Journal of Neonatal Surgery
ISSN(Online): 2226-0439
Vol. 14, Issue 7 (2025)
https://www.jneonatalsurg.com

OPEN ACCESS

Hepatocelular Carcinoma Misdiagnosed as Focal Nodular Hyperplasia. Case Report

Muhammad Yunus Rosyidi[*1], Ardhi Tripriyanggara[1]

[1]Department of Radiology, Faculty of Medicine, Universitas Airlangga, Dr. Soetomo General Academic Hospital, Surabaya, East Java, Indonesia

Email ID: my23871987@gmail.com

Cite this paper as: Muhammad Yunus Rosyidi, Ardhi Tripriyanggara,. (2025). Hepatocelular Carcinoma Misdiagnosed as Focal Nodular Hyperplasia. Case Report. *Journal of Neonatal Surgery*, 14 (7), 17-22.

ABSTRACT

Introduction: Focal Nodular Hyperplasia (FNH) often mimics Hepatocellular Carcinoma (HCC) in imaging, making biopsy essential to confirm the correct diagnosis. A clear understanding of FNH's features is necessary to avoid misdiagnosis and improper treatment. Case Report: A 29-year-old woman experienced lumps and pain in the upper abdomen. Her lab results showed an AFP level of 76 ng/mL. The CT scan revealed a solid mass with central scarring in the left liver lobe, measuring approximately 3.9 x 4.7 x 3.5 cm, consistent with FNH. The core biopsy indicated liver tissue with cholestasis and no malignancy. However, following resection of the left liver lobe, pathology confirmed hepatocellular carcinoma (HCC). Discussion: The CT scan showed a solid mass characteristic of FNH, and the core biopsy also supported FNH. However, post-resection pathology revealed HCC. This difference was due to the smaller tissue sample obtained through core biopsy, as open biopsy provides a more comprehensive sample, allowing for a more accurate assessment of malignancy, a clearer diagnosis, and better guidance for treatment. Conclusion: Understanding the characteristics of FNH is essential from CT Scan, and biopsy should be considered the gold standard for accurate diagnosis. Open biopsy, with its larger tissue sample, can improve diagnostic precision.

Keywords: *Focal Nodular Hyperplasia, Hepatocellular Carcinoma, Biopsy, CT scan, Histology.*

1. INTRODUCTION

Hepatocellular carcinoma (HCC) is the primary liver tumor. Hepatocellular carcinoma accounts for over 90% of primary liver tumors. This activity elucidates the evaluation and management of hepatocellular carcinoma and underscores the role of the interprofessional team in assessing and treating patients with this condition.[1] Focal Nodular Hyperplasia (FNH) is a non-cancerous liver mass that can strikingly resemble Hepatocellular Carcinoma (HCC) in radiological evaluations, making differentiation highly challenging.[1] Both conditions exhibit similar characteristics, such as solid masses and central necrosis.[1], [2]

Imaging examinations such as CT scans and MRIs are commonly utilized for detecting liver lesions ; however, the limitations of this technology can diminish diagnostic accuracy [3]. As per the study by Luo et al. [2], these limitations should be taken into consideration, The accuracy rates for distinguishing FNH from HCC using CT are only 32.5% and 44.2% using MRI. This poses a greater challenge in cases of atypical or large lesions, where imaging fails to provide a definitive depiction.[4] Further, in Luo et al. [2], it was found that all patients with rare benign liver tumors underwent surgery, highlighting the direct impact of inaccurate diagnosis. The reliance on imaging methods and biopsies underscores the importance of developing more precise diagnostic techniques to prevent diagnostic errors and ensure appropriate treatment [5].

To differentiate between FNH and HCC, a biopsy, considered the gold standard, is often necessary. [6], [7] This step is vital for determining the appropriate treatment plan, as the prognosis and therapeutic approaches for these two conditions differ significantly. [6] A comprehensive understanding of the radiological and histological features of FNH is crucial to prevent diagnostic errors and avoid unnecessary treatments.

