

Case Report

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Ruptured Hepatocellular Carcinoma Secondary to Undiagnosed Hepatitis B in a Young Male Papua New Guinean Patient

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Abstract

A 29-year-old male from Papua New Guinea (PNG) presented to a rural Australian hospital with acute severe chest and abdominal pain. ECG did not demonstrate acute ischemic changes; however, cardiac troponin was raised, and he was initially managed as acute coronary syndrome with dual antiplatelet therapy and therapeutic anticoagulation. He subsequently developed worsening abdominal pain and a hemoglobin decrement. Computed Tomography (CT) Angiogram of the abdomen demonstrated a large mass in the right lobe of the liver with hemoperitoneum. Serology revealed active Hepatitis B, with liver biopsy confirming hepatocellular carcinoma. Following multidisciplinary team discussion, he underwent palliative locoregional treatment with Selective Internal Radiation Therapy (SIRT).

Keywords

Hepatocellular carcinoma; HCC; Hepatitis B

1. Case Description

A 29-year-old, previously well, male from Papua New Guinea (PNG) was brought in by ambulance to a small rural hospital in Australia with sudden onset of severe chest pain as well as right upper abdominal pain. On examination, his vital signs were within normal limits, but he had tenderness in the right upper quadrant. An ECG demonstrated sinus rhythm without evidence of acute ischemic changes. Initial investigation showed a low hemoglobin of 115 g/L (reference range: 135–180), mildly elevated liver function tests (ALP 147 U/L (30–110), ALT 60 U/L (<45), AST 60 U/L (<35), elevated creatinine 208 µmol/L (60–110), Lactate 8.2 mmol/L (0.5–2.2), and Troponin cTnI 126 ng/L (<20). He was initially managed

as acute coronary Syndrome (ACS) and commenced on dual antiplatelet therapy and therapeutic anticoagulation.

The patient was transferred to a large regional hospital, where additional investigations revealed a persistently decreasing hemoglobin of 92 g/L (135–180) and an increasing Troponin (cTnI) to 709 ng/L (<20). Serial ECGs persistently did not demonstrate ischemia. Computed tomography (CT) pulmonary angiogram and abdomen/pelvis did not demonstrate pulmonary embolism, but revealed a large heterogeneous mass in the right lobe of the liver. Hepatitis serology confirmed Hepatitis B (anti-HBc reactive, HBsAg reactive, HBsAb negative), with normal tumor markers, AFP 11 µg/L (<10), CEA 1.2 µg/L (<3.5), and CA 19.9 <5 kU/L

(<5.0). A type II myocardial infarction in the setting of acute abdominal pathology was diagnosed, and no further antiplatelet therapy was given. A CT Angiogram of the abdomen further characterized the upper abdominal mass as a $12 \times 9 \times 8$ cm lesion involving liver segments IV, V, and VI, with heterogeneous enhancement and moderate hemoperitoneum (**Figure 1**).

He was transferred to a tertiary metropolitan hospital for multidisciplinary assessment and management. Examination by the surgical team revealed significant hepatomegaly, which had not previously been appreciated. Magnetic resonance imaging (MRI) of the liver with Gd-EOB-DTPA (Primovist) showed a multifocal hepatic tumor centered on segments IV, V, and VI. This was suspicious for multifocal hepatocellular carcinoma (HCC) (**Figure 2**). A percutaneous liver biopsy was performed, which confirmed HCC (**Figure 3**); however, there was no non-neoplastic liver tissue to confirm cirrhosis. While cirrhosis was not confirmed on biopsy, he was calculated to have Child-Pugh A cirrhosis, with a conjugated bilirubin of $22 \mu\text{mol/L}$ (<20), INR of 0.9 (0.9–1.2), and platelets of $115 \times 10^9/\text{L}$ (140–400). Staging CT of the chest, abdomen, and pelvis did not reveal extrahepatic metastatic disease, and the patient was classified as Stage B according to the Barcelona Clinic Liver Cancer (BCLC) guidelines. He was promptly commenced on Entecavir 0.5 mg daily for treatment of HBV.

The hepatobiliary multidisciplinary team (MDT) meeting consensus was that there was extensive disease with likely intrahepatic metastasis, macrovascular invasion, and ruptured disease. While surgical management was considered in the form of an extended right hepatectomy, shared decision-making with the patient revealed his wish to avoid surgery and return to PNG as soon as possible. Following further discussion within the MDT, it was agreed

that palliative management with locoregional therapy in the form of selective internal radiation therapy (SIRT) as a single treatment would be in the best interests of the patient and his wishes. He proceeded with SIRT as an inpatient. He did not experience any complications from treatment, and post-procedure CT-PET confirmed dose delivery to the liver without significant extrahepatic uptake. Following completion of SIRT, the patient returned home to PNG with transfer of care to a local facility; thus, follow-up to date remains unknown.

