

Received: 2026.04.03  
Accepted: 2026.09.10  
Available online: 2026.09.23  
Published: 2026.XX.XX

# Resolution of Severe Jaundice Following Hepatic Artery Infusion of Bevacizumab and 5-Fluorouracil With Oral Regorafenib in Metastatic Colorectal Cancer: A Case Report

Authors' Contribution:  
Study Design A  
Data Collection B  
Statistical Analysis C  
Data Interpretation D  
Manuscript Preparation E  
Literature Search F  
Funds Collection G

BDE 1 **Xiuli Zhang**  
D 1 **Yan Zhou**  
C 1 **Wenxi Yu**   
C 1 **Chen Liang Zhou**  
F 1 **Guangzhi Wang**  
F 1 **Guowei Qian**  
**and collaborators\***

1 Department of Oncology, Shanghai Sixth People's Hospital Affiliated to Shanghai Jiao Tong University School of Medicine, Shanghai, PR China  
2 Shanghai Clinical Research Ward (SCRW), Shanghai Sixth People's Hospital Affiliated to Shanghai Jiao Tong University School of Medicine, Shanghai, PR China

\* A full list of authors is available on the website

**Corresponding Authors:** Hongtao Li, Shanghai Sixth People's Hospital, No. 600 Yishan Road, Shanghai, 200233, China, e-mail: [Lhtmed@shsmu.edu.cn](mailto:Lhtmed@shsmu.edu.cn)  
Yonggang Wang, Shanghai Sixth People's Hospital, No. 600 Yishan Road, Shanghai, 200233, China, e-mail: [sirui666@163.com](mailto:sirui666@163.com)  
**Financial support:** None declared  
**Conflict of interest:** None declared

**Patient:** Male, 63-year-old  
**Final Diagnosis:** Jaundice • metastatic colorectal cancer  
**Symptoms:** Jaundice  
**Clinical Procedure:** —  
**Specialty:** Oncology

**Objective:** Unusual or unexpected effect of treatment  
**Background:** Hepatic artery infusion (HAI) chemotherapy has been established as an indispensable treatment for hepatic metastatic colorectal cancer (CRLM), particularly in patients with multiple lesions.  
**Case Report:** We report the case of a patient diagnosed with liver metastasis from sigmoid colon cancer. The patient underwent hepatic segmentectomy and resection of the colon lesion in April 2019, following 8 cycles of systemic chemotherapy. After 4 postoperative courses of chemotherapy, the patient was monitored with regular follow-up. However, by November 2021, the patient had experienced 2 episodes of hepatic lesion recurrence and received late-line chemotherapy, combined with transcatheter arterial chemoembolization (TACE) and radiotherapy. In April 2024, the patient presented with severe jaundice, with total bilirubin (TB) up to 204  $\mu\text{mol/L}$  ( $\approx 12 \text{ mg/dL}$ ), and concurrent abdominal magnetic resonance imaging (MRI) demonstrated multiple hepatic lesions without evidence of biliary obstruction. After thorough discussion, shared decisionmaking led to the initiation a treatment regimen consisting of HAI with fluorouracil and bevacizumab, along with regorafenib. Because the bilirubin level decreased the next morning after the first infusion, additional cycles were performed, and subsequent arteriography showed a gradual transition from diffuse neoplastic abnormal staining to normal vascular patterns, and the liver lesions were significantly reduced in size.

**Conclusions:** Given the patient's poor adherence to regorafenib and its low late-line efficacy reported in the literature, we believe that HAI likely contributed more significantly to this case. While regorafenib's contribution cannot be fully excluded, this case shows that patients with heavily pretreated CRLM accompanied by jaundice can tolerate HAI of bevacizumab and fluorouracil.

**Keywords:** Jaundice • Bevacizumab • Infusions, Intra-Arterial  
**Full-text PDF:** <https://www.amjcaserep.com/abstract/index/idArt/953655>

 2175  —  4  32

Publisher's note: All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher



## Introduction

Patients who develop jaundice due to colorectal liver metastases (CLM) are typically managed with best supportive care, which is associated with a poor median overall survival of approximately 1 to 2 months [1,2]. Jaundice can arise from various causes; in cases of biliary obstruction, biliary drainage can significantly extend survival to about 9 to 12 months, enabling further chemotherapy [1-3]. However, administering systemic chemotherapy in patients with jaundice is challenging, as the pharmacokinetics and tolerability of chemotherapeutic agents in this setting—particularly with severe jaundice—have not been adequately evaluated.

Nevertheless, favorable outcomes have been reported in patients with jaundice treated with systemic anticancer therapies, including chemotherapy, targeted therapy, and immunotherapy, based on isolated case reports or small series [4-8]. In these cases, the highest reported bilirubin level was 27.7 mg/dL, which decreased to 2.5 mg/dL after first-line systemic therapy (oxaliplatin, 5-fluorouracil [5-FU], leucovorin, and bevacizumab) alone without biliary drainage [9]. Notably, most of these patients were treatment-naïve, and successful management of severe jaundice after multiple failed treatment lines remains unreported. The safety and efficacy of HAI with bevacizumab in patients with end-stage disease and concomitant severe jaundice are unknown.

