

CASE REPORT

암성혈전을 동반한 침윤성 간암으로 오진된 문맥염으로 인한 급성 간경색

심민정¹, 양태영¹, 조남길¹, 우아라¹, 김은주¹, 박근희¹, 이주호^{1,2}, 이윤빈^{1,2}, 황성규^{1,2}, 임규성^{1,2}, 박하나^{1,2}
차의과학대학교 분당차병원 내과학교실¹, 소화기내과²

Hepatic Infarction Caused by Portal Vein Thrombophlebitis Misdiagnosed as Infiltrative Hepatic Malignancy with Neoplastic Thrombus

Minjung Shim¹, Tae Young Yang¹, Nam Gil Cho¹, Ara Woo¹, Eunju Kim¹, Keunhoi Park¹, Joo Ho Lee^{1,2}, Yun Bin Lee^{1,2}, Seong Gyu Hwang^{1,2}, Kyu Sung Rim^{1,2}, and Hana Park^{1,2}

Department of Internal Medicine¹, Division of Gastroenterology and Hepatology², CHA Bundang Medical Center, CHA University, Seongnam, Korea

Portal vein thrombosis (PVT) is a form of venous thrombosis that usually presents in chronic form without any sequelae in patients with hepatocellular carcinoma (HCC) or liver cirrhosis. Accurate differential diagnosis of bland PVT from neoplastic PVT is an important step for planning treatment options, but the acute form can be challenging. Here we present a case of acute hepatic infarction caused by acute bland PVT combined with pylephlebitis, which was misdiagnosed as infiltrative hepatic malignancy with neoplastic PVT owing to the perplexing imaging results and elevated tumor markers. (**Korean J Gastroenterol 2016;68:156-160**)

Key Words: Chronic hepatitis B; Tenofovir; Portal vein; Thrombophlebitis

INTRODUCTION

The blood supply system of the liver is composed of portal vein, which provides two-thirds of the blood supply, and the hepatic artery, which provides the remaining one-third of the blood supply.¹ Portal vein thrombosis (PVT) is a form of venous thrombosis that affects the hepatic portal vein and reduces blood supply to the liver causing portal hypertension and ischemic damage to the liver.²

There are two different forms of PVT—neoplastic thrombus of the portal vein and bland thrombus. Neoplastic thrombus of the portal vein, found in 6.5-44% of patients with hep-

atocellular carcinoma (HCC), is related to direct invasion.³ It is an important determinant for tumor staging, prognosis and treatment, limiting treatment options to chemoembolization, surgical resection, and liver transplantation. The other form of PVT is a bland thrombus found in 4.5-26% of patients with chronic liver disease and in 42% of patients with HCC.³ It develops from sluggish blood flow, which can be treated with anticoagulation and thrombolysis.⁴ These two different forms of PVT are often very similar in presentation, especially in imaging in the acute stage, and difficult to differentially diagnose. Therefore, PVT necessitates close scrutiny for differential diagnosis.⁵

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교신저자: 박하나, 13496, 성남시 분당구 야탑로 59, 차의과학대학교 분당차병원 내과학교실, 소화기내과

Correspondence to: Hana Park, Department of Internal Medicine, Division of Gastroenterology and Hepatology, CHA Bundang Medical Center, CHA University, 59 Yatap-ro, Bundang-gu, Seongnam 13496, Korea. Tel: +82-31-780-5219, Fax: +82-31-780-4927, E-mail: phn223@cha.ac.kr

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We present the case of a 52-year-old man with acute hepatic infarction caused by bland PVT, misdiagnosed as infiltrative hepatic malignancy with neoplastic thrombus. A major cause of this misdiagnosis was the confusing imaging results because of its comorbid septic thrombophlebitis. We here report the case with a review of relevant literature to help understand the differences between bland thrombosis and neoplastic thrombosis in clinical manifestations and radiologic results, to facilitate proper diagnosis.

CASE REPORT

A 52-year-old man was referred to the Department of Internal Medicine for hematemesis at the emergency room. He was a heavy drinker who drinks more than four times a week.