2. Discussion

Primary liver cancer was the sixth most common cancer diagnosed in 2020 and the third leading cause of cancer death worldwide [1]. Hepatocellular carcinoma (HCC) is the most prevalent primary liver cancer, representing approximately 60–80% of liver cancers worldwide, with increasing incidence in Oceania [2]. Globally, both Hepatitis B virus (HBV) and Hepatitis C virus (HCV) remain leading risk factors for hepatocellular carcinoma [3]. The sequelae of chronic HBV infection vary from an inactive carrier state to the development of cirrhosis, hepatic decompensation, HCC, extrahepatic manifestations, and death. The 2021 World Health Organization (WHO) global progress report on viral hepatitis estimated that in 2019, there were 296 million people worldwide living with chronic hepatitis B infection [4]. There are approximately 1.5 million new infections annually, with 140,000 incident cases in the Western Pacific region, despite the availability of a safe and highly effective vaccine. The prevalence of HBV is 7.1% in the Western Pacific, compared to 2.1% in Australia [5]. It was suggested that universal screening for HBV in Australia may be a cost-effective strategy for achieving the WHO targets for HBV elimination by 2030 [6].



Figure 1: Large mass in the right lobe of the liver (approximately $12 \times 9 \times 8$ cm) with heterogeneous enhancement and a moderate volume of free fluid consistent with hemoperitoneum.

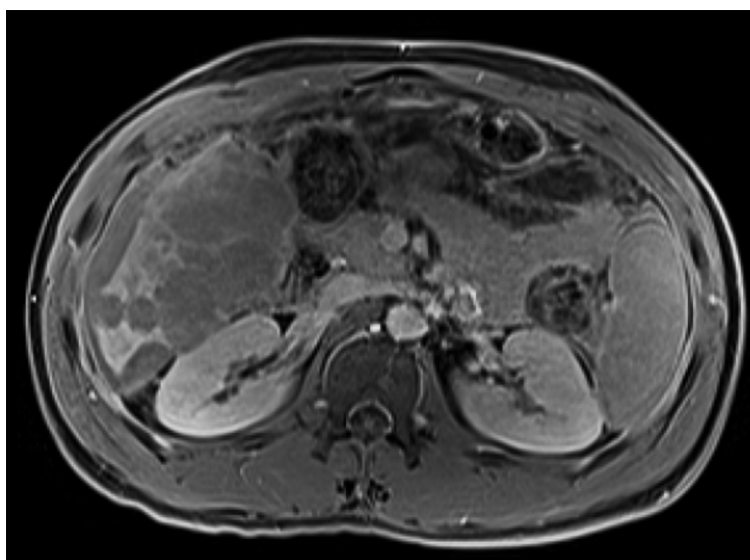


Figure 2: Multifocal hepatic tumor centered on segments IV, V, and VI, with additional lesions throughout the right hemiliver. Multiple adjacent nodules coalesce to form a larger conglomerate mass, with additional nodules scattered throughout segments VI, VII, and VIII.