This report describes a case of interest, differing from prior reports in 2 key aspects: first, it involves an end-stage patient after multiple failed treatment lines, with diffuse liver metastases causing jaundice and concomitant thrombocytopenia; second, the remarkable response was achieved via hepatic artery infusion chemotherapy (HAIC) along with oral

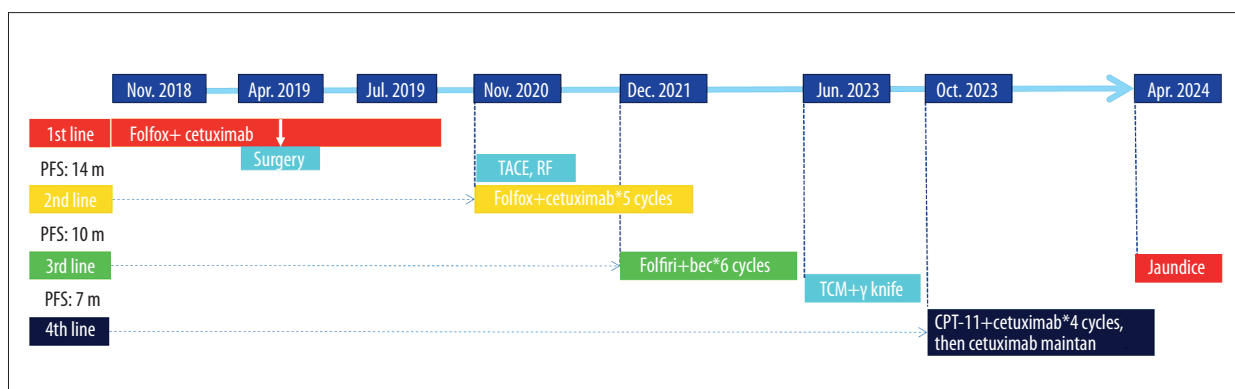
regorafenib. This case indicates that patients with CRLM accompanied by severe jaundice may benefit from HAI of bevacizumab and fluorouracil accompanied with oral regorafenib after multi-line treatment.

## Case Report

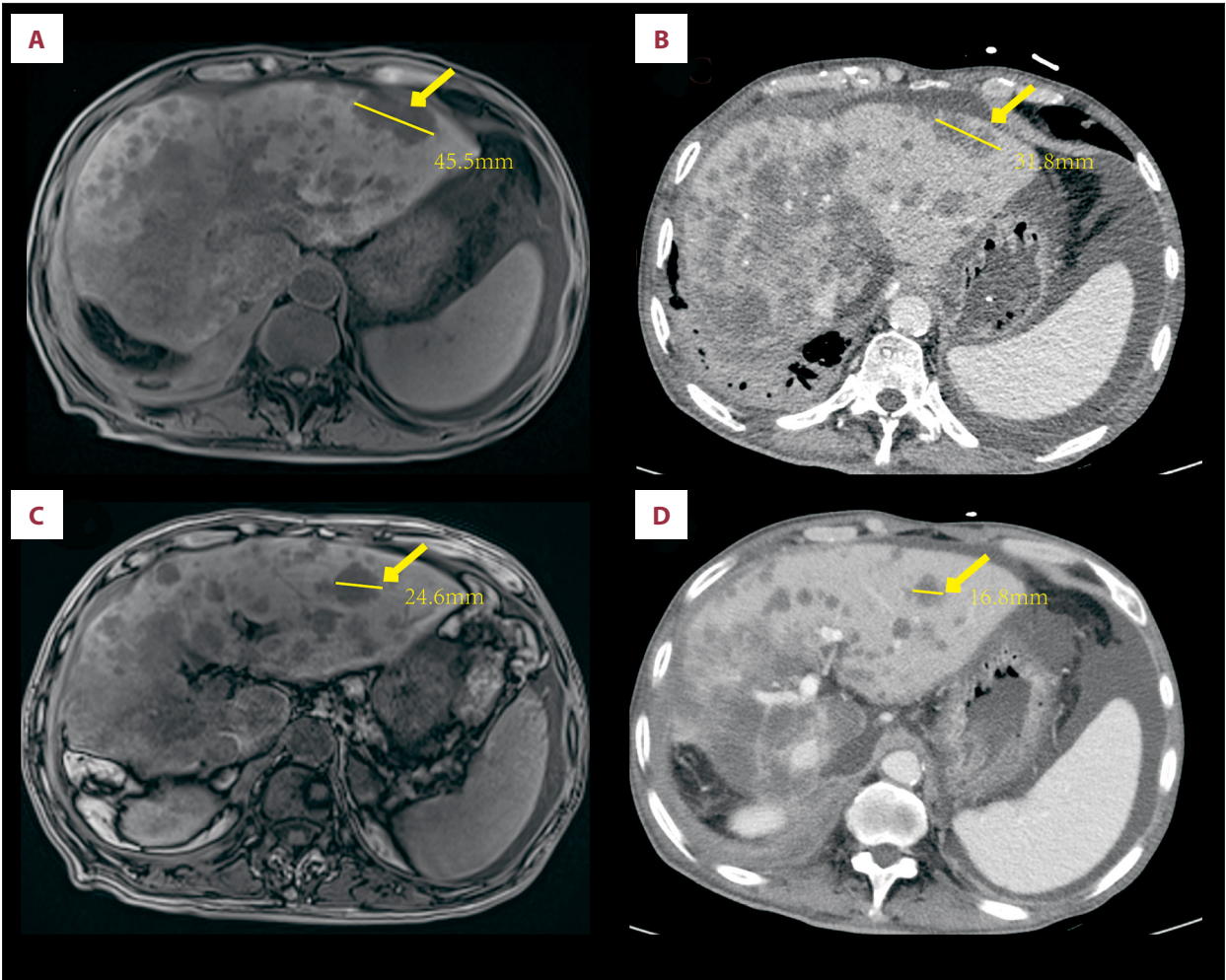
A 62-year-old man with a 5-year history of diabetes and no other significant past medical history initially presented in November 2018 with a 5-month history of constipation accompanied by hematochezia. He underwent a colonoscopy and was diagnosed with sigmoid adenocarcinoma on November 16, 2018. Immunohistochemistry analysis revealed that the tumor was microsatellite stable (MSS) and RAS wild type. Abdominal magnetic resonance imaging (MRI) revealed multiple metastatic lesions within the liver.