2. CASE REPORT

A 29-year-old woman has been experiencing on-and-off pain in her upper right abdomen for two years, along with progressive weight loss over the past year, without any signs of jaundice in her medical history. Laboratory results were as follows: OT/PT: 20/17, Total/Direct Bilirubin: 0.5/0.17, HBsAg: non-reactive, AFP: 76 ng/mL, and CA 125: 10.7. Abdominal CT scan findings revealed a solid mass with partially indistinct margins and irregular edges measuring approximately 3.9 x 4.7 x 3.5 cm in segment II of the left hepatic lobe. The lesion exhibited rapid contrast uptake in the arterial phase, followed by mild yet persistent enhancement in the venous and delayed phases relative to normal liver tissue. A distinctive central scar remained consistently hypodense across all imaging phases (pre-contrast, arterial, venous, and delayed), strongly indicative of Focal Nodular Hyperplasia (FNH). CT-guided core biopsy showed hepatic tissue with cholestasis and no evidence of malignancy, supporting the diagnosis of FNH. However, the patient underwent left hepatic lobe resection, and the pathological examination confirmed Hepatocellular Carcinoma (HCC).

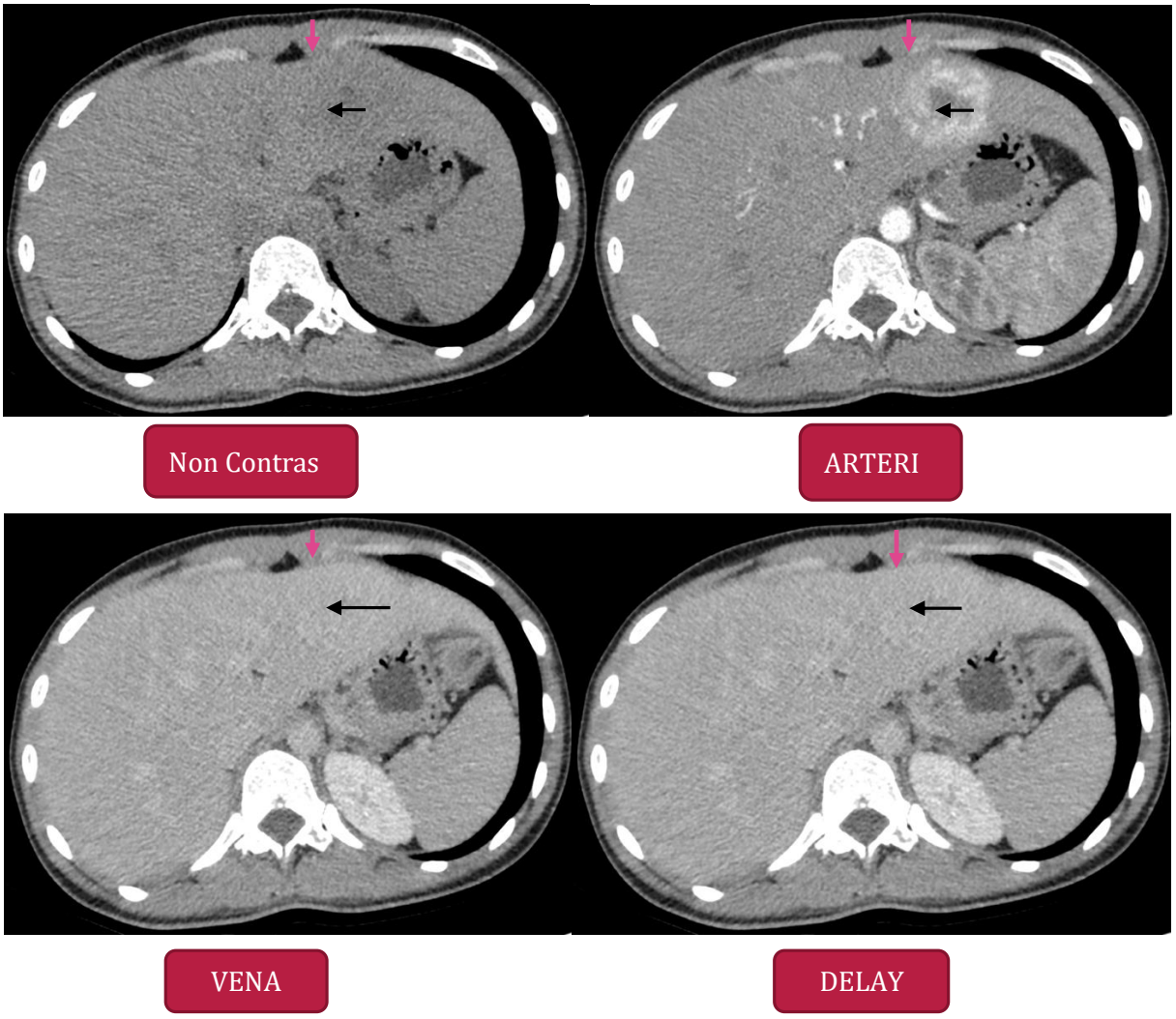

Figure 1. CT Scan Abdomen : A solid mass with partially indistinct margins and irregular edges in segment II of the left hepatic lobe (orange arrow). Following contrast administration, the lesion exhibits a rapid influx of contrast in the arterial phase, followed by a subtle yet persistent enhancement during the venous and delayed phases, distinguishing itself from the surrounding normal liver tissue. The lesion also shows central scarring (black arrow) that remains hypodense in all phases, including pre-contrast, arterial, venous, and delayed phases.

