



Liver Abscess as an Initial Manifestation of Rectal Adenocarcinoma: A Case Report

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Abstract

Purpose: This report discusses an uncommon case where a pyogenic liver abscess served as the first clinical indication of an underlying rectal adenocarcinoma, highlighting the importance of abdominal imaging in detecting unusual presentations of colorectal cancer.

Case Summary: A 73-year-old man came in with symptoms of fever, pain in the right upper quadrant, and increased inflammatory markers. An abdominal ultrasound revealed a large collection in segment VIII of the liver. The patient later reported experiencing dyspepsia, a loss of appetite, and weight loss. A subsequent colonoscopy discovered a circumferential mass in the rectum, and histopathological analysis confirmed it as moderately differentiated rectal adenocarcinoma. A pelvic MRI described the lesion as T2N0. It was suspected that the liver abscess was caused by hematogenous bacterial seeding from the rectal tumor. Liver biopsy showed no presence of tumor cells.

Conclusion: This case highlights the necessity of considering hidden gastrointestinal cancers in patients who present with unexplained liver abscesses. Cross-sectional imaging is crucial not only for diagnosing and managing these abscesses but also for detecting underlying tumors that might otherwise remain unnoticed.

Keywords: Liver abscess · Rectal cancer · Rectal adenocarcinoma · Pyogenic abscess · Abdominal CT · MRI · Colorectal cancer.

Introduction

It is uncommon for colorectal cancer to initially present as a liver abscess. While the gastrointestinal tract is recognized as a potential source for liver infection through the portal venous system, it is rare for a liver abscess to appear before any noticeable gastrointestinal symptoms. This case underscores the importance of abdominal imaging in detecting both the abscess and the primary cancer.

Case Presentation

A 73-year-old man with a known history of diabetes came to the emergency department after experiencing fever, malaise, and pain in the right upper quadrant of the abdomen for 10 days. On physical examination, mild enlargement of the liver and tenderness were observed. Laboratory tests showed an elevated white blood cell count (WBC 14,000/ μ L), increased C-reactive protein levels (165 mg/L), and slightly abnormal liver enzyme levels. An abdominal ultrasound revealed a large collection in segment VIII of the liver. A contrast-enhanced CT scan of the abdomen identified a 7.2 \times 5.8 cm hypodense lesion in segment VII of the liver, with peripheral rim enhancement, indicating a pyogenic liver abscess. The abscess was drained percutaneously with ultrasound guidance. Despite the drainage and intravenous antibiotics, the patient continued to have low-grade fevers. Due to the unexplained origin of the abscess, further investigation was conducted. A colonoscopy uncovered a polypoidal mass in the rectum, 7 cm from the anal verge. A biopsy confirmed it as moderately differentiated rectal adenocarcinoma. Magnetic resonance imaging (MRI) of the pelvis revealed a polypoidal lesion with an intermediate T2 signal and restricted diffusion, consistent with a T2 lesion. Liver biopsy of the abscess wall revealed inflammatory changes but no signs of malignancy.