He was preliminarily staged as clinical Stage IV, then received a course of conversion chemotherapy consisting of 8 cycles of the FOLFOX plus cetuximab regimen (oxaliplatin 85 mg/m<sup>2</sup> IV on day 1; calcium folinate 400 mg/m<sup>2</sup> IV; 5-FU 400 mg/m<sup>2</sup> IV bolus followed by a 2400 mg/m<sup>2</sup> continuous infusion over 46 hours; and the cetuximab 500 mg/m<sup>2</sup> IV once every 2 weeks), which was completed in April 2019. Subsequently, on April 20, 2019, he underwent hepatic segmentectomy and a laparoscopic Dixon's procedure. Four cycles of adjuvant chemotherapy were completed after the operation.

During routine surveillance, a liver lesion recurred in November 2020, and 5 cycles of FOLFOX combined with cetuximab were administered again. Concurrently, TACE was performed. Abdominal MRI in May 2021 showed significant regression of the liver lesion. Unfortunately, the liver metastases recurred



**Figure 1.** Timeline of the treatment history before clinical presentation of jaundice. PFS, progression-free survival; TACE, transcatheter arterial chemoembolization; RF, radiofrequency; Bev, bevacizumab; TCM, traditional Chinese medicine; CPT-11, irinotecan; FOLFOX, oxaliplatin 85 mg/m<sup>2</sup> IV on day 1; calcium folinate 400 mg/m<sup>2</sup> IV; 5-FU 400 mg/m<sup>2</sup> IV bolus followed by a 2400 mg/m<sup>2</sup> continuous infusion over 46 hours; and cetuximab 500 mg/m<sup>2</sup> IV once every 2 weeks; FOLFIRI, Irinotecan 400 mg/m<sup>2</sup> IV; calcium folinate 400 mg/m<sup>2</sup> IV; 5-FU 400 mg/m<sup>2</sup> IV bolus followed by a 2400 mg/m<sup>2</sup> continuous infusion over 46 hours; bevacizumab 7.5 mg/Kg IV once every 2 weeks.



