

Pedunculated Hepatocellular Adenoma in a Woman on Long-Term Oral Contraceptives: A Rare and Atypical Presentation

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AUTHORS' CONTRIBUTIONS

Maram Aljuaid - Supervision, radiological interpretation, and review of the final manuscript.

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DISCLOSURES

The authors declare no conflict of interest.

CONSENT

No, the patient remains anonymous.

HUMAN AND ANIMAL RIGHTS

Not Applicable.

ABSTRACT

A unique benign liver tumor was discovered in a 37-year-old woman who had used oral contraceptives for an extended period. She experienced ongoing pain and bloating in her right abdomen. Imaging studies showed a sizable liver mass that appeared cancerous. After surgical removal, tissue examination confirmed it was an inflammatory non-cancerous tumor. This case underscores the necessity of early detection and prompt surgical intervention to avert complications, particularly in those with long-term estrogen exposure. It also stresses the importance of clinical vigilance to prevent misdiagnosis in similar situations.

CASE REPORT

BACKGROUND

Hepatocellular adenoma (HCA) is an uncommon benign tumor of the liver that primarily affects women of reproductive age and has a strong link to long-term use of oral contraceptives (OCPs) [1]. While many cases remain asymptomatic, HCAs can result in serious complications such as bleeding, malignant transformation, or diagnostic challenges, particularly when they are large or present atypically [2,3]. The pedunculated variant of HCA, which grows outward from the liver's surface, creates additional diagnostic and treatment hurdles due to its resemblance to malignant tumors and the risk of rupture [4-6]. This case is noteworthy as it details a large pedunculated inflammatory HCA in a woman with a history of chronic OCP use. There was no evidence of hemorrhage or cancerous transformation, despite the considerable mass effect. This unusual case adds important information to the sparse literature on pedunculated HCAs and

emphasizes the necessity of considering this rare subtype in the differential diagnosis of abdominal masses located outside the liver [7, 8].

CASE REPORT

A 37-year-old medically free woman presented with complaints of abdominal pain and bloating. She had been taking oral contraceptive pills (OCPs) for the past six years. There was no history of alcohol use or known metabolic disorders. She reported experiencing dull right-sided abdominal pain and generalized bloating for several months. On physical examination, a palpable, rounded, soft mass was noted in the right mid-abdomen, measuring approximately 14 cm and causing visible abdominal distension. Liver function tests were within normal limits.

A contrast-enhanced computed tomography (CT) scan of the abdomen and pelvis was performed using a liver mass protocol. The CT demonstrated normal liver parenchyma without evidence of cirrhosis. A large, well-defined, rounded exophytic mass was seen arising from hepatic segment III, measuring $7.4 \times 14.5 \times 15.9$ cm (anteroposterior $\times$ transverse $\times$ craniocaudal). The lesion exhibited heterogeneous enhancement during the arterial phase, becoming more homogeneous in the portal venous and delayed phases. No significant washout was identified. The mass was supplied by branches of the left hepatic artery and the left portal vein. It exerted a mass effect on the inferior vena cava (IVC) and the second and third parts of the duodenum. No active bleeding or hemoperitoneum was observed. No additional hepatic lesions were noted. Surgical excision of the mass confirmed the diagnosis of an inflammatory hepatocellular adenoma (HCA), with no evidence of malignant transformation. The surgical specimen consists of a well-circumscribed, exophytic, non-encapsulated mass measuring 15.0 cm in greatest dimension, with a smooth to lobulated contour. The cut surface of the mass is variegated tan-yellow to red-brown. No areas of congestion and hemorrhage. Focally, the lesion shows a soft, friable texture with dilated vascular spaces. No central stellate scar is identified. The surrounding hepatic parenchyma appears grossly unremarkable. No gross evidence of necrosis, capsular invasion, or satellite nodules is identified. Sections show a well-demarcated hepatocellular neoplasm composed of benign-appearing hepatocytes arranged in thickened trabeculae and solid plates. The lesional hepatocytes are mildly enlarged with preserved nuclear-to-cytoplasmic ratios and minimal cytologic atypia. A prominent inflammatory component is noted, characterized by mildly dilated and congested sinusoids. No significant mitotic activity, necrosis, or features of malignant transformation are identified. Overall, the morphologic features are consistent with an inflammatory hepatocellular adenoma.