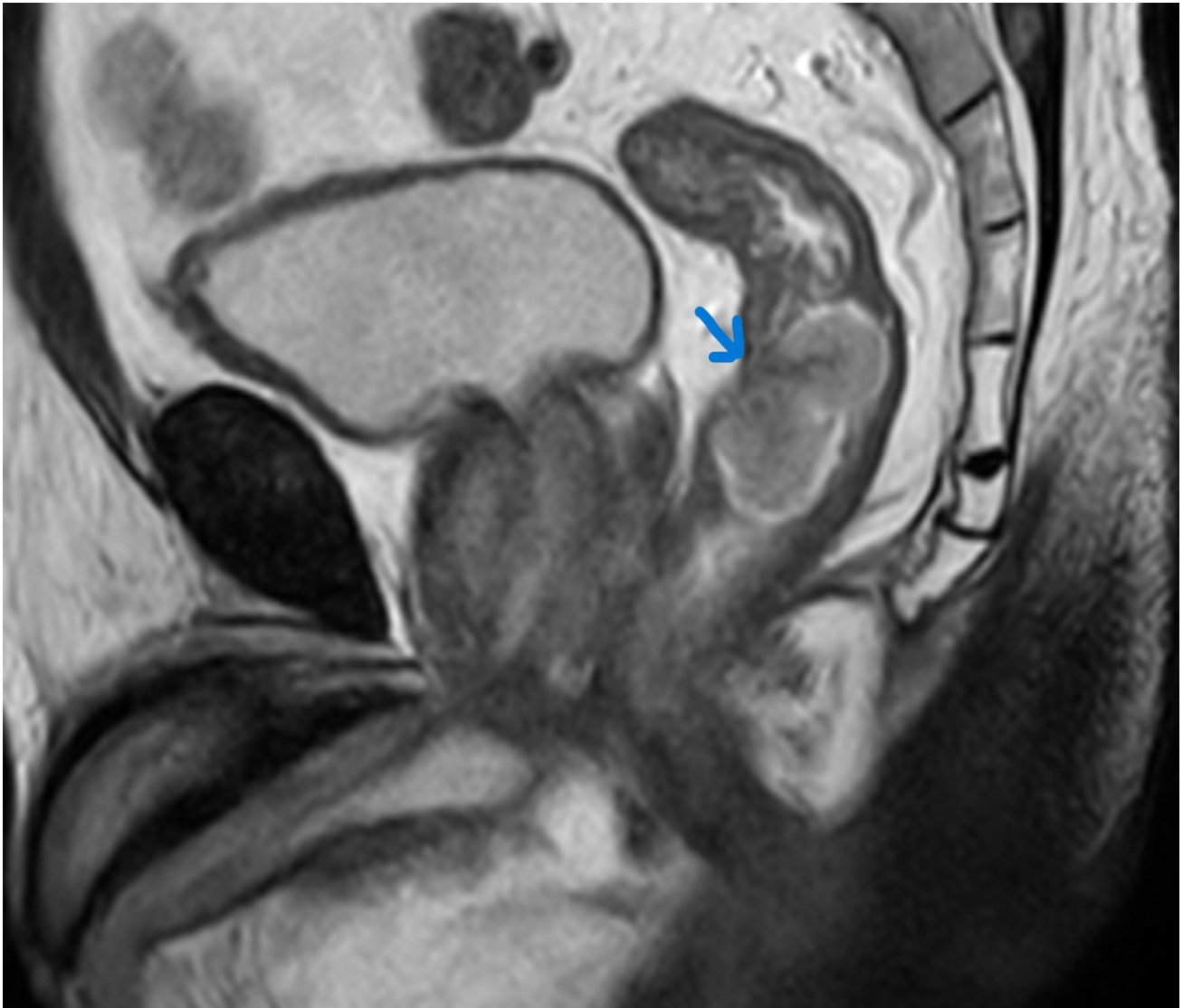


Figure 1: Sagittal T2 weighted MRI of the pelvis showing rectal wall thickening