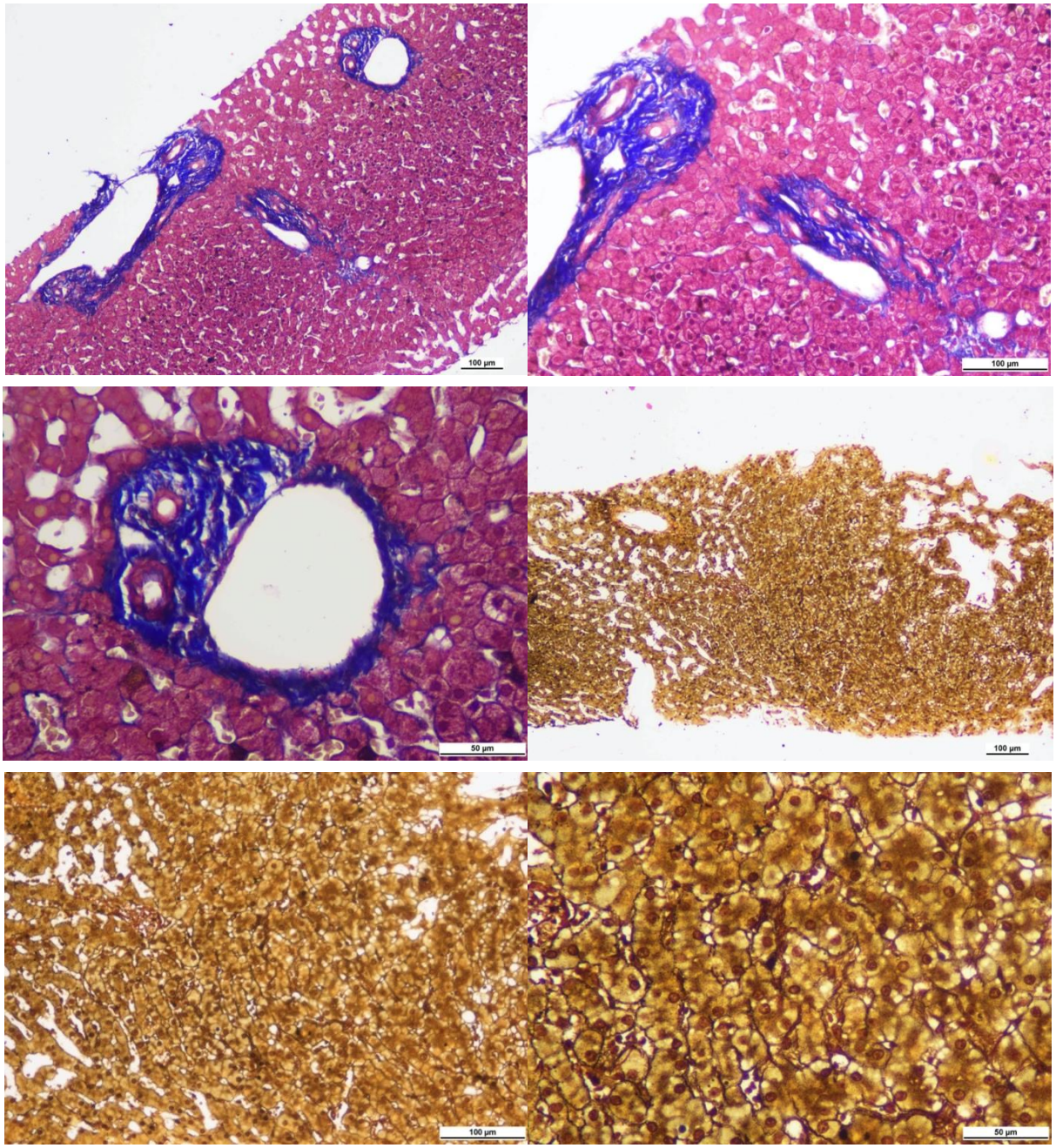

Figure 2. Core biopsy: Shows liver tissue sections portal tracts displaying bile ductular reaction. The hepatic lobules consist of hepatocytes with round nuclei, fine chromatin, ample cytoplasm, and some showing hydropic degeneration. The sinusoids are dilated, congested, and contain erythrocytes, no tumor cells, and no evidence of malignancy is observed.