DISCUSSION

Etiology & Demographics

Hepatocellular adenoma (HCA) is an uncommon benign tumor of the liver, predominantly affecting women in their reproductive years. Its occurrence is strongly associated with hormonal influences, particularly the intake of oral contraceptives and anabolic steroids [1]. Additional risk factors include diabetes and glycogen storage diseases. The incidence within the general population is estimated at 1 to 2 cases per million individuals annually, while among users of oral contraceptives, it stands at approximately 3.4 cases per 100,000 each year [1], underscoring the infrequency of this condition even in that specific group.

While HCAs are largely linked to the use of oral contraceptives, their prevalence exhibits regional variations. In Western nations, notably the USA and Europe, HCAs are more commonly found in younger women. Conversely, Asian populations report a lower incidence, likely due to differing patterns of oral contraceptive usage [2,9].

Typically, hepatocellular adenomas manifest as solitary and asymptomatic masses that are often identified incidentally via imaging methods such as ultrasound, computed tomography (CT), or magnetic resonance imaging (MRI) performed for other medical issues. However, some individuals may experience abdominal pain resulting from hemorrhage or rupture, especially with larger lesions [3,10,11].

The inflammatory subtype known as inflammatory HCA (HCA-I) constitutes the majority of cases, representing around 40-50% of all HCAs [12]. This variant is most commonly seen in young women who use oral contraceptives and those who are obese or have metabolic syndrome. Among all subtypes of HCA, HCA-Is present the greatest risk for hemorrhage, with bleeding occurring in up to 30% of instances [13]. This heightened risk is believed to stem from sinusoidal dilation and the presence of thick-walled abnormal arteries along with peliotic regions within the tumor.

Clinical & Imaging findings

Hepatocellular adenomas (HCAs) are frequently asymptomatic and often identified incidentally; however, they may occasionally present with right upper quadrant discomfort, a discernible abdominal mass, or complications such as bleeding or malignant transformation [2]. Risk factors associated with the potential for malignant transformation include male sex, tumor size larger than 5 cm, glycogen storage disorders, and the β -catenin-activated molecular subtype.

Imaging Characteristics of Hepatocellular Adenomas (HCA)

Ultrasound (US):

On ultrasound examination, HCAs typically manifest as well-defined lesions with diverse echogenic properties. They often appear hyperechoic or isoechoic and may exhibit mild internal vascular flow detectable through Doppler imaging [14].

Computed Tomography (CT):

In CT scans, HCAs usually present as hypo- or isoattenuating lesions prior to contrast administration. During the arterial phase, these lesions show marked enhancement due to their vascular nature. In the portal venous phase, they generally become isodense or slightly hypodense [14,15].

Magnetic Resonance Imaging (MRI):

MRI provides an effective assessment of the tissue characteristics of HCAs. On T1-weighted images, HCAs may exhibit hyperintensity when fat or hemorrhage is present; in contrast, they tend to appear mildly hyperintense on T2-weighted images [14,16]. Dynamic post-contrast MRI typically shows significant arterial enhancement with potential washout in later stages [15]. During the hepatobiliary phase following gadoteric acid administration, most HCAs display hypointensity due to a lack of functional hepatocytes. However, specific β -catenin-mutated subtypes might retain contrast and be seen as iso- or

hyperintense lesions resembling focal nodular hyperplasia [15]. Recognizing these imaging features is vital for identifying atypical variants such as pedunculated HCA and making informed decisions regarding surgical versus conservative treatment options.