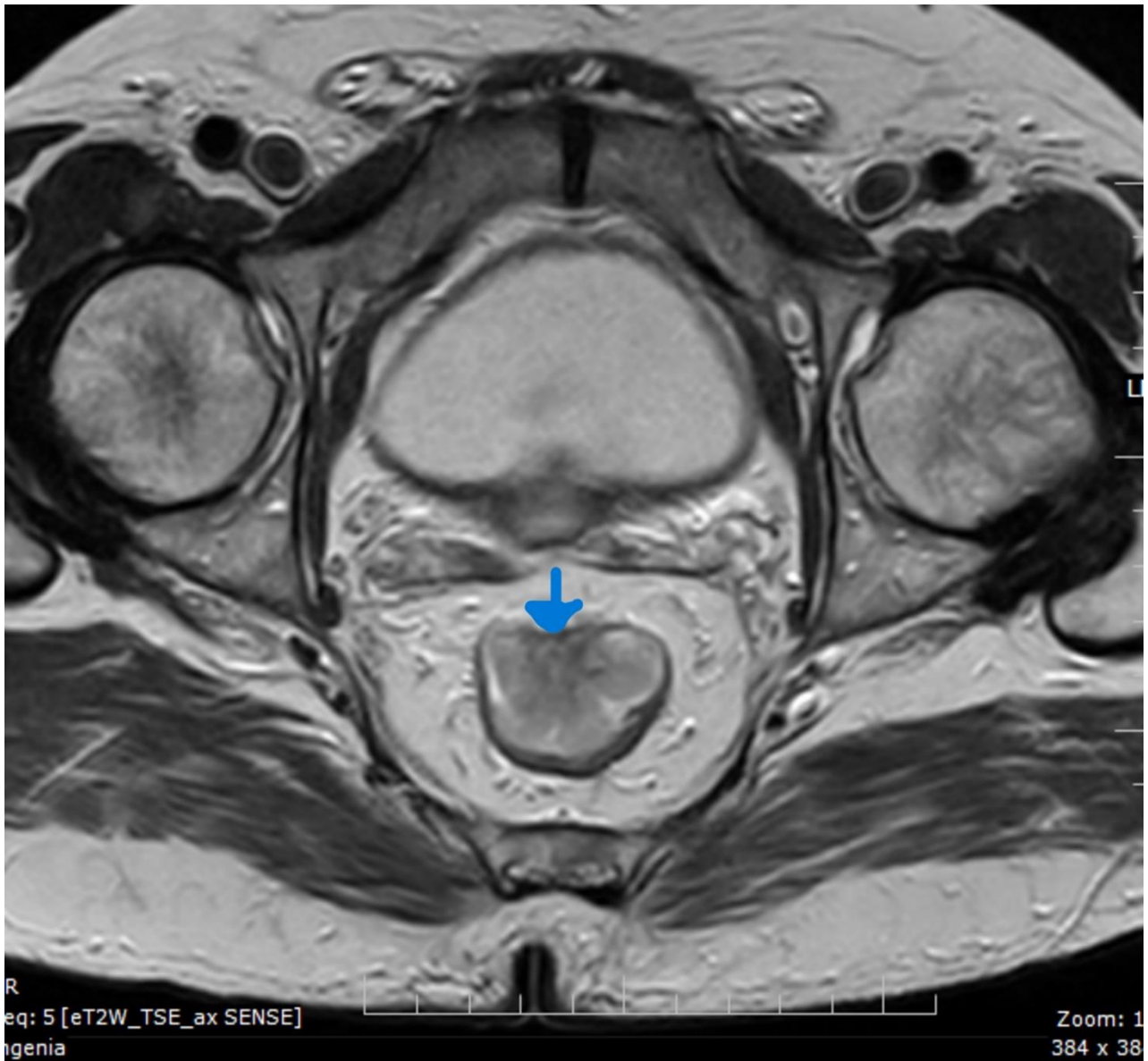


Figure 2: Axial T2-weighted MRI of the pelvis showing rectal wall thickening