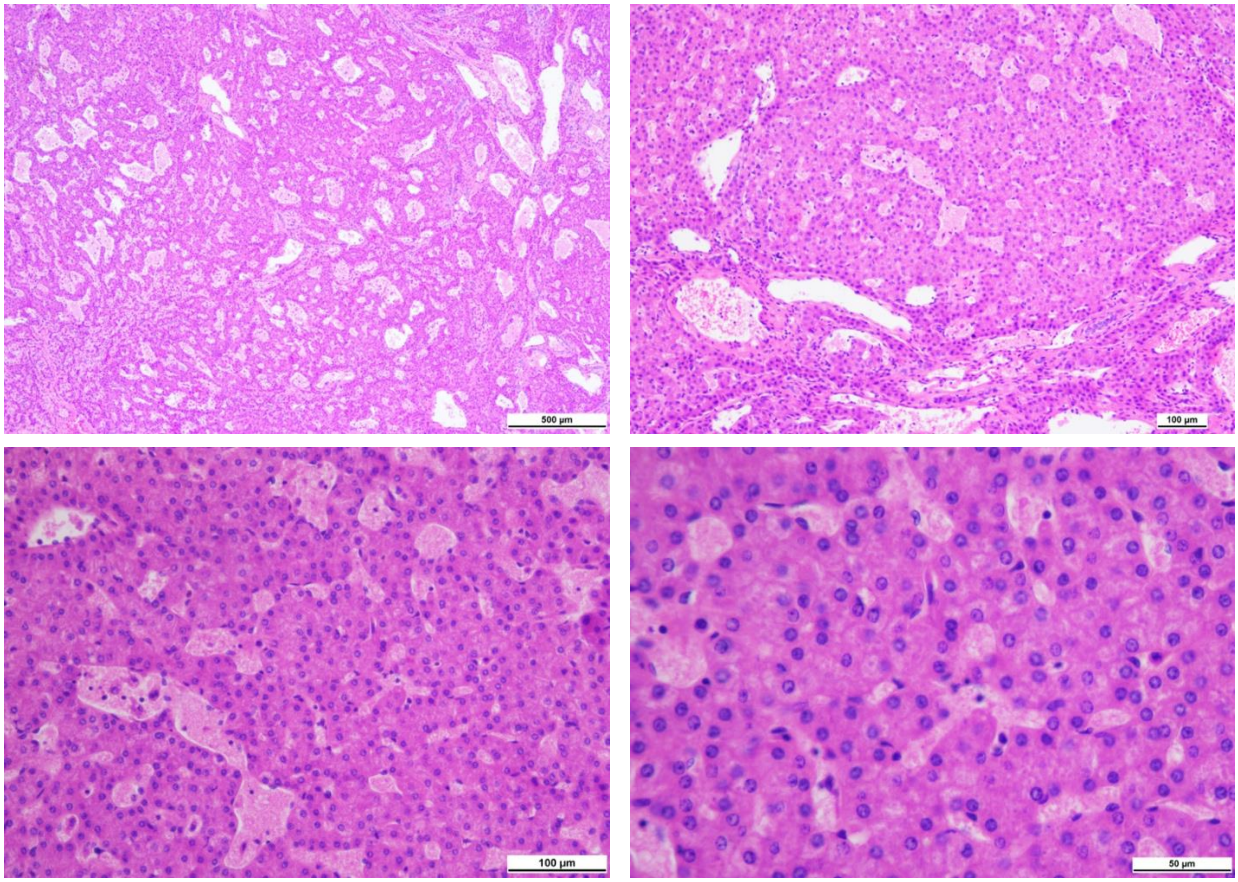

Figure 3. Left hepatic lobe resection: The specimen reveals liver tissue with a solitary tumor exhibiting a macrotrabecular growth pattern. The tumor is composed of proliferating hepatocytes with round, mildly pleomorphic, hyperchromatic nuclei, some with vesicular chromatin, and ample eosinophilic cytoplasm. The tumor shows invasive growth into the stroma but no evidence of lymphangioinvasion or perineural invasion. There are no hyaline bodies, Mallory-Denk bodies, clear cells, fatty change, or giant bile ducts identified in this specimen. A mild inflammatory lymphocytic infiltrate is observed.

3. DISCUSSION

Hepatocellular carcinoma (HCC), the most prevalent form of liver cancer, frequently poses significant diagnostic challenges [8], as it can be incredibly difficult to differentiate from non-cancerous lesions like focal nodular hyperplasia (FNH). The case discussed involves a 29-year-old woman presenting with intermittent upper right abdominal pain for two years, weight loss, and laboratory and imaging findings indicating a liver mass. Laboratory results revealed an alpha-fetoprotein (AFP) level of 76 ng/mL, which can suggest malignancy.

CT scan of the abdomen shows a solid mass with characteristics not typical for HCC, including early wash-in in the arterial phase and slight contrast enhancement in the venous phase, as well as the presence of central scarring that remains hypodense, supporting the appearance of FNH. This finding aligns with prior research that suggests FNH often shows a homogeneous enhancement pattern, along with a central scar visible on CT images.