Most HCAs are classified as well-defined intraparenchymal hepatic masses. Conversely, pedunculated HCAs represent a rare variant that presents unique diagnostic and management challenges because of their atypical exophytic growth pattern and possible complications like spontaneous rupture [4,17]. In some exceptional instances, pedunculated HCAs have been associated with elevated levels of protein induced by vitamin K absence or antagonist-II (PIVKA-II), which acts as a tumor marker that can mimic hepatocellular carcinoma and result in diagnostic uncertainty [5]. This case report outlines the clinical, radiological, and pathological features of an HCA while discussing its diagnostic intricacies and management implications. It also contributes important insights to the limited existing literature concerning this unusual presentation.

While inflammatory HCAs larger than 5 cm pose a significant risk for hemorrhage or rupture, particularly when they exert pressure on adjacent structures [6], our patient exhibited no signs of these complications despite a large size applying pressure on both the inferior vena cava (IVC) and duodenum. This observation makes this case clinically significant. Furthermore, there exists a 5-10% likelihood of malignant transformation from HCA to hepatocellular carcinoma [3,11]. The diagnosis of pedunculated HCAs is complicated by their extrahepatic appearance, along with difficulties in identifying vascular connections to the liver and their varying imaging characteristics [7].

Molecular Classification

The updated classification identifies eight molecular subtypes of hepatocellular adenomas (HCA), each with distinct clinical and imaging features [18]. These include HNF1A-mutated HCA, characterized by HNF1A gene mutations, fatty changes, and low malignant risk; inflammatory HCA, linked to inflammatory pathways (e.g., IL-6/JAK/STAT) and obesity, with a bleeding risk; and β -catenin-activated HCA, further subclassified by CTNNB1 mutation sites, where exon 3 mutations carry the highest malignant risk and exons 7/8 have a lower risk. Mixed forms combine β -catenin and inflammatory features. Additionally, sonic hedgehog HCA, associated with the INHBE-GLI1 fusion, presents larger tumors and a high intra-tumoral bleeding risk, requiring pathological confirmation. Lastly, unclassified HCA refers to lesions that do not fit other categories and lack specific molecular markers.

Treatment & Prognosis

The patient underwent complete surgical excision of the hepatic mass. Histopathology confirmed the diagnosis of an inflammatory subtype with no evidence of malignant transformation. No postoperative complications were observed,

and the patient was discharged in stable condition. Ongoing follow-up was recommended to monitor for recurrence, although no signs of recurrence have been reported to date.

Differential Diagnoses

An interesting case report published in 2020 described a 34-year-old woman with a known history of a uterine tumor who underwent abdominal CT and MRI as part of a staging workup. Incidentally, imaging revealed a giant left subdiaphragmatic mass with no apparent connection to the liver. Diagnostic laparoscopy confirmed the presence of a large pedunculated hepatic mass arising from the left lobe of the liver, and final histopathology established the diagnosis of an inflammatory HCA [7].

Another case report from 2019 described two young adult females with a history of oral contraceptive pill use ranging from 2 to 5 years [19]. Both patients presented with single large pedunculated liver tumors amid normal hepatic parenchyma. The cases were managed with surgical resection, and final histopathology confirmed the diagnosis of benign HCAs, specifically the steatotic (HNF1A-inactivated) subtype. This underscores the well-established association between oral contraceptive use and the development of HCAs, particularly in young women.

Pedunculated HCAs represent a rare subset, accounting for approximately 10% of all reported cases [8]. They should be considered in the differential diagnosis of epigastric, subdiaphragmatic, or perihepatic masses, even in the absence of a clear connection to the liver on imaging.

Final Remarks

Given their rare presentation and potential for complications such as hemorrhage or diagnostic confusion with malignant tumors, early recognition and surgical management are essential. This report adds to the limited literature on pedunculated HCAs and underscores the need for heightened clinical and radiological awareness of this uncommon entity. By presenting this case, we aim to raise awareness and contribute to the growing understanding of this significant clinical condition.

TEACHING POINT

Pedunculated hepatocellular adenomas are uncommon extrahepatic liver tumors that may resemble malignancies because of their unusual location, considerable size, and diverse enhancement patterns on multiphasic imaging. Recognizing their arterial hyperenhancement and homogeneous appearance in the delayed phase is essential for accurate diagnosis and effective surgical planning.