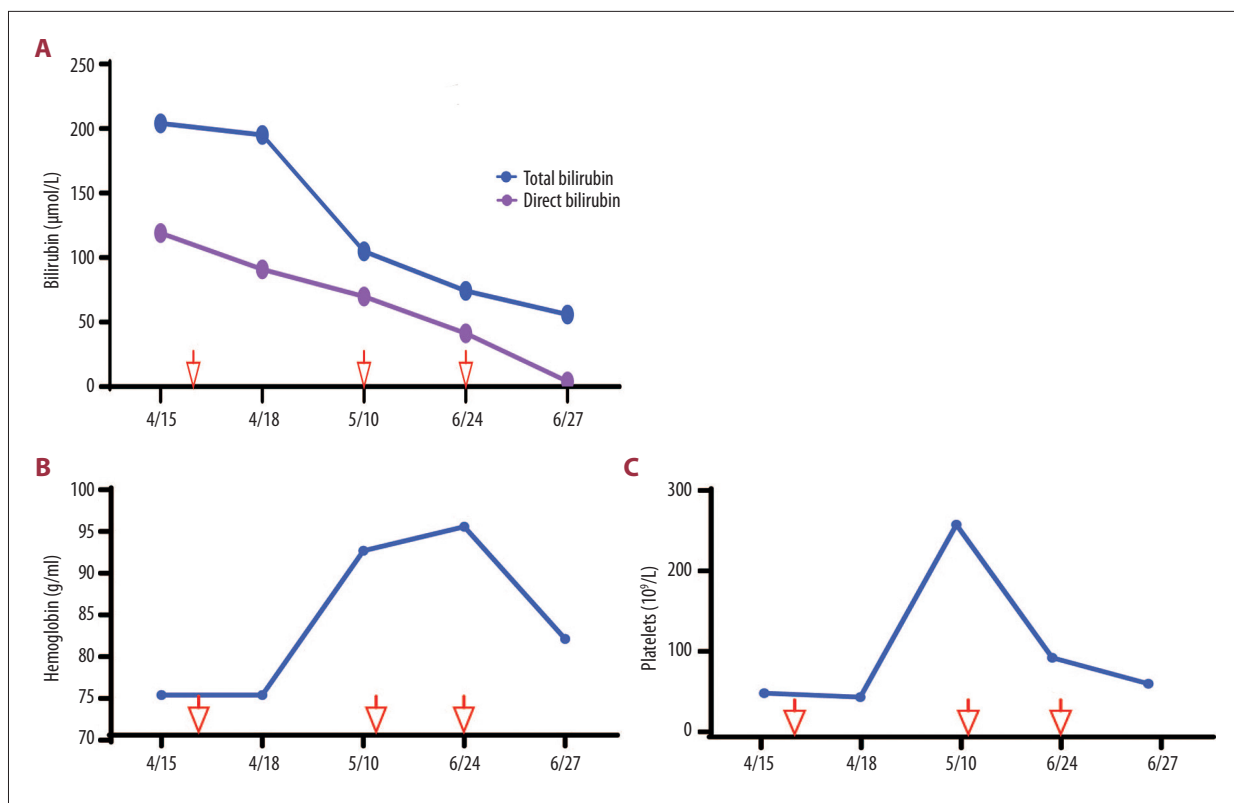
**Figure 2.** Changes of the liver lesion before and after arterial infusion therapy. Panel **A** and **B** show the liver lesions before hepatic arterial infusion therapy on magnetic resonance imaging performed on April 16, 2024, with the 2 target lesions measuring 45.5 mm and 24.6 mm, respectively. Panel **C** and **D** show the liver lesions after hepatic arterial infusion therapy on contrast-enhanced computed tomography performed on June 26, 2024, with the 2 target lesions measuring 31.8 mm and 16.8 mm, respectively.

in November 2021. Six cycles of the FOLFIRI plus bevacizumab regimen (irinotecan 400 mg/m<sup>2</sup> IV; calcium folinate 400 mg/m<sup>2</sup> IV; 5-FU 400 mg/m<sup>2</sup> IV bolus followed by a 2400 mg/m<sup>2</sup> continuous infusion over 46 hours; bevacizumab 7.5 mg/Kg IV once every 2 weeks) were subsequently administered, and he underwent gamma knife treatment. Due to an unsatisfactory effect, starting in May 2023 the combination of irinotecan and cetuximab was administered for 4 cycles, followed by cetuximab maintenance therapy. The treatment processes of this patient are shown in **Figure 1**.

On April 10, 2024, the patient presented again with jaundice of skin and sclera, along with abdominal distension. Laboratory results showed evidence of liver dysfunction with TB to 204 µmol/L (≈12mg/dL) (normal range: ≤18 µmol/L), direct bilirubin (DB) to 119 µmol/L (≈7 mg/dL) (normal range: ≤6

µmol/L), alanine aminotransferase (ALT) to 27U/L (normal range: ≤50 U/L), aspartate aminotransferase (AST) to 121 U/L (normal range: 15-46 U/L), γ-glutamyl transpeptidase (γ-GT) to 119U/L (normal range: 12-58 U/L), and albumin 33.2 g/L (normal range: 35-50 g/L) on April 15, 2024. His platelet count and hemoglobin level decreased to 60 × 10<sup>9</sup>/L (normal range: 125-350 × 10<sup>9</sup>/L) and 75 g/L (normal range: 130-175 g/L), respectively. The patient had no prior history of hepatitis, and routine screening performed prior to this admission yielded negative results for hepatitis B and hepatitis C infection. Abdominal MRI showed diffuse metastatic lesions in the liver, and multiple enlarged lymph nodes were found in the retroperitoneum without evidence of biliary obstruction (**Figure 2A, 2B**).