[6], [7] In non-contrast CT scans, FNH appears as a solitary lesion with a central necrotic area surrounded by a well-defined homogeneous region, indicating a mass effect. The lesion's density is similar to the surrounding liver tissue. In the arterial phase of liver enhancement, FNH generally enhances, except for the necrotic central tissue. In the venous phase, the lesion's density becomes similar to the surrounding liver parenchyma, but the necrotic area remains hypodense. In the delayed phase, the necrotic central tissue shows contrast enhancement.[9] In certain instances, FNH may exhibit unusual imaging characteristics, including the absence of central scar enhancement, lesion calcification, or pseudocapsular enhancement during the delayed phase, which can sometimes complicate its differentiation from HCC. Studies have shown that 95.9% of HCCs demonstrate enhancement with washout, while only 22.2% of FNHs share this feature. Rare presentations can occur when the tumor surpasses 5 cm in size, although most tumors remain under this threshold. According to Ishak and Rabin's study [10] of 130 FNH patients, 85% had a single nodule smaller than 5 cm, 12% had lesions between 5 and 10 cm, and just 3% had lesions exceeding 10 cm. Tumors larger than 5 cm can cause symptoms by expanding the Glisson capsule or exerting pressure on surrounding structures, leading to

abdominal pain or a sensation of a mass in the abdomen.[10]