QUESTIONS

Question 1: Which of the following features is most useful in distinguishing a pedunculated hepatocellular adenoma from other hepatic lesions?

1. Right upper quadrant pain.
2. Location in the left hepatic lobe.
3. Absence of cirrhosis.
4. Vascular connection to the liver. (applies)
5. Female gender and contraceptive use.

Explanation: The most definitive diagnostic indicator is the presence of a vascular pedicle linking the lesion to the liver, typically visible on CT or MRI. This assists in differentiating it from peritoneal or gastric masses.

[Discussion > Clinical & Imaging Findings]

Question 2: Which of the following imaging characteristics is most characteristic of hepatocellular adenoma on contrast-enhanced CT?

1. Central scar with delayed enhancement.
2. Progressive delayed washout.
3. Arterial phase hyperenhancement. (applies)
4. Capsular retraction.
5. Irregular borders with necrosis.

Explanation: Hepatocellular adenomas generally exhibit arterial hyperenhancement and become more homogeneous in the delayed phase. Central scars and capsular retraction are features associated with other lesions, such as focal nodular hyperplasia or carcinoma.

[Figure 1, Discussion > Clinical & Imaging Findings]

Question 3: Which of the following is the strongest risk factor for hepatocellular adenoma in young women?

1. Diabetes mellitus.
2. Glycogen storage disease.
3. Chronic viral hepatitis.
4. Long-term oral contraceptive use. (applies)
5. Obesity alone.

Explanation: The most consistently observed risk factor for young women is prolonged estrogen exposure from oral contraceptives, as supported by both your case and existing literature [1,2].

[Introduction, Discussion > Etiology & Demographics]

Question 4: Which histopathological feature is most indicative of inflammatory hepatocellular adenoma?

1. Fibrous septa with central scar.
2. Fatty degeneration of hepatocytes.
3. Sinusoidal dilatation with inflammatory infiltrates. (applies)
4. Atypical mitoses and nuclear pleomorphism.
5. Diffuse bile duct proliferation.

Explanation: Inflammatory HCAs typically exhibit sinusoidal dilatation, lymphocyte infiltration, and thick-walled vessels, without signs of cellular atypia or scar tissue.

[Figure 2, Discussion > Treatment & Prognosis]

Question 5: Which of the following is the most serious complication associated with large hepatocellular adenomas?

1. Hepatic steatosis.
2. Biliary obstruction.

3. Portal vein thrombosis.
4. Spontaneous hemorrhage or rupture. (applies)
5. Ascites.

Explanation: Large HCAs are known to have a significant risk of spontaneous hemorrhage, which can be life-threatening, particularly in inflammatory and β -catenin-mutated subtypes.

[Discussion > Treatment & Prognosis, Conclusion]