Given the advanced disease and the family's preference for aggressive treatment, along with supporting evidence from

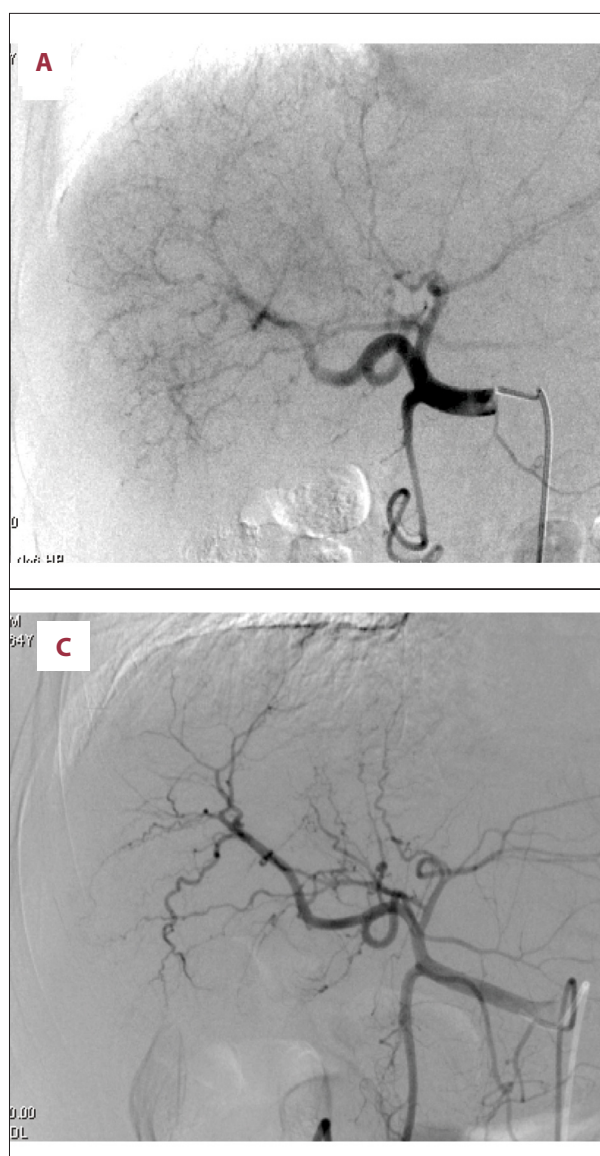


**Figure 3.** Changes in bilirubin, hemoglobin, and platelet levels before and after arterial infusion therapy. The bilirubin levels decreased obviously after arterial infusion therapy (A). The hemoglobin and platelet levels both increased to varying extents (B, C). Red arrows indicate the timing of arterial perfusion which were on April 16, May 11, and June 24, 2024, respectively (A-C).

clinical trials, HAIC combined with oral regorafenib was initiated (note: subsequent follow-up revealed poor compliance with regorafenib post-discharge, resulting in inconsistent dosing). The first cycle of the HAIC regimen was administered on April 17, 2024. The temporary indwelling catheter procedure for hepatic arterial infusion was performed with reference to a phase III trial [10], as detailed below. After administering local anesthesia at the puncture site, we established vascular access via the Seldinger technique by puncturing the right femoral artery, inserting a guidewire, and placing a 5F catheter sheath (TERUMO) to create a secure channel. Digital subtraction angiography (DSA) of the common hepatic artery was then performed to identify the tumor's blood supply through 5F RH catheter (TERUMO). Subsequently, a 2.2F microcatheter (Tokai Medical Products) was used for super-selective catheterization, with its tip placed distally in the proper hepatic artery, bypassing the gastroduodenal artery, to ensure coverage of the entire hepatic blood supply. The catheter, microcatheter, and arterial sheath were secured to the groin using medical dressings. The therapeutic agents bevacizumab 300 mg and 5-FU 3000 mg were locally infused for 4 hours and 6 hours, respectively, by electric pump (APON Corporation). The catheter and sheath were removed after infusion. Finally, post-operative management involved compressing and closing the

puncture site, advising the patient to remain on bed rest for 24 hours with the affected leg immobilized, and providing supportive care to monitor and manage potential complications.

After the first cycle, DB and TB levels trended downward (from 204 and 119 μmol/L to 195 and 91 μmol/L, respectively, the next morning on April 18, 2024) without further elevation or notable adverse effects. Meanwhile, AST and γ-GT levels decreased from 121 and 119 U/L to 115 and 91 U/L. This encouraged us to administer another 2 cycles of the regimen on May 11, 2024, and June 24, 2024, leading to marked improvements in laboratory results and clinical status (Figure 3A-3C). Upon completion of 3 cycles of HAIC treatment, the TB and DB levels decreased to near-normal levels to 56 and 4 μmol/L, respectively, on June 27, 2024. Although limitations arise from using different modalities, imaging evaluation indicated that the liver lesions also regressed substantially after infusion treatment (Figure 2C, 2D). Further, hepatic artery angiography showed the blood supply arteries gradually changed from tumor-like staining characteristics of blurred boundaries, dense staining, and tortuous courses to clear boundaries, light staining, and natural courses, indicative of vascular normalization [11] (Figure 4A-4C). During the treatment process, no other interventions were implemented apart from the use of liver-protecting drugs.