Core biopsy has become the gold standard for confirming the diagnosis of FNH and ruling out the possibility of HCC. According to the literature, biopsy provides essential histological information to differentiate between these two conditions.[11] FNH histology typically reveals nodular hepatocellular parenchyma with ductular reactions and abnormal blood vessels, without any tumor cells present.[12] Pathology results show portal tracts with bile duct reactions, consisting of hepatocyte cells with round nuclei, fine chromatin, sufficient cytoplasm, hydropic degeneration, dilated sinusoids, congestion, erythrocytes, and no tumor cells. This matches existing literature that describes FNH pathology showing fibrous septa without portal tracts, thick-walled blood vessels, ductal proliferation, hepatocellular nodules, dilated sinusoids, perisinusoidal fibrosis, and chronic cholestasis, which are commonly found in FNH. FNH in the presence of fatty liver may exhibit focal features similar to steatohepatitis, mimicking hepatocellular carcinoma (HCC) of the steatohepatitic type.[13] Careful recognition of the unique histological features of FNH, such as thick-walled blood vessels, bile duct reactions, and thick fibrous septa, can significantly help exclude the possibility of steatohepatitic-type HCC.[14]

The patient underwent a left liver lobectomy, and the pathology results revealed features of HCC. This finding contrasts with the previous core biopsy, which is considered the gold standard for diagnosis in this case, and showed liver tissue with cholestasis, without signs of malignancy, suggesting FNH. The difference is likely due to the smaller tissue sample obtained in the core biopsy compared to the larger sample from the lobectomy. Extensive research has overwhelmingly demonstrated that core biopsy surpasses fine needle aspiration in accuracy across all areas, whereas open biopsy is unquestionably the most reliable method, excelling over both in detecting malignancy, ensuring precise diagnosis, and directing optimal treatment.[15]

4. CONCLUSION

This case report highlights the importance of understanding the radiological and histological characteristics of FNH, as well as the need for biopsy procedures as the gold standard to ensure an accurate diagnosis. CT scan shows a homogeneous enhancement pattern with a central scar, while pathology reveals typical fibrosis with ductules at the border between hepatocytes and the fibrous area, prominent arteries, and benign hepatocytes exhibiting features of chronic cholestasis. However, in this case, both the radiological findings and core biopsy were consistent with FNH, which is considered the gold standard for diagnosis in this case. Despite this, the post-resection pathology report indicated HCC. This discrepancy is likely due to the smaller tissue sample obtained from the core biopsy compared to the larger sample from the left liver lobectomy (open biopsy), leading to the conclusion that a larger tissue sample improves diagnostic accuracy.

CONSENT AND ETHICS COMMITTEE APPROVAL

Explicit written consent was secured from the patient, as this case report contains no identifiable patient data. This study strictly adheres to ethical principles and has obtained full approval from the Research Ethics Committee of Dr. Soetomo General Hospital, Surabaya.

CONFLICT OF INTEREST

The author affirms no conflict of interest in this study

ACKNOWLEDGMENT

None

FUNDING

None

REFERENCES

[1] G. N. Ioannou, M. F. Splan, N. S. Weiss, G. B. McDonald, L. Beretta, and S. P. Lee, “Incidence and predictors of hepatocellular carcinoma in patients with cirrhosis,” *Clin. Gastroenterol. Hepatol.*, vol. 5, no. 8, pp. 938–945, 2007, doi: 10.1016/j.cgh.2007.02.039.

[2] L. Luo *et al.*, “Rare benign liver tumors that require differentiation from hepatocellular carcinoma: focus on diagnosis and treatment,” *J. Cancer Res. Clin. Oncol.*, vol. 149, no. 7, pp. 2843–2854, 2023, doi: 10.1007/s00432-022-04169-w.

