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approximately 12 months, with no interval growth at any time point. Complete 3-dimensional measurements (13 × 14 × 17 cm) were recorded only on the baseline Gd-EOB-DTPA-enhanced MRI; at the 4 surveillance examinations, only the consistently assessed maximum axial diameter on non-contrast CT was recorded, and multidimensional measurements are therefore not available for those time points. No new soft-tissue or high-attenuation component was identified within the lesion, and the septation-like structures and the areas of fat density were unchanged. Had interval growth or a new solid component been observed, surgical resection or transcatheter arterial embolization would have been considered. At the most recent assessment, 12 months after presentation, the patient was ambulatory and free of abdominal pain or distension, had no jaundice, had normal serum total bilirubin, alkaline phosphatase, and gamma-glutamyl transferase levels, and had no lower-extremity edema to suggest inferior vena cava compression. Surveillance is ongoing.

Discussion

CEH was first described by Reid et al as a clinicopathologic entity in which a hematoma persists and gradually enlarges, driven by chronic inflammation and recurrent microhemorrhage from fragile neovascular channels within the capsule [1]. Shimagaki et al defined CEH as a hematoma that slowly enlarges over a period of at least 1 month [3]. Although CEH has been reported frequently in the extremities, body surface, and thoracic cavity, hepatic CEH is extremely rare. In a literature review by Nakagawa et al [4], only 10 cases of hepatic CEH were identified [3,4,6-13]. To the best of our knowledge, including the present case, only 11 cases of hepatic CEH have been reported to date (**Table 1**). Reported patients have ranged from middle-aged to elderly adults. In all 10 previously reported cases, the diagnosis was confirmed histologically after resection, whereas the present case is the only one managed conservatively with imaging surveillance, without histological confirmation.

Regarding treatment, circumstances that have favored surgical intervention in reported cases of hepatic CEH include symptomatic mass effect, such as compression of adjacent structures or hemorrhagic complications, and the inability to exclude malignancy, particularly primary hepatic sarcoma or sarcomatoid carcinoma [3,4,7-13]. In 1 reported case, transcatheter arterial embolization and drainage were initially performed for symptomatic compression and hemorrhagic complications; however, recurrence eventually necessitated complete surgical resection including the capsule [6]. In most prior reports of hepatic CEH, surgical resection was performed shortly after diagnosis because malignancy could not be excluded [3,4,7,13]. Although observation without surgery was initially selected in several reported cases, interval enlargement or the appearance of new solid components within the lesion later raised concern for malignancy, ultimately leading to surgical resection. In these cases, the interval from initial diagnosis to surgery ranged from 4 months to 16 years [8-12] (**Table 1**). Those intervals therefore represent observation that preceded resection, not management without resection, and they are not directly comparable with the ongoing surveillance described here.

Although intracystic nodules in CEH may demonstrate contrast enhancement on dynamic CT [3,7,10-13] (**Table 1**), HCC is generally considered unlikely when the lesion lacks arterial-phase hyperenhancement, which is a characteristic imaging hallmark of HCC [14]. On MRI, the coexistence of hemorrhagic components of varying ages produces heterogeneous internal signal intensity. Akata et al termed this pattern of mixed signal intensities on T2-weighted images the “mosaic sign” and reported its usefulness as a diagnostic clue for CEH [2]. An important differential diagnosis for hepatic CEH includes primary hepatic sarcoma and sarcomatoid carcinoma, as these entities can produce overlapping MRI features: large heterogeneous masses with mixed low-to-high signal intensities on T1- and T2-weighted images and a mosaic-like appearance reflecting intratumoral hemorrhage and necrosis [2,15,16].

A possible imaging clue for differentiating CEH from primary hepatic sarcoma and sarcomatoid carcinoma on contrast-enhanced MRI may be the absence, rather than the presence, of internal enhancement. Reported cases of primary hepatic sarcoma and sarcomatoid carcinoma have generally demonstrated contrast enhancement of the solid tumor component on MRI [5,15-19]. In contrast, patients in only 3 reported cases of hepatic CEH, including the present case, have undergone contrast-enhanced MRI [3,12], with 1 demonstrating internal enhancement and the other 2 showing no internal enhancement (**Table 1**). This comparison therefore rests on 2 informative CEH cases and on a sarcoma literature composed largely of single reports, and it has never been evaluated in a series with a defined denominator. The small number of reported cases precludes firm conclusions and raises the possibility of publication bias. Notably, Fujii et al reported a hepatic mass that was initially considered to represent CEH based on MRI findings but was ultimately diagnosed as primary hepatic sarcoma after surgical resection [5]. In that case, internal contrast enhancement was observed on preoperative MRI [5], further suggesting that the presence of internal enhancement may not be sufficiently discriminatory. Accordingly, the absence of internal enhancement should be regarded as a hypothesis-generating observation that may lower, but does not exclude, suspicion of primary hepatic sarcoma and sarcomatoid carcinoma, rather than as a validated discriminator. Prospective accumulation of contrast-enhanced MRI findings in histologically confirmed cases would be required before this observation could be used to guide management.