REFERENCES

- [1] Rooks JB, Ory HW, Ishak KG, et al. Epidemiology of hepatocellular adenoma: The role of oral contraceptive use. *JAMA*. 1979; 242(7): 644–648. PMID: 221698.
- [2] Barthelmes L, Tait IS. Liver cell adenoma and liver cell adenomatosis. *HPB (Oxford)*. 2005; 7(3): 186–196.
- [3] Cho SW, Marsh JW, Steel J, et al. Surgical management of hepatocellular adenoma: Take it or leave it? *Ann Surg Oncol*. 2008; 15(10): 2795–2803. PMID: 18696154.
- [4] Grazioli L, Olivetti L, Mazza G, Bondioni MP. MR imaging of hepatocellular adenomas and differential diagnosis dilemma. *Int J Hepatol*. 2013; 2013: 374170. PMID: 23606972.
- [5] Kobayashi S, Matsui O, Gabata T, et al. Radiological and histopathological manifestations of hepatocellular nodular lesions concomitant with various congenital and acquired hepatic hemodynamic abnormalities. *Jpn J Radiol*. 2009; 27(2): 53–68.
- [6] Nault JC, Bioulac-Sage P, Zucman-Rossi J. Hepatocellular benign tumors: From molecular classification to personalized clinical care. *Gastroenterology*. 2013; 144(5): 888–902. PMID: 23485860.
- [7] Shafae Z, Liu S, Fiel MI, Blue R. Giant pedunculated hepatocellular adenoma masquerading as a subdiaphragmatic mass: Diagnostic challenges of a rare tumor. *Radiol Case Rep*. 2020; 16(1): 84–89.
- [8] Larson BK, Guindi M. A limited immunohistochemical panel can subtype hepatocellular adenomas for routine practice. *Am J Clin Pathol*. 2017; 147(6): 557–570. PMID: 28472207.
- [9] Hirohashi S, Blum HE, Ishak KG, et al. Tumours of the liver and intrahepatic bile ducts. In: Hamilton SR, Aaltonen LA, eds. Pathology and Genetics of Tumours of the Digestive System. World Health Organization Classification of Tumours. *IARC Press*. 2000: 155–200.
- [10] van Aalten SM, de Man RA, IJzermans JNM, Terkivatan T. Systematic review of haemorrhage and rupture of hepatocellular adenomas. *Br J Surg*. 2012; 99(7): 911–916. PMID: 22619025.
- [11] Dokmak S, Paradis V, Vilgrain V, et al. A single-center surgical experience of 122 patients with single and multiple hepatocellular adenomas. *Gastroenterology*. 2009; 137(5): 1698–1705. PMID: 19664629.
- [12] Lin H, van den Esschert J, Liu C, van Gulik TM. Systematic review of hepatocellular adenoma in China and other regions. *J Gastroenterol Hepatol*. 2011; 26(1): 28–35. PMID: 21175790.

- [13] Glockner JF, Lee CU, Mounajjed T. Inflammatory hepatic adenomas: Characterization with hepatobiliary MRI contrast agents. *Magn Reson Imaging*. 2018; 47: 103–110. PMID: 29221964.
- [14] Tse JR, Felker ER, Naini BV, et al. Hepatocellular adenomas: Molecular basis and multimodality imaging update. *Radiographics*. 2023; 43(3): e220134. PMID: 36821508.
- [15] Kim TH, Woo S, Ebrahimzadeh S, McInnes MDF, Gerst SR, Do RK. Hepatic adenoma subtypes on hepatobiliary phase of gadoxetic acid-enhanced MRI: Systematic review and meta-analysis. *Am J Roentgenol*. 2023; 220(1):28–38. PMID: 35920706.
- [16] Purysko AS, Remer EM, Coppa CP, Obuchowski NA, Schneider E, Veniero JC. Characteristics and distinguishing features of hepatocellular adenoma and focal nodular hyperplasia on gadoxetate disodium-enhanced MRI. *Am J Roentgenol*. 2012; 198(1):115–123. PMID: 22194486.
- [17] Jacob D, Silverstone L, Mullineux J. Hepatic adenoma. *Radiopaedia.org*. Published 2008.
- [18] Nault JC, Couchy G, Balabaud C, et al. Molecular classification of hepatocellular adenoma associates with risk factors, bleeding, and malignant transformation. *Gastroenterology*. 2017; 152(4): 880.e6 –894.e6. PMID: 27939373.
- [19] Khiero FI, Jasim H. Pedunculated hepatocellular adenoma: A presentation of a rare disease. Report of two cases with review of literature. *ResearchGate Preprint*. Published 2019.