**Figure 4.** Changes of the neoplastic staining before and after arterial infusion therapy. Panel **A** shows the hepatic arteriogram before arterial infusion therapy, revealing diffuse neoplastic staining. Panel **B** and **C** show the hepatic arteriogram after the 2 arterial infusion therapies, showing gradual normalization of the vascular pattern. Panels **A**, **B**, and **C** display the angiographic images after the first, second, and third arterial infusion therapies, respectively. The times of arterial infusion were as listed above.

## Discussion

We describe the case of a patient with unresectable colorectal liver metastases (CRLM) who, after receiving multiple treatment lines, presented with severe jaundice and achieved significant laboratory and imaging remission through HAIC with 5-FU and bevacizumab and oral regorafenib.

Use of hepatic arterial infusion therapy is supported by a strong foundation of theoretical principles and clinical trials. Given that liver tumors are predominantly supplied with blood by the hepatic artery [12,13], the infusion of chemotherapy drugs into the hepatic artery exposes the tumor to high concentrations of these agents, resulting in minimal systemic adverse reactions and better patient tolerance. Randomized trials have shown that HAIC significantly enhances complete and

partial response rates in CRLM compared to systemic therapy [14-16]. Fluorinated pyrimidines, such as 5-FU, are ideal for HAIC due to their short half-life, high first-pass hepatic extraction, and efficacy against colorectal cancer (CRC) liver metastases [17,18]. In addition, this route of administration produces less systemic toxicity than intravenous administration, with a toxicity profile primarily characterized by gastrointestinal ulceration and elevation of hepatic enzymes that generally does not affect performance status [19]. Furthermore, the combination of HAIC with systemic agents, including regorafenib or fruquintinib, has substantial promise in managing unresectable CRLM, providing a survival benefit without exacerbating toxicity.

Anti-angiogenic therapy plays a pivotal role in patients with unresectable CRLM. Bevacizumab, a humanized monoclonal antibody, inhibits tumor angiogenesis by targeting the vascular endothelial growth factor (VEGF) signaling pathway [20]. Intravenous bevacizumab benefits patients with unresectable CRLM in both first-line and subsequent settings [21,22], and it has little hepatic metabolism and limited liver clearance, which accounts for its relative safety in patients with compromised liver function [23,24]. The BEVIAC study revealed that intra-arterial hepatic bevacizumab (7.5 mg/kg) combined with systemic chemotherapy is feasible and safe in patients

with unresectable CRLM who had progressed on a first-line systemic treatment [25]. In this clinical trial, the combination therapy resulted in 2 partial responses and 5 stable diseases in 9 evaluable patients, which means a disease control rate (DCR) of 78%. Notably, an R0 resection of liver metastases was achieved in 1 patient. Despite the small sample size, its safety profile suggests that the combination of arterially infused bevacizumab with other drugs warrants further exploration. Intra-arterial delivery of bevacizumab has also been shown to improve overall survival in newly diagnosed glioblastoma patients following surgical resection when compared to historical data [26,27].

The elevated bilirubin caused by CRLM occurs mainly through 2 mechanisms. Obstructive jaundice resulting from biliary compression by metastatic lesions is mainly managed with biliary drainage. A retrospective cohort study showed that HAIC remains an effective therapeutic modality for these patients if hyperbilirubinemia is not resolved by biliary drainage [28]. The hepatocellular jaundice caused by diffuse liver metastases is mostly treated with dose-reduced chemotherapy regimens [29]. Our patient had experienced multiple failed treatments and had severe jaundice; therefore, he was not a candidate for systemic chemotherapy. After multidisciplinary discussion, local interventional treatment along with regorafenib were recommended.

We primarily attribute the patient's clinical response to hepatic arterial infusion therapy rather than systemic treatment, based on 2 key considerations: first, the patient had poor adherence to the prescribed regorafenib regimen following discharge; second, clinical trial data indicate that regorafenib exhibits less than 5% partial response rate in patients who have failed standard therapies [30]. This finding suggests that hepatic arterial infusion chemotherapy can be a viable alternative option in subsequent-line management of unresectable CRLM.