He was unaware of being a hepatitis B virus carrier and was only told that he had elevated liver enzymes due to his fre-

quent drinking habits. Upon physical examination, his vital signs were unstable with blood pressure 100/60 mmHg, pulse rate 110 beats/minute, and body temperature 36.4°C initially, which went up to 38.9°C after sufficient hydration. He had ascites and pitting edema on both legs, thought to be associated with portal hypertension. The blood test showed white blood cell count 20,250/mm³ (segmented neutrophils 88%, lymphocytes 6.5%, monocytes 5.0%, eosinophils 0.5%), hemoglobin 6.4 g/dL, platelet 126,000/μL, albumin 2.1 g/dL, total bilirubin 2.11 mg/dL, ALT 83 IU/L, AST 149 IU/L, and PT 21.1 seconds (INR 1.86). Furthermore, the tumor markers, CA 19-9 and AFP, were elevated to 2,427.81 U/mL and to 29.1 ng/mL, respectively. According to his laboratory results and clinical manifestations, we classified him as Child-Pugh class B. HBsAg was positive, anti-HBs negative, HBeAg negative, anti-HBe positive and HBV DNA 7,860,000 IU/mL. Erythrocyte sedimentation rate and CRP, were also

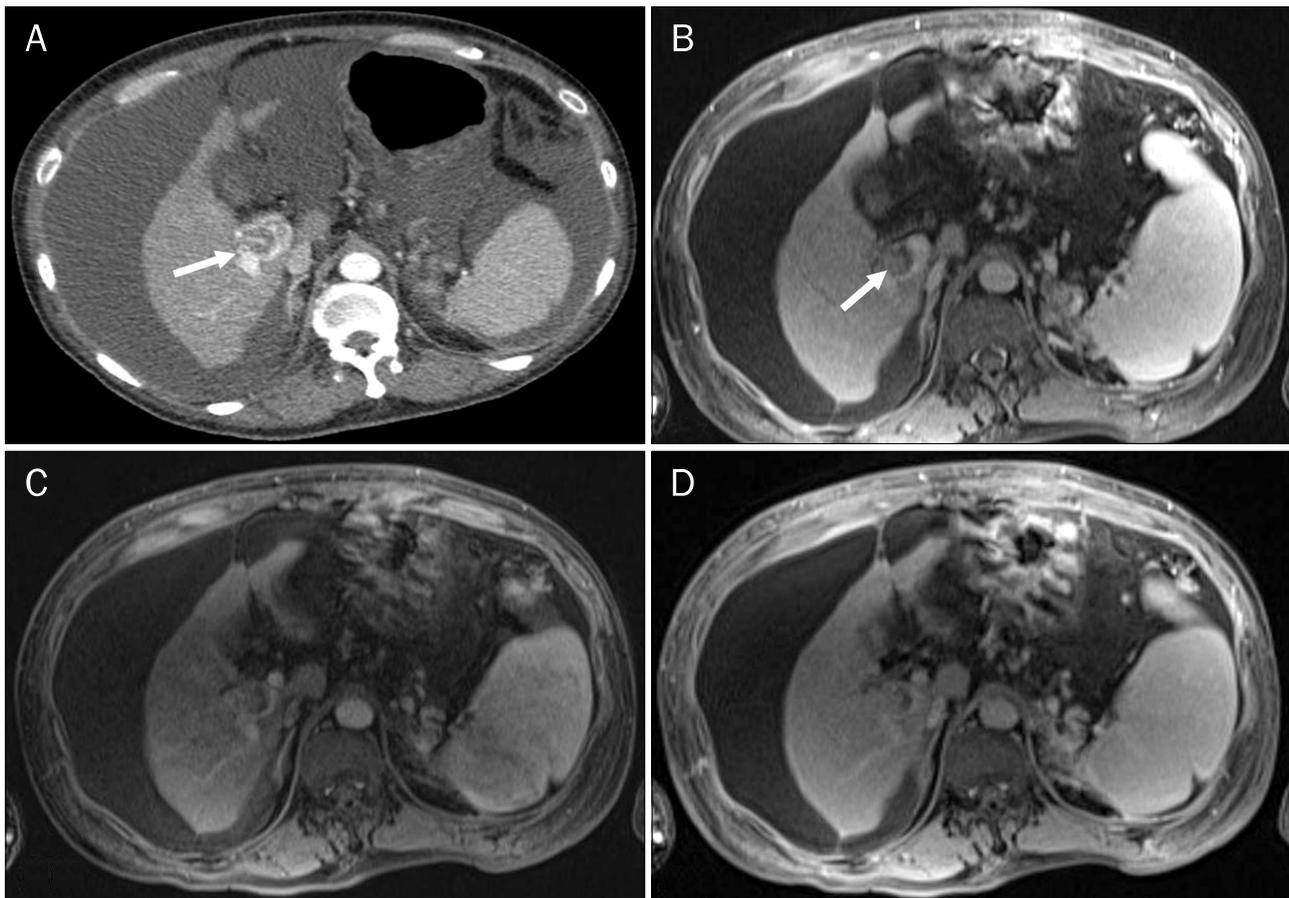


Fig. 1. Portal vein (PV) thrombosis on imaging studies. Suspiciously infiltrative and hypovascular hepatocellular carcinoma on S8 of markedly shrunken liver parenchyma with enhanced thrombosis (arrows) at right PV and main PV on CT scans. (A) Liver MRI revealed portal vein thrombosis on contrast enhanced fat suppression T1 portal phase (B), enhancement on early arterial phase of dynamic enhanced study (C), and on hepatobiliary phase (D).

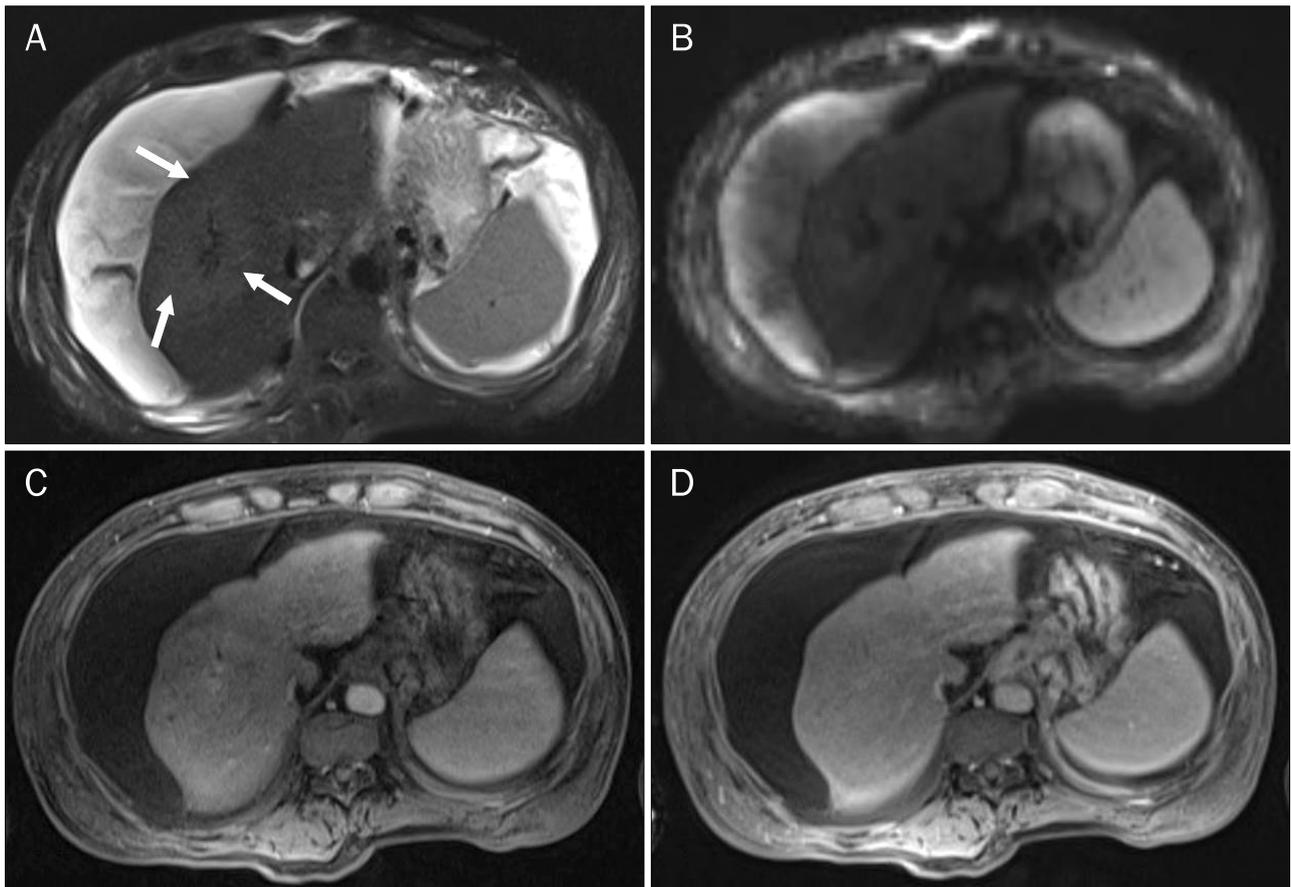


Fig. 2. Acute hepatic infarction on liver MRI. Liver MRI at first visit showed ill-defined and slightly T2 high signal intensity lesion (arrows) on S8 of liver (A) and sustained high signal intensity on diffusion weighted imaging. (B) The lesion was not demarcated well on enhanced early arterial phase of dynamic study (C) or on hepatobiliary phase because of markedly decreased liver function (D).

elevated to 42 mm/hour and 7.15 mg/dL, respectively.