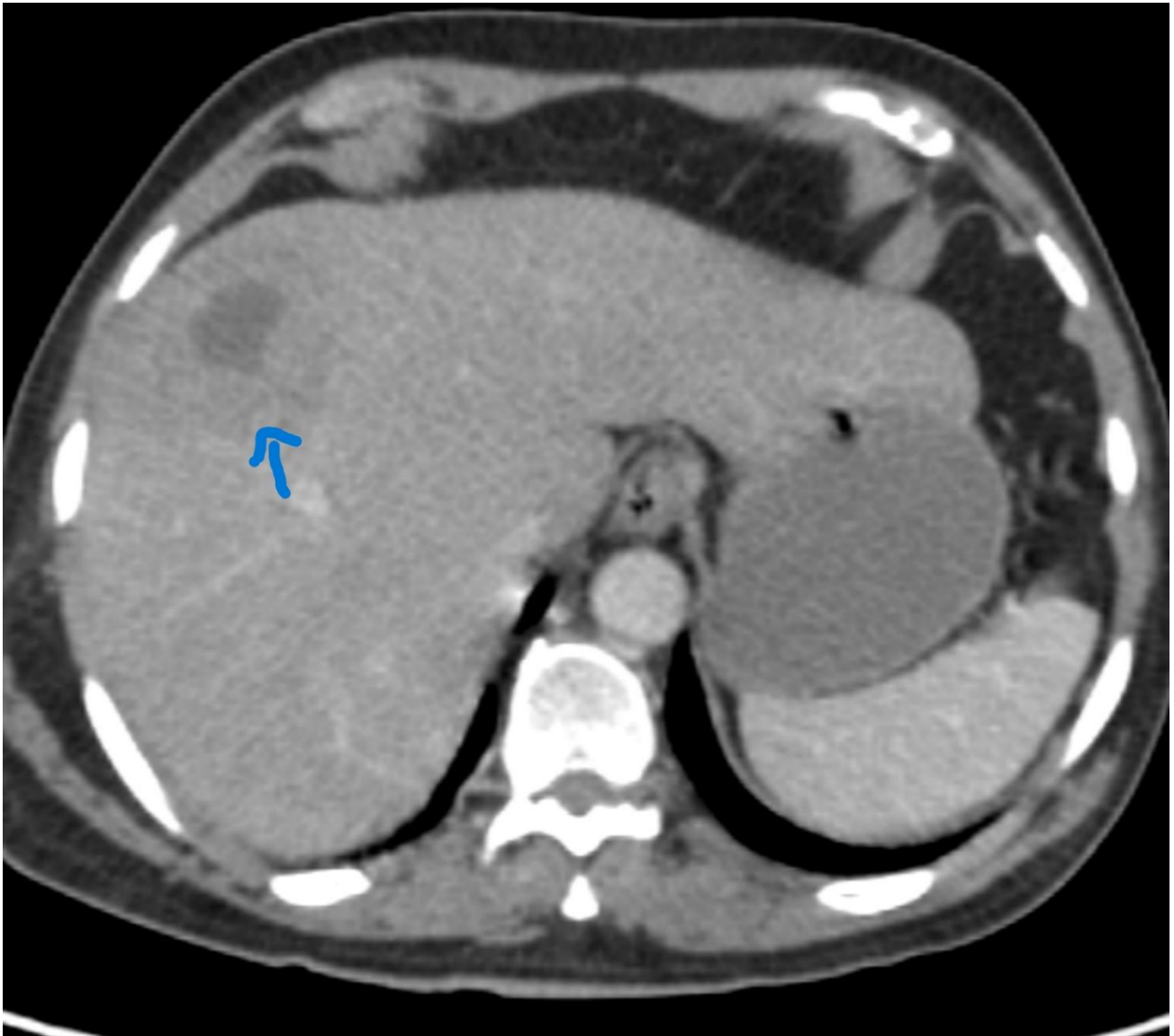


Figure 3: Contrast-enhanced axial CT image showing a rim-enhancing lesion in the right hepatic lobe