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Table 1. Clinical characteristics and imaging findings of reported cases of hepatic chronic expanding hematoma.

Author (year) [Ref]	Age, years	Sex	Contrast-enhanced CT findings	MRI findings (T1/T2)	Contrast-enhanced MRI findings	Observation period / time to surgery	Reason for surgery	Histological confirmation
Sunahara (2014) [7]	78	M	Internal nodular enhancement	Mosaic sign	NA	< 1 month	Suspicion of malignancy	Yes (resection)
Nakao (2015) [8]	68	M	No internal enhancement	Mosaic sign	NA	10 years	Suspicion of malignancy due to tumor growth	Yes (resection)
Tomimatsu (2019) [9]	80	M	Internal nodular enhancement	Mosaic sign	NA	16 years	Suspicion of malignancy due to tumor growth	Yes (resection)
Ihara (2020) [10]	79	F	Internal nodular enhancement	NA	NA	4 months	Suspicion of malignancy due to tumor growth	Yes (resection)
Yokogawa (2022) [11]	84	F	Internal nodular enhancement	NA	NA	1 year	Suspicion of malignancy due to tumor growth	Yes (resection)
Kobayashi (2021) [12]	65	F	Internal nodular enhancement	Mosaic sign	Internal enhancement	12 years	Suspicion of malignancy	Yes (resection)
Ono (2021) [6]	56	M	No internal enhancement	NA	NA	2 months	Regrowth after transcatheter arterial embolization and compressive symptoms due to tumor growth	Yes (resection)
Taniguchi (2022) [13]	57	F	Internal nodular enhancement	Mosaic sign	NA	< 1 month	Suspicion of malignancy and development of compressive symptoms due to tumor growth	Yes (resection)
Shimagaki (2024) [3]	85	M	Internal nodular enhancement	Mosaic sign	No internal enhancement	< 1 month	Suspicion of malignancy	Yes (resection)
Nakagawa (2024) [4]	68	M	No internal enhancement	Mosaic sign	NA	< 1 month	Suspicion of malignancy and development of compressive symptoms	Yes (resection)

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Table 1 continued. Clinical characteristics and imaging findings of reported cases of hepatic chronic expanding hematoma.

Author (year) [Ref]	Age, years	Sex	Contrast-enhanced CT findings	MRI findings (T1/T2)	Contrast-enhanced MRI findings	Observation period / time to surgery	Reason for surgery	Histological confirmation
Hiramoto (present case)	84	F	No internal enhancement	Mosaic sign	No internal enhancement	12 months (surveillance ongoing; no resection)	Not applicable (no operation)	No (presumed diagnosis)

CT, computed tomography; F, female; M, male; MRI, magnetic resonance imaging; NA, not available (examination not performed); T1, T1-weighted imaging; T2, T2-weighted imaging.

In the present case, the absence of internal contrast enhancement on contrast-enhanced MRI was one of several considerations supporting surveillance. Combined with the high surgical risk associated with concurrent heart failure, the patient's advanced age, and her firm refusal of invasive procedures, conservative management with close imaging surveillance was adopted as an individualized management strategy for this particular patient. The clinical stability and the absence of interval growth on serial CT over 12 months are reassuring, but they do not confirm the identity of the lesion and do not exclude a slowly growing malignancy; they support continuation of surveillance rather than establishing the diagnosis.

