

Case Report

Laennec's Approach for Central Liver Resection of Colorectal Cancer Liver Metastasis Adjacent to the Hepatic Hilum that Occurred 10 Years after Colectomy: a Case Report

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Abstract

We present a rare case report of colorectal cancer liver metastasis manifested 10 years after the resection of primary tumor. A 38-year old woman was referred to us with complains of right upper quadrant abdominal pain. Ten years before this she underwent colectomy due to colorectal cancer. Imaging revealed a liver mass adjacent to the portal vein bifurcation at the liver hilum. After 6 cycles of chemotherapy and partial response according to the radiological control, she underwent a central liver resection (Sg4, Sg5 and Sg8v+middle hepatic vein) with surgical skeletonization of 1st and 2nd order hepatic pedicles. The patient was discharged on 5th post-operative day. At 18th month of follow-up she was alive without any signs of recurrence.

Keywords: Colorectal cancer liver metastasis; Parenchymal sparing liver resection; Late metachronous metastasis

Introduction

Colorectal Cancer (CRC) is the 3rd most common cancer type worldwide and the 4th in Ukraine. CRC cells have the potential to disseminate from their origin in the colon to other areas of the body, often before the primary tumor is detectable [1]. It was shown that as few as 105 cells (~0.001 cm³) can initiate the CRC metastatic process [2]. A fraction of CRC cells might carry distinct biological traits conferring metastatic potential. Concurrently, dormant tumor cells have the ability to survive in the specific sites such as liver, lungs, bone marrow, lymph nodes, potentially reactivating after years of successful treatment of the primary tumor to initiate a metastatic disease [3].

Current treatment and surveillance guidelines recommend chest/abdominal/pelvic Computer Tomography (CT) and colonoscopy from the date of surgery for a total of 5 years for stage II-IV CRC [4]. However, 7%-11% of patients may develop a late recurrence after 5 years from initial colorectal surgery [5]. Therefore, the significance of extended monitoring beyond the initial 5 years remains a crucial inquiry.

For the last 3 decades, surgical resection of the primary colorectal

tumor and metastatic lesions provides the best oncological results and remains the standard of treatment [6,7]. The surgery for Colorectal Cancer Liver Metastases (CRLM) should be performed with the intent of complete removal of the tumor and preservation of at least 25%-30% of healthy liver remnant. Patients presenting with borderline resectable liver lesions may be considered for a two-stage hepatectomy with portal vein embolization and parenchymal sparing techniques [8,9]. In case of resectable metachronous liver metastases (diagnosed at least 6 months after the primary tumor surgery) neoadjuvant Chemotherapy (CTx) is optional [10]. However, in case of unresectable or borderline resectable liver metastases, CTx has the potential to down-staging and increasing the resectability [11].

In this case report we present our experience in applying parenchymal sparing liver surgery techniques and Laennec membrane-tunnel approach to successfully treat a patient with delayed onset of CRLM that occurred 10 years following initial diagnosis.

Case Presentation

A 38-years-old women complained of the pain in the upper right abdominal quadrant was referred to our hospital. Ten years before this, the patient underwent surgery due to the sigmoid colon adenocarcinoma: pT3pN0cM0 IIA stage, MSS [12]. The latest follow-up that was conducted 5 years prior to the current visit, revealed a disease free status. Chest/abdominal/pelvic CT showed the mass in Sg4 and Sg5 of the liver, spread to the ventral part of Sg8, 126 mm × 86 mm in size (Figure 1).

The tumor mass in 90% contact with the Left Portal Vein (LPV), including the involvement of the Sg4a and Sg4b Glissonian pedicles (B). The Right Portal Vein (RPV) and the Right Anterior Portal Vein (RAPV) were in contact up to 90%, the ventral branch of Sg8 was within the thickness of the tumor mass, and the Anterior Fissure Vein (AFV) passed along the tumor margin (A, C, D).

After the radiological visualization and core needle biopsy the

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patient was diagnosed with the borderline resectable solitary late metachronous colorectal adenocarcinoma pMMR/MSS, KRAS, NRAS and BRAF WT liver metastases. Multidisciplinary team recommended FOLFOX+cetuximab regimen with re-evaluation for conversion to resectable every 3 CHx cycles. On the 3rd month of radiological follow-up, after 6 cycles of chemotherapy, a 13% decrease of liver lesion was registered; this corresponded to the stabilization of the disease, according to RECIST 1.1 criteria [13].

According to CT and MRI data, there was no reliable evidence of tumor invasion to the 2nd order Glissonian pedicles (Figure 2). The decision was made to perform a central liver resection (Sg4, Sg5, Sg8v+middle hepatic vein) with surgical skeletonization of 1st and 2nd order hepatic pedicles.

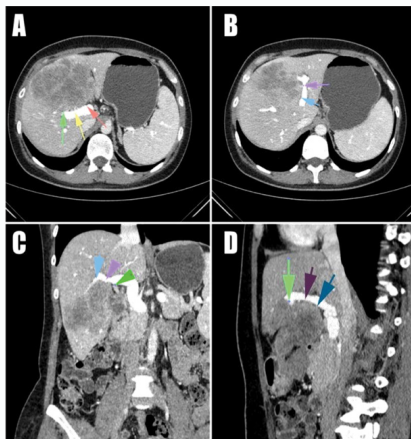


Figure 1: CT scans before the CTx.

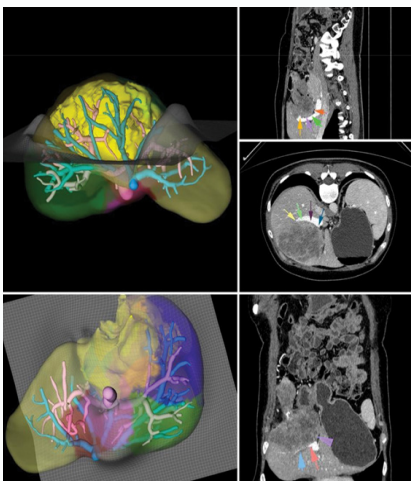


Figure 2: D and 3D CT imaging of the patient after 3 months of CTx.

Surgical technique

The J-shaped surgical incision was used. We conducted intraoperative ultrasonography to achieve a precise understanding of the location of metastatic mass and its relationship with the hepatic Glissonian pedicles. Liver mobilization included dissection of the falciform and round ligaments with preservation of the left and right triangular ligaments. Liver parenchyma transection was begun from the right side through the right portal scissure with anatomical resection of Sg5 and to the RAPV with subsequent surgical skeletonization of the right hepatic pedicle with Laennec membrane-

tunnel approach [14,15]. Further parenchymal transection from the left side of the lesion followed the umbilical scissure, with transection within the gap between Laennec's capsule and liver hilar plate, along the left hepatic pedicle. After two transection lines joined in one, the confluence of left and right portal pedicles was detached from the metastatic mass. Third order pedicles to Sg4 and Sg5, and to the ventral portion of the Sg8 were ligated within the Laennec's gap, and parenchymal transection was continued through the umbilical scissure. Middle hepatic vein was mobilized and transected with Prolene 4.0 suturing. Further parenchymal transection between paracaval portion of Sg1 and anterior sector+Sg4 allowed completing the procedure.

Liver transection was conducted using crash-clamp technique and application of the intermittent Pringle maneuver (20 min ischemia, 5 min reperfusion). Blood loss was 350 ml, blood units transfusion wasn't performed. Total surgery duration was 310 min with 65 min of liver warm ischemia. Postoperative period was uneventful and patient was discharged on the 5th