We performed emergent esophagogastroduodenoscopy, through which gastric varices (F3) and esophageal varices (F3) with multiple tortuous, enlarged, exposed vessels were revealed. We applied endoscopic bleeding control six times of band ligation for esophageal varices by endoscopy, which ultimately controlled the esophageal variceal bleeding. Intravenous terlipressin and antibiotics were also used for management of variceal bleeding. After endoscopic hemostasis, tenofovir was prescribed to treat his chronic hepatitis B.

A contrast-enhanced CT scan showed marked shrinkage of the liver parenchyma and detected suspicious infiltrative hypovascular hepatic malignancy on S8 of the liver with malignant tumor thrombosis from right to main portal vein and advanced liver cirrhosis. An additional MRI to confirm the suspicious carcinoma still showed possible infiltrative hypovascular HCC or mixed cholangio-HCC on S8/4 of the liver with right portal vein invasion (Figs. 1, 2). Because of the en-

hanced, not well demarcated lesion on arterial phase and the enhancing thrombi filling in the right portal vein and main portal vein, we decided to proceed with percutaneous liver biopsy of the highly suspicious malignant lesion.

After his ascites and liver functions improved, ultrasound-guided biopsies were done at the liver parenchyma and thrombosis of the right portal vein. The specimens revealed neither malignant features nor any pathologic feature of infarction apart from cirrhosis and minimal hepatitis. Based on the results, we decided to monitor his condition over time, using anti-viral agents and antibiotics on an outpatient basis after his discharge.

Two months later, an MRI scan showed markedly improved liver parenchymal volume and a decrease in hepatic lesions. The enhancing thrombus was also resolved except for focal residual thrombi without enhancement.

Eventually, the perfusion variation at the right anterior segment was revealed as an ischemic change caused by the be-

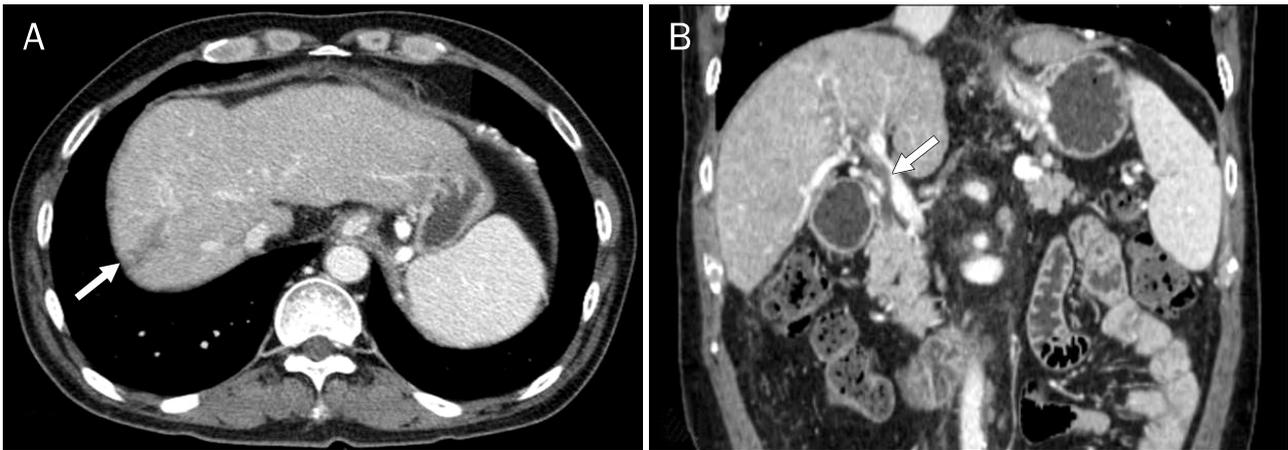


Fig. 3. Liver tumor CT after 12 months showed a remaining wedge-shaped non-enhanced low attenuated lesion (arrow) on S8 of liver (A) and chronic partial thrombi (benign thrombi) (arrow) at anterior branch of right portal vein (PV) and main PV with arterioportal shunts (B).

nign portal vein thrombophlebitis at the right/main portal vein.