No precipitating cause was identified in the present patient, who had no history of abdominal trauma, abdominal surgery, or antithrombotic therapy. Because CEH is usually described as developing after trauma or surgery [1,2], the absence of an identifiable precipitating event removes the clinical context that ordinarily makes the diagnosis plausible, and it therefore adds to, rather than resolves, the uncertainty that already follows from the lack of histopathological confirmation. Two of the previously reported hepatic cases arose within a pre-existing hepatic cyst rather than after trauma or surgery [9,12], so an unremarkable traumatic and surgical history does not by itself exclude CEH. In a lesion that has not been sampled, however, it means that the diagnosis rests on imaging morphology and subsequent radiological behavior alone. We accepted this residual uncertainty because the patient, having been informed that malignancy could not be excluded, preferred conservative management to biopsy and resection. Respecting that preference while maintaining structured imaging surveillance was, in our judgment, a reasonable course for this particular patient. In comparable lesions in which invasive confirmation is declined or carries high risk, conservative management with careful imaging surveillance and predefined triggers for intervention may therefore be a defensible option, provided that the etiologic uncertainty is stated explicitly rather than resolved by assumption.

A notable feature of the present case was the absence of interval growth despite the large size of the lesion during 12 months of follow-up. Although several previously reported cases of hepatic CEH underwent prolonged observation before eventual surgical resection, the natural history of hepatic CEH managed without surgery remains poorly characterized. Although CEH is generally considered a slowly enlarging lesion [1,3], several reported cases have demonstrated long-term radiological stability for more than 10 years before eventual surgical resection [8,9,12]. Together with the present case, these observations suggest that not all hepatic CEHs inevitably enlarge and that some lesions may enter a prolonged stable phase without further growth. Because those lesions were nonetheless resected, and because the present lesion has not been sampled, these observations cannot establish that surveillance is safe as a general management pathway. At most, they indicate that surveillance may be a defensible individualized option when the imaging features are characteristic, no feature suggests malignancy, there are no progressive symptoms of mass effect, operative risk is high or surgery is declined, and the patient accepts an unconfirmed diagnosis and indefinite follow-up.

This report has several limitations. First, there is no histopathological confirmation, because biopsy and surgery were declined; the diagnosis of hepatic CEH is therefore presumptive and rests on imaging features and clinical stability alone, and primary hepatic sarcoma and sarcomatoid carcinoma cannot be excluded. Additionally, no precipitating traumatic or surgical event was identified, so the presumptive diagnosis is not supported by a typical etiologic history. Second, the follow-up of 12 months is short relative to the reported natural history of this lesion, in which stability for more than 10 years has been followed by growth [8,9,12]. The term of the present observation is therefore short-to-intermediate and does not describe a completed natural history. Third, a single unbiopsied case cannot establish the safety of surveillance or the diagnostic value of absent internal enhancement. Fourth, surveillance was performed with non-contrast CT, which does not allow internal contrast enhancement to be reassessed during follow-up. Further accumulation of conservatively managed cases, ideally with eventual pathological correlation, will be necessary to clarify the natural history of hepatic CEH and to establish optimal management strategies.

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Conclusions

This case highlights the importance of including CEH in the differential diagnosis of giant hepatic masses. In an 84-year-old patient with substantial comorbidity who preferred to avoid invasive procedures, conservative management with CT imaging surveillance was a defensible individualized strategy, and the presumed CEH remained radiologically stable for 12 months. This experience does not establish surveillance as an alternative to resection for hepatic CEH in general, and it does not validate the absence of internal contrast enhancement as a discriminator against primary hepatic sarcoma or sarcomatoid carcinoma; both should be treated as hypotheses for future case accumulation. Active evaluation, including surgical resection, should be pursued when surveillance reveals interval growth or a new solid component, or when malignancy cannot be reliably excluded and the patient is fit for and accepts intervention.

Institution Where Work Was Done

Tokyo Bay Urayasu Ichikawa Medical Center, Urayasu, Chiba, Japan.

Declaration About Informed Consent

Written informed consent for publication of this case report and the accompanying images was obtained from the patient. Signed authorization is held by the corresponding author and is available to the Editorial Office on request.

AI Usage

During the preparation of this manuscript, the authors used Claude (Anthropic, San Francisco, CA, USA), a large language model, to assist with the literature search and with English-language drafting, editing, and restructuring of the text. It was used to identify potentially relevant published reports efficiently and because the authors are non-native speakers of English. All references were retrieved and checked against the original publications by the authors. All clinical data, imaging interpretation, and scientific conclusions were provided and verified by the authors, who reviewed and edited all AI-assisted text and take full responsibility for the content of this manuscript.

Declaration of Figures' Authenticity

All figures submitted have been created by the authors who confirm that the images are original with no duplication and have not been previously published in whole or in part.

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