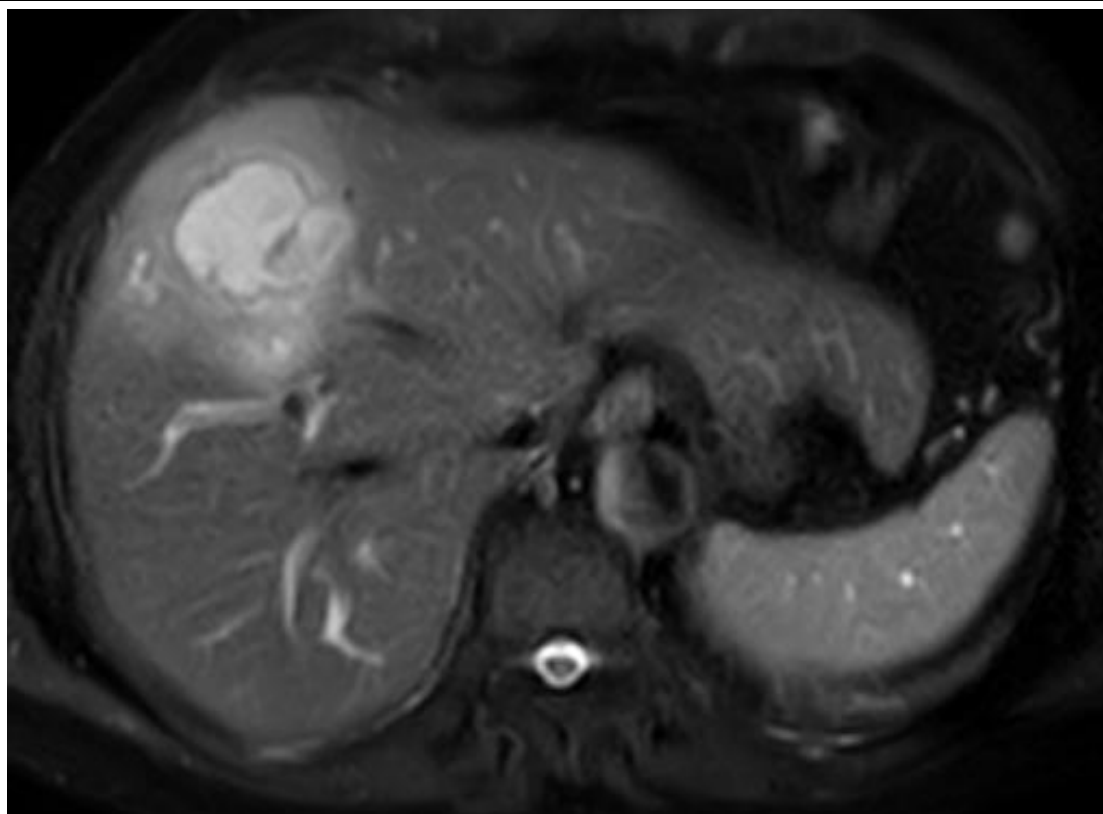


Figure 4: Axial T2 weighed MRI showing at T2 markedly hyperintense lesion in the right hepatic lobe with surrounding hyperintensity indicating an abscess with surrounding inflammation/edema

Discussion

The coexistence of colorectal carcinoma (CRC) and pyogenic liver abscess (PLA), although relatively uncommon, is a clinically significant entity that warrants high suspicion, particularly when liver abscesses occur without a clear source. Multiple studies have shown that CRC can either directly or indirectly predispose patients to hepatic abscess formation. This association has important diagnostic, therapeutic, and prognostic implications.

1. *Epidemiological Association Between CRC and Liver Abscess*

Colorectal cancer remains the third most common malignancy worldwide and a leading cause of cancer-related mortality【1】. Although metastasis to the liver is the most frequent hepatic manifestation of CRC, liver abscess—particularly pyogenic liver abscess (PLA)—has been increasingly recognized as a paraneoplastic or indirect complication, particularly in patients with underlying mucosal barrier disruption or occult malignancy【2】.

Several studies have demonstrated a statistically significant association between PLA and CRC. In a landmark population-based cohort study in Taiwan, Wang et al. found that patients with PLA had a 3.5-fold increased risk of developing CRC, particularly within one year of abscess diagnosis **【3】**. This finding underscores the potential role of liver abscess as a sentinel event, prompting thorough colorectal evaluation in affected patients.

2. Pathophysiology: From Tumor to Abscess

The pathogenesis linking CRC to liver abscess formation is multifactorial. The most accepted hypothesis involves translocation of enteric bacteria, particularly *Klebsiella pneumoniae*, through a disrupted colonic mucosa, such as that seen in ulcerated or necrotic tumors **【4】**. This microbial breach allows bacteria to access the portal venous system, ultimately seedling the liver parenchyma and forming abscesses.

Additionally, tumor-induced local immunosuppression, obstruction of colonic lumen, and alteration of the gut microbiome may further predispose patients to bacteremia and hepatic infection. In some cases, invasion of the mesenteric vessels by tumor may provide a direct conduit for microbial embolization.

Klebsiella liver abscess syndrome (KLAS), particularly prevalent in East Asian populations, is frequently associated with diabetes mellitus and underlying malignancy, and has emerged as a key clinical pattern in such presentations **【5】**.