FIGURES

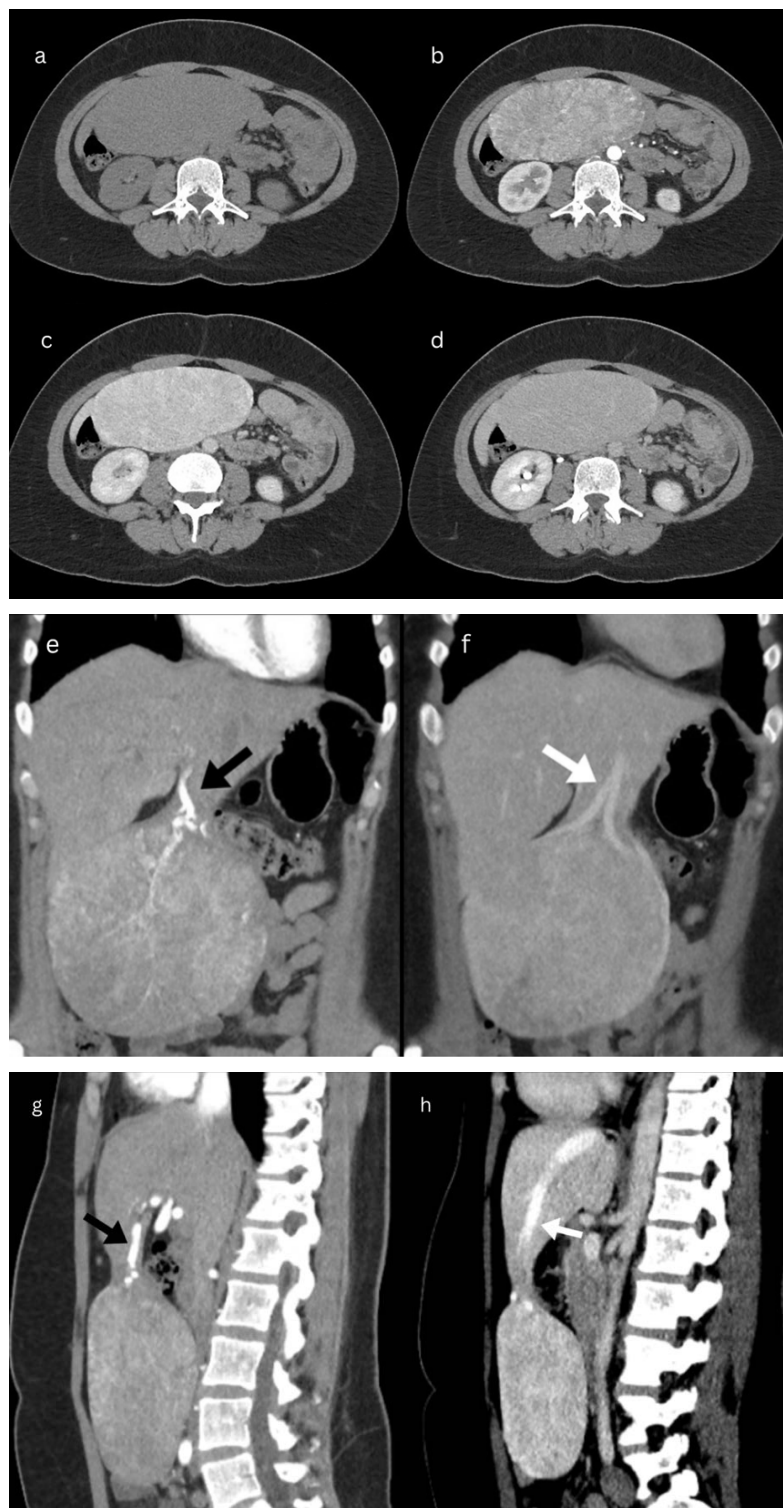


Figure 1: A 37-year-old female with a pedunculated hepatocellular adenoma.

FINDINGS: a. Non-contrast axial CT abdomen. b. Arterial phase. c. Portal venous phase. d. Delayed phase. There is a large exophytic mass arising from the left hepatic lobe with heterogeneous hyperenhancement on the arterial phase and isoenhancement on the portal venous and delayed phase. No washout identified. No intratumoral fat component or hemorrhagic foci were identified on the non-contrast phase. e. Coronal reformat - arterial phase. f. Coronal reformat - portal venous phase. g. Sagittal reformat - arterial phase. h. Sagittal reformat - portal venous phase. The coronal and sagittal reformats showed the left exophytic mass is fed by the left hepatic artery (black arrow) and left hepatic veins (white arrow). **TECHNIQUE:** Multiphasic contrast-enhanced CT abdomen following liver mass protocol. IV contrast administered: approximately 100–120 mL of nonionic iodinated contrast (standard weight-based dose ~1.5 mL/kg) injected at 3–5 mL/sec with saline chaser.