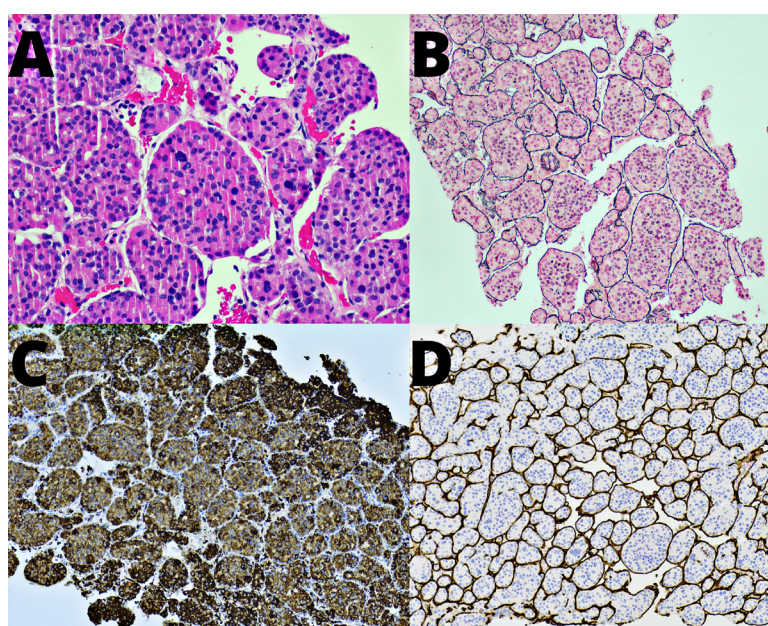


Figure 3: Histopathology consistent with a moderately differentiated hepatocellular carcinoma. A: Haematoxylin and eosin-stained sections showing neoplastic hepatocytes with a predominantly trabecular pattern. Higher power shows moderate nuclear atypia with a mitotic figure seen at high power (center of the image). B: Reticulin-stained sections showing widened hepatocyte plates with alteration and fragmentation of the reticulin network. C: Immunohistochemistry for HepPar1 is diffusely positive, which is a marker of hepatocyte differentiation with high sensitivity and specificity for well to moderately differentiated HCCs. It also stains benign hepatocytes. D: Immunohistochemistry for CD34 showing sinusoidal capillarization. CD34 is an endothelial marker that is not normally expressed in sinusoidal epithelium but is activated due to the increased arterial blood supply to the tumor. There was no non-neoplastic liver for assessment.

This case outlines the unique public health challenges faced by the citizens of PNG and the difficulty of identifying HCC in young patients with chronic hepatitis, where population-based surveillance is limited and early detection is increasingly dependent on proactive physical examination. Proactive HCC management is reliant on accurate disease staging and early multidisciplinary input to ensure an individualized treatment approach. The Barcelona Clinic

Liver Cancer (BCLC) guidelines on the Management of HCC outline the current standard of treatment, including local therapy such as surgical resection, tumor ablation with microwave, transarterial bland or chemoembolization (TACE), selective internal radiation therapy (SIRT), and liver transplant, in addition to systemic therapy options like molecular therapy [7] (Figure 4).

- Primary liver cancer is the cause of approximately 830,000 deaths annually worldwide. Hepatocellular carcinoma (HCC) is the most dominant type and has a rising incidence in Oceania.
- Hepatitis B virus (HBV) and hepatitis C virus (HCV) are significant risk factors for the development of cirrhosis and HCC. Clinicians should have a low threshold for screening for viral hepatitis, especially patients from endemic areas. Those positive should be referred to their local hepatology service for ongoing management, which may include surveillance using ultrasound and tumor markers (AFP).
- Despite the availability of an effective and safe vaccine, globally, there are an estimated 1.5 million new hepatitis B infections annually.
- Barcelona Clinic Liver Cancer (BCLC) is the most commonly used guideline for the management of HCC; however, treatment of HCC should be determined by a multidisciplinary team.

Figure 4: Practical points.

Following careful MDT and family discussion, SIRT was selected as the most appropriate and safe management option for the patient, offering demonstrated HCC disease control in Hepatitis B patients of Asian descent, a single treatment dose aligned with patient preference, and a low risk of adverse events that may be poorly managed in limited healthcare settings [8].

It is worthwhile noting that patients with Hepatitis B undergoing systemic therapy for HCC need to continue antiviral therapy to prevent viral reactivation, which may act as a barrier for patients with limited financial and physical access to healthcare services. Australia's commitment to improving healthcare and associated outcomes for countries in Oceania is demonstrated through the Official Development Assistance (ODA) program. The ODA provides financial and technical assistance to countries, including PNG, with up to \$200 million (AUD) allocated to healthcare and diseases endemic to the region [9].

This case highlights the importance of a broad differential to complex disease presentations, careful consideration of individual risk factors, and the prevailing healthcare challenges that face the Asia-Pacific region.

Authors' Contributions

DB: Conceptualization, Writing - Original Draft; DD: Writing - Review & Editing; AM: Writing - Review & Editing; AE: Writing - Review & Editing; EO: Writing - Review & Editing; DC: Writing - Review & Editing, Supervision; RB: Writing - Review & Editing, Supervision; SD: Writing - Review & Editing, Supervision; SF: Writing - Review & Editing, Supervision; BL: Writing - Review & Editing, Supervision; NO: Writing - Review & Editing, Supervision.

Data Availability

Case report details are shared within the paper. Further case report information may be requested from the authors.

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Conflicts of Interest

The authors did not have any conflicts of interest to disclose.

Ethical Approval

This case report adheres to the ethical standards of the institutional research committee and the principles outlined in the Declaration of Helsinki.

Patient Consent

Written informed consent was obtained from the patient for the publication of this report and accompanying images.

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