3. Imaging and Diagnostic Challenges

Radiologically, differentiating pyogenic liver abscess from necrotic metastatic lesions can be challenging. Both may appear as hypoattenuating lesions on CT with peripheral rim enhancement. However, liver abscesses often show multiloculated or septated features, “cluster sign,” or gas formation (though rare), and may exhibit restricted diffusion on DWI sequences.

Contrast-enhanced MRI with diffusion-weighted imaging and hepatobiliary phase imaging can further assist in lesion characterization. Metastases tend to demonstrate peripheral rim enhancement with central necrosis but are more likely to retain morphology over serial imaging, whereas abscesses may change significantly with antibiotic therapy **【6】**.

4. Clinical Presentation and Clues to Underlying Malignancy

Patients with Pyogenic Liver Abscess typically present with fever, right upper quadrant pain, malaise, and occasionally jaundice. However, in elderly or immunocompromised individuals, symptoms may be subtle or atypical. Importantly, liver abscess without a clear source—such as biliary disease, appendicitis, or trauma—should prompt colorectal evaluation.

Studies have shown that up to 7–15% of PLA cases have an underlying malignancy, with colorectal carcinoma being among the most common sources [7]. Therefore, colonoscopy should be strongly considered in patients with cryptogenic liver abscesses.

5. Microbiological and Laboratory Correlation

Klebsiella pneumoniae is the predominant organism isolated in CRC-associated liver abscesses, particularly in East Asia. Other organisms include *Escherichia coli*, *Streptococcus anginosus*, and anaerobes such as *Bacteroides fragilis* [8]. Blood cultures are positive in up to 50% of cases, and aspirated pus often reveals polymicrobial flora in abscesses of colonic origin.

Tumor markers such as carcinoembryonic antigen (CEA) may be mildly elevated, though they are not specific. Liver function tests often show a cholestatic pattern, and inflammatory markers such as CRP and leukocytosis are typically elevated.

6. Management Considerations

Management of Pyogenic Liver Abscess involves a combination of broad-spectrum antibiotic therapy and image-guided percutaneous drainage when indicated. Empiric coverage typically includes agents effective against gram-negative bacilli and anaerobes, such as third-generation cephalosporins or piperacillin-tazobactam, with de-escalation based on culture sensitivities.

Simultaneous or subsequent treatment of the underlying malignancy is essential. In many cases, liver abscess resolution must precede definitive cancer therapy (e.g., surgery or chemotherapy), especially if systemic inflammation or sepsis is present.

Early recognition of concurrent CRC is vital, as delays can lead to progression of disease or missed opportunities for curative resection. Several reports advocate for routine colonoscopy in patients with cryptogenic PLA, especially when no biliary or identifiable gastrointestinal cause is found **【9】** .

7. Prognostic Implications

The prognosis of patients with both PLA and CRC varies depending on stage at diagnosis, timeliness of intervention, and presence of systemic complications. While PLA is typically treatable with antibiotics and drainage, missed or delayed CRC diagnosis may negatively impact survival.

Interestingly, some authors suggest that the occurrence of liver abscess may paradoxically lead to earlier detection of colorectal cancer, especially in the absence of overt gastrointestinal symptoms **【10】** . This raises the potential of liver abscess acting as a clinical marker for occult CRC.

Conclusion

The association between colorectal carcinoma and liver abscess is clinically relevant yet underrecognized. Pyogenic liver abscess, particularly in the absence of identifiable cause, should prompt a high index of suspicion for underlying CRC. The pathophysiological link—primarily involving mucosal disruption and bacterial translocation via the portal system—has been well established. Radiologists and clinicians must maintain vigilance when evaluating hepatic lesions in oncologic or septic patients, using advanced imaging and thorough clinical correlation. Colonoscopic evaluation should be routinely performed in cryptogenic liver abscess cases to rule out gastrointestinal malignancy. Multidisciplinary management is essential to ensure timely diagnosis and treatment of both infectious and neoplastic processes.

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