[3] [E. F. Widiastari, W. A. Graha, and M. Pardede, “Lung Bullae Due to Septic Pulmonary Embolism in a 4-Year-Old Child: A Case Report,” *Pharmacol. Med. Reports, Orthop. Illn. Details*, vol. 1, no. 3, 2022, doi: 10.55047/comorbid.v1i3.355.

[4] Z.-Y. Yang and G.-Q. Bao, “Focal nodular hyperplasia misdiagnosed as hepatocellular carcinoma: a case report and literature review,” *Dig. Med. Res.*, vol. 4, no. 17, pp. 1–8, 2021, doi: 10.21037/DMR-20-157.

[5] T. K. Kim, E. Lee, and H.-J. Jang, "Imaging findings of mimickers of hepatocellular carcinoma," *Clin. Mol. Hepatol.*, vol. 21, no. 4, pp. 326–343, 2015, doi: 10.3350/CMH.2015.21.4.326.

[6] [A. Kitao *et al.*, "Differentiation between hepatocellular carcinoma showing hyperintensity on the hepatobiliary phase of gadoxetic acid–enhanced MRI and focal nodular hyperplasia by CT and MRI," *Am. J. Roentgenol.*, vol. 211, no. 2, pp. 347–357, 2018, doi: 10.2214/AJR.17.19341.

[7] J. W. Van den Esschert, T. M. Van Gulik, and S. S. K. S. Phoa, "Imaging modalities for focal nodular hyperplasia and hepatocellular adenoma," *Dig. Surg.*, vol. 27, no. 1, pp. 46–55, 2010, doi: 10.1159/000268407.

[8] [A. Riski Apriady, Y. Wibisono, and A. Nugraha Hermawan, "Headache Profile And Associated Symptoms In Intracranial Tumors," *Pharmacol. Med. REPORTS, Orthop. Illn. DETAILS*, vol. 1, no. 1, 2022, doi: 10.55047/comorbid.v1i1.36.

[9] N. Darai, R. Shu, R. Gurung, X. Zhang, and G. Teng, "Atypical CT and MRI features of focal nodular hyperplasia of liver: a study with radiologic-pathologic correlation," *Open J. Radiol.*, vol. 5, no. 3, pp. 131–141, 2015, doi: 10.4236/ojrad.2015.53020.

[10] K. G. Ishak and L. Rabin, "Benign tumors of the liver," *Med. Clin. North Am.*, vol. 59, no. 4, pp. 995–1013, 1975, doi: 10.1016/S0025-7125(16)31998-8.

[11] D. J. Rowan *et al.*, "Diagnostic challenges of focal nodular hyperplasia: interobserver variability, accuracy, and the utility of glutamine synthetase immunohistochemistry," *Histopathology*, vol. 79, no. 5, pp. 791–800, 2021, doi: 10.1111/his.14424.

[12] J. Y. Choi *et al.*, "Focal nodular hyperplasia or focal nodular hyperplasia-like lesions of the liver: a special emphasis on diagnosis," *J. Gastroenterol. Hepatol.*, vol. 26, no. 6, pp. 1004–1009, 2011, doi: 10.1111/j.1440-1746.2011.06659.x.

[13] H. R. Makhlouf, H. M. Abdul-Al, and Z. D. Goodman, "Diagnosis of focal nodular hyperplasia of the liver by needle biopsy," *Hum. Pathol.*, vol. 36, no. 11, pp. 1210–1216, 2005, doi: 10.1016/j.humpath.2005.08.014.

[14] M. S. Torbenson, "Morphologic subtypes of hepatocellular carcinoma," *Gastroenterol. Clin.*, vol. 46, no. 2, pp. 365–391, 2017, doi: 10.1016/j.gtc.2017.01.009.

[15] S. Kasraeian, D. C. Allison, E. R. Ahlmann, A. N. Fedenko, and L. R. Menendez, "A comparison of fine-needle aspiration, core biopsy, and surgical biopsy in the diagnosis of extremity soft tissue masses," *Clin. Orthop. Relat. Res.*, vol. 468, pp. 2992–3002, 2010, doi: 10.1007/s11999-010-1401-x.