Our case prompts consideration of new drug options, such as immune checkpoint inhibitors, for arterial infusion. A recent study showed that trans-arterial infusion of programmed death-1 (PD-1) antibody (pembrolizumab) is safe and effective for treating liver metastasis from melanoma [31]. Similarly, the intra-arterial cerebral infusion of cetuximab after disruption of the blood-brain barrier with mannitol for recurrent malignant glioma has been shown to be safe and well tolerated [32]. Ongoing clinical trials evaluating arterially infused drugs are needed to generate more robust data on treatment outcomes.

Several key limitations of the present case must be explicitly acknowledged to interpret the findings prudently. First, this study had a single-case design, which lacks control groups and comparative data, limiting the external validity and generalizability

of the conclusion. Second, concurrent hepatoprotective drugs, nutritional support, and symptomatic treatments were administered during HAIC intervention, bringing unavoidable confounding effects on jaundice improvement and tumor regression. Third, we did not fully exclude alternative causes of jaundice, including drug-induced liver injury and autoimmune hepatobiliary disorders, which can contribute to bilirubin fluctuations even if such alternative causes are unlikely.

## Conclusions

Patients developing jaundice due to colorectal liver metastases typically have a poor prognosis. Here, we present a case of end-stage metastatic colorectal cancer after multiple failed treatment lines, complicated by thrombocytopenia, in which a remarkable response was achieved via HAIC. The HAIC regimen (bevacizumab 300 mg for 4 hours + 5-FU 3000 mg for 6 hours per cycle) with oral regorafenib resulted in a continuous decline in total/direct bilirubin within 2 months, resolution of tumor vascular staining on angiography, and a significant reduction in liver metastases. Although our patient had a favorable outcome, this case cannot be generalized to routine clinical practice. The application of this approach should be individualized based on each patient's specific clinical context.

## Acknowledgments

We are grateful to Haiyan Hu, Zan Shen, and Yonggang Wang for suggestions on the treatment plan for our patient. We acknowledge the use of Qwen during the preparation of this manuscript. It was used solely for English language editing and grammar correction to improve the quality of the manuscript. All scientific content in this paper is entirely our own work. We take full responsibility for the accuracy and integrity of the content.

## Patient Consent

Written informed consent was obtained from the patient for the publication of this case report.

## Data Availability Statement

The data used in this article are available upon request from the authors.

## Declaration of Figures' Authenticity

All figures submitted have been created by the authors who confirm that the images are original with no duplication and have not been previously published in whole or in part.