After twelve months of conservative treatment including antiviral therapy and drinking cessation, the abdominal CT scan showed an improved lesion of focal infarction and post-inflammatory change on S8 of the liver as a wedge shaped, non-enhanced, low attenuated lesion with a benign chronic partial thrombi still detectable at the anterior branch from right to main portal vein with arterioportal shunts and cavernous transformation (Fig. 3). The elevated tumor markers, CA 19-9 and AFP, were decreased significantly to 74.9 U/mL and to 1.8 ng/mL, respectively (Fig. 4).

DISCUSSION

PVT is quite rare in the general population, but the prevalence is higher among patients with liver cirrhosis due to increased intrahepatic vascular resistance and reduced portal flow.^{2,6}

Bland PVT appears to develop slowly in most patients, and is usually well tolerated and asymptomatic with no significant changes in the liver due to two compensatory mechanisms, ‘arterial rescue’ and ‘venous rescue’. The arterial compensation of enhanced liver blood flow activated immediately as a vascular reflex to preserve hepatic perfusion, and the development of portal to portal collaterals begins in a few days to preserve venous circulation.² We propose that an acute PVT also can lead to low-perfused ischemic hepatic lesion when it occurs in special clinical settings with defective early arterial rescue, for example, hypovolemia. Besides, acute PVT

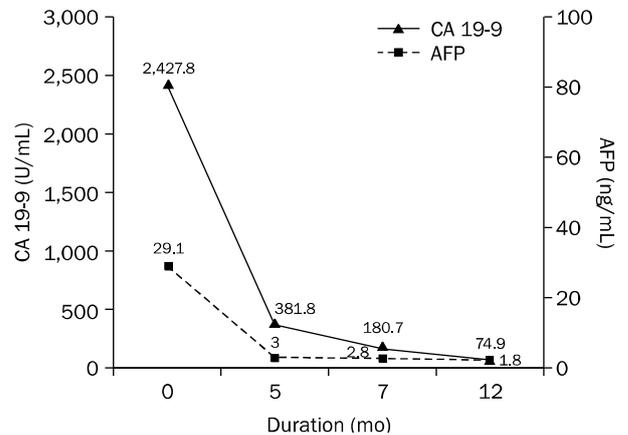


Fig. 4. Serial changes of serum CA 19-9 and AFP levels.

easily results in variceal bleeding due to aggravated portal hypertension, contributing simultaneously to defective arterial rescue.^{7,8}

Distinguishing bland thrombus from neoplastic thrombus of the portal vein is important for determining different therapeutic options and predicting survival.³ Bland PVT can be simply treated with anticoagulation. Neoplastic PVT, however, needs a more careful treatment planning because a number of patients are unsuitable for curative treatment options due to high tumor recurrence rate.⁹ Thus, pathologic confirmation by biopsy or fine needle aspiration can be necessary for the diagnosis of neoplastic PVT with HCC.¹⁰

CT and MRI are the most commonly used imaging techniques in the assessment of PVT and hepatic lesion currently.^{11,12} The leading radiologic feature used in differentiation of neoplastic PVT from bland PVT is streaky enhancement of the

thrombus during the hepatic arterial phase.¹³ However, it can be perplexing to diagnose bland thrombus of the portal vein via imaging study when septic thrombophlebitis is comorbid.

Septic pylephlebitis is defined as suppurative, inflamed thrombosis of the portal vein and is followed most commonly by intra-abdominal infection even though a primary source of infection or pathogen could not be identified in more than 50% of patients.^{14,15} It presents as early enhancement of thrombus in arterial phase, which misleads us into suspecting malignancy, especially when it occurs in an acute form with ischemic lesion in the liver parenchyma.¹⁵ The American Association for the Study of Liver Diseases (AASLD) recommendations for diagnosis of acute PVT emphasizes that septic pylephlebitis should be considered in patients with acute PVT and high fever concurrently.¹⁶

Because cirrhotic patients are susceptible to both bacterial infections and thrombosis,¹⁷ bland PVT can be detected as an aggressive form with ischemic hepatic lesion when combined with septic pylephlebitis. In that case, the imaging study would show the confusing features of neoplastic PVT as were seen in our case. The elevated CA 19-9 level can also be a confusing factor implying neoplasm. However, we should keep in mind that the marker is related not only to tumorous conditions but also benign conditions such as biliary tract infections, advanced liver diseases, etc.¹⁸⁻²⁰ Elevated CA 19-9 levels in this case declined rapidly from 2,427 to 74 in a year, reflecting improvement in the combined inflammation of the biliary tract.