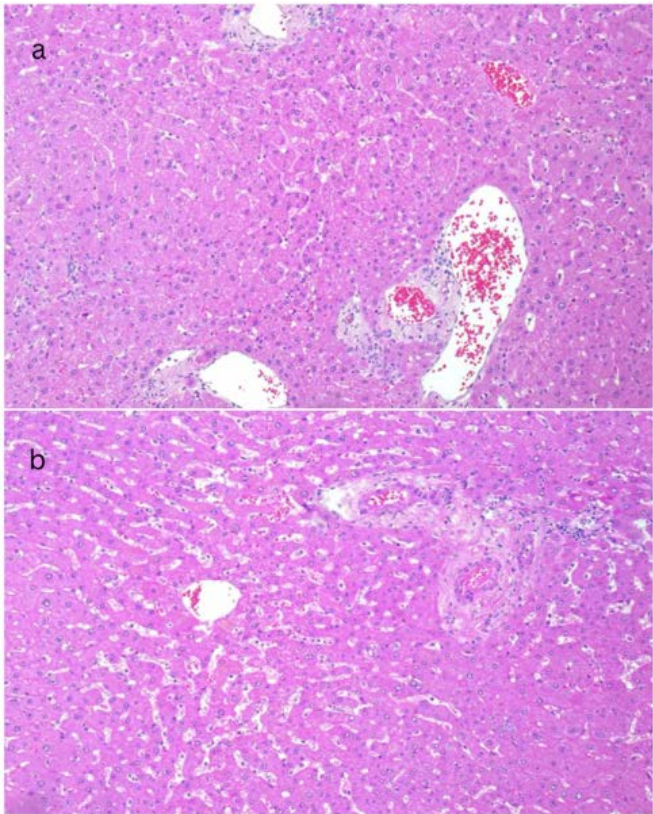


Figure 2: Histopathological sections showing a hepatocytic lesion with sinusoidal dilatation and prominent inflammatory infiltrates, including lymphocytes and occasional neutrophils. Pseudoportal tracts and telangiectatic features are seen. Dilated arteries and thick-walled vessels are present. No significant cellular atypia, mitotic activity, or evidence of malignancy is identified (original magnification x200).

Table 1: Summary of Pedunculated Hepatocellular Adenoma, Inflammatory Subtype (HCA-I).

Parameter	Details
Etiology	A solitary, benign hepatocellular tumor, often asymptomatic and discovered incidentally.
Incidence	Extremely rare in the general population (1–2 cases per million people per year); approximately 3.4 cases per 100,000 oral contraceptive users annually.
Gender Ratio	More common in females.
Age Predilection	Women of reproductive age.
Risk Factors	Hormonal exposure (oral contraceptives, anabolic steroids), diabetes, glycogen storage disease, and metabolic syndrome.
Treatment	Surgical resection due to the risk of rupture, bleeding, or malignant transformation if left untreated.
Prognosis	Good prognosis.
Imaging Findings	A contrast-enhanced CT shows a large, well-defined exophytic mass (7.4×14.5×15.9 cm) from segment III. Heterogeneous arterial enhancement, becoming homogeneous in portal/delayed phases with no washout. It was supplied by the left hepatic artery & the portal vein. Exerts mass effect on IVC and duodenum; no bleeding or additional lesions.

KEYWORDS

Hepatocellular Adenoma; Hepatic Adenoma; Pedunculated Type; Benign Liver Tumor; Oral Contraceptive Pills.

ABBREVIATIONS

HCA = Hepato Cellular Adenoma
OCP = Oral Contraceptive Pills
IVC = Inferior Vena Cava
CT = Computed Tomography
MRI = Magnetic Resonance Imaging

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