## References:

- Kastelijns JB, van der Loos MATC, Welsing PMJ, et al. Clinical outcomes of biliary drainage of malignant biliary obstruction due to colorectal cancer metastases: A systematic review. *European Journal of Internal Medicine*. 2021;88:81-88
- Nichols SD, Albert S, Shirley L, et al. Outcomes in patients with obstructive jaundice from metastatic colorectal cancer and implications for management. *J Gastrointest Surg*. 2014;18(12):2186-91
- Yang H, Qin Q, Tang Y, Zhu W. Correlation between functional drainage and survival in malignant biliary obstruction after percutaneous biliary drainage. *Heliyon*. 2024;10(2):e24088
- Ikejiri F, Yokomizo K, Tamura K. Successful treatment with nivolumab in a patient with gastric cancer with severe liver failure resulting from multiple liver metastases: A case report. *Oncol Lett*. 2024;27(6):1-5
- Noventa S, Cherri S, Zaniboni A. Chemotherapy in advanced pancreatic cancer with hyperbilirubinemia. *Digestive Medicine Research*. 2020;3:18
- Utsunomiya S, Okumura A, Watanabe K, et al. A case of liver metastases with hyperbilirubinemia that was safely treated with chemotherapy (FOLFOX plus Cetuximab). *Annals of Oncology*. 2017;28:ix105
- Meryem L, Soumia G, Bouchra B. Safe use of capecitabine-cisplatin in metastatic gastric carcinoma with severe liver dysfunction: A case report from Algeria. *Electronic Physician*. 2017;9(8):4942-45
- Fakih MG. 5-fluorouracil leucovorin and oxaliplatin (FOLFOX) in the treatment of metastatic colon cancer with severe liver dysfunction. *Oncology*. 2004;67(3-4):222-24
- Walia T, Quevedo JF, Hobday TJ, et al. Colorectal cancer patients with liver metastases and severe hyperbilirubinemia: A consecutive series that explores the benefits and risks of chemotherapy. *Ther Clin Risk Manag*. 2008;4(6):1363-66
- Li QJ, He MK, Chen HW, et al. Hepatic arterial infusion of oxaliplatin, fluorouracil, and leucovorin versus transarterial chemoembolization for large hepatocellular carcinoma: A randomized phase III trial. *J Clin Oncol*. 2022;40(2):150-60
- Viallard C, Larrivee B. Tumor angiogenesis and vascular normalization: Alternative therapeutic targets. *Angiogenesis*. 2017;20(4):409-26
- Healey JE Jr. Vascular patterns in human metastatic liver tumors. *Surg Gynecol Obstet*. 1965;120:1187-193
- Breedis C, Young G. The blood supply of neoplasms in the liver. *Am J Pathol*. 1954;30(5):969-77
- Hohn DC, Stagg RJ, Friedman MA, et al. A randomized trial of continuous intravenous versus hepatic intraarterial floxuridine in patients with colorectal cancer metastatic to the liver: The Northern California Oncology Group trial. *J Clin Oncol*. 1989;7(11):1646-54
- Allen-Mersh TG, Earlam S, Fordy C, et al. Quality of life and survival with continuous hepatic-artery floxuridine infusion for colorectal liver metastases. *Lancet*. 1994;344(8932):1255-60
- Kemeny N, Daly J, Reichman B, et al. Intrahepatic or systemic infusion of fluorodeoxyuridine in patients with liver metastases from colorectal carcinoma. A randomized trial. *Ann Intern Med*. 1987;107(4):459-65
- Clarkson B, O'Connor A, Winston L, Hutchison D. The physiologic disposition of 5-fluorouracil and 5-fluoro-2'-deoxyuridine in man. *Clin Pharmacol Ther*. 1964;5:581-610
- Ensminger WD, Gyves JW. Clinical pharmacology of hepatic arterial chemotherapy. *Semin Oncol*. 1983;10(2):176-82
- Ensminger WD, Rosowsky A, Raso V, et al. A clinical-pharmacological evaluation of hepatic arterial infusions of 5-fluoro-2'-deoxyuridine and 5-fluorouracil. *Cancer Res*. 1978;38(11 Pt 1):3784-92
- Asahara T, Takahashi T, Masuda H, et al. VEGF contributes to postnatal neovascularization by mobilizing bone marrow-derived endothelial progenitor cells. *EMBO J*. 1999;18(14):3964-72
- Hurwitz H, Fehrenbacher L, Novotny W, et al. Bevacizumab plus irinotecan, fluorouracil, and leucovorin for metastatic colorectal cancer. *N Engl J Med*. 2004;350(23):2335-42
- Saltz LB, Clarke S, Diaz-Rubio E, et al. Bevacizumab in combination with oxaliplatin-based chemotherapy as first-line therapy in metastatic colorectal cancer: A randomized phase III study. *J Clin Oncol*. 2008;26(12):2013-19
- Shord SS, Bressler LR, Tierney LA, et al. Understanding and managing the possible adverse effects associated with bevacizumab. *Am J Health Syst Pharm*. 2009;66(11):999-1013
- Huang CW, Yeh YS, Ma CJ, et al. Patients with metastatic colorectal cancer and hyperbilirubinemia treated with FOLFIRI plus bevacizumab as first-line treatment. *Chemotherapy*. 2017;62(1):80-84
- Rigault E, Lacas B, Glehen O, et al. Intra-arterial hepatic bevacizumab and systemic chemotherapy in hepatic metastasis of colorectal cancer: A phase II multicentric trial in second-line treatment. *Cancer Treat Res Commun*. 2023;34:100674
- Lesniak WG, Chu C, Jablonska A, et al. A Distinct advantage to intraarterial delivery of (89)Zr-bevacizumab in PET imaging of mice with and without osmotic opening of the blood-brain barrier. *J Nucl Med*. 2019;60(5):617-22
- Burkhardt JK, Santillan A, Hofstetter CP, et al. Intra-arterial bevacizumab with blood brain barrier disruption in a glioblastoma xenograft model. *J Exp Ther Oncol*. 2012;10(1):31-37
- Wang T, Dong J, Zhang Y, et al. Efficacy and safety of hepatic artery infusion chemotherapy with mFOLFOX in primary liver cancer patients with hyperbilirubinemia and ineffective drainage: A retrospective cohort study. *Ann Transl Med*. 2022;10(7):411
- Quidde J, Azemar M, Bokemeyer C, et al. Treatment approach in patients with hyperbilirubinemia secondary to liver metastases in gastrointestinal malignancies: A case series and review of literature. *Ther Adv Med Oncol*. 2016;8(3):144-52
- Grothey A, Van Cutsem E, Sobrero A, et al. Regorafenib monotherapy for previously treated metastatic colorectal cancer (CORRECT): An international, multicentre, randomised, placebo-controlled, phase 3 trial. *Lancet*. 2013;381(9863):303-12
- Shen L, Qi H, Chen S, et al. Cryoablation combined with transarterial infusion of pembrolizumab (CATAP) for liver metastases of melanoma: An ambispective, proof-of-concept cohort study. *Cancer Immunol Immunother*. 2020;69(9):1713-24
- Chakraborty S, Filippi CG, Wong T, et al. Superselective intraarterial cerebral infusion of cetuximab after osmotic blood/brain barrier disruption for recurrent malignant glioma: Phase I study. *J Neurooncol*. 2016;128(3):405-15