In summary, we experienced a case of misdiagnosis of hepatic infarction with bland PVT as an infiltrative hepatic malignancy with neoplastic PVT because of its aggressive features arising from combined infection. We should understand the characteristics of cirrhotic patients and diagnose carefully when we meet patients with acute PVT in clinical settings.

REFERENCES

1. Bauer W, Dale HH, Poulsson LT, Richards DW. The control of circulation through the liver. *J Physiol* 1932;74:343-375.
2. Ponziani FR, Zocco MA, Campanale C, et al. Portal vein thrombosis: insight into physiopathology, diagnosis, and treatment. *World J Gastroenterol* 2010;16:143-155.
3. Li C, Hu J, Zhou D, et al. Differentiation of bland from neoplastic thrombus of the portal vein in patients with hepatocellular carcinoma: application of susceptibility-weighted MR imaging. *BMC Cancer* 2014;14:590.
4. Lang SA, Loss M, Wohlgemuth WA, Schlitt HJ. Clinical management of acute portal/mesenteric vein thrombosis. *Viszeralmedizin* 2014;30:394-400.
5. Chawla YK, Bodh V. Portal vein thrombosis. *J Clin Exp Hepatol* 2015;5:22-40.
6. Shah V. Molecular mechanisms of increased intrahepatic resistance in portal hypertension. *J Clin Gastroenterol* 2007;41 Suppl 3:S259-S261.
7. Harding DJ, Perera MT, Chen F, Olliff S, Tripathi D. Portal vein thrombosis in cirrhosis: controversies and latest developments. *World J Gastroenterol* 2015;21:6769-6784.
8. Plessier A, Darwish-Murad S, Hernandez-Guerra M, et al. Acute portal vein thrombosis unrelated to cirrhosis: a prospective multicenter follow-up study. *Hepatology* 2010;51:210-218.
9. Takizawa D, Kakizaki S, Sohara N, et al. Hepatocellular carcinoma with portal vein tumor thrombosis: clinical characteristics, prognosis, and patient survival analysis. *Dig Dis Sci* 2007;52:3290-3295.
10. Jelic S, Sotiropoulos GC; ESMO Guidelines Working Group. Hepatocellular carcinoma: ESMO Clinical Practice Guidelines for diagnosis, treatment and follow-up. *Ann Oncol* 2010;21 Suppl 5:v59-v64.
11. Engelbrecht M, Akin O, Dixit D, Schwartz L. Bland and tumor thrombi in abdominal malignancies: magnetic resonance imaging assessment in a large oncologic patient population. *Abdom Imaging* 2011;36:62-68.
12. Tublin ME, Dodd GD 3rd, Baron RL. Benign and malignant portal vein thrombosis: differentiation by CT characteristics. *AJR Am J Roentgenol* 1997;168:719-723.
13. Lee HK, Park SJ, Yi BH, Yeon EK, Kim JH, Hong HS. Portal vein thrombosis: CT features. *Abdom Imaging* 2008;33:72-79.
14. Kanellopoulou T, Alexopoulou A, Theodossiades G, Koskinas J, Archimandritis AJ. Pylephlebitis: an overview of non-cirrhotic cases and factors related to outcome. *Scand J Infect Dis* 2010;42:804-811.
15. Wong K, Weisman DS, Patrice KA. Pylephlebitis: a rare complication of an intra-abdominal infection. *J Community Hosp Intern Med Perspect* 2013;3. doi: 10.3402/jchimp.v3i12.20732.
16. DeLeve LD, Valla DC, Garcia-Tsao G. Vascular disorders of the liver. *Hepatology* 2009;49:1729-1764.
17. Lee YY, Tee HP, Mahadeva S. Role of prophylactic antibiotics in cirrhotic patients with variceal bleeding. *World J Gastroenterol* 2014;20:1790-1796.
18. Albert MB, Steinberg WM, Henry JP. Elevated serum levels of tumor marker CA19-9 in acute cholangitis. *Dig Dis Sci* 1988;33:1223-1225.
19. Pavai S, Yap SF. The clinical significance of elevated levels of serum CA 19-9. *Med J Malaysia* 2003;58:667-672.
20. Singhal A, Lander E, Karachristos A, et al. Elevation of CA 125 and CA 19-9 in patients with end-stage liver disease. *Int J Biol Markers* 2012;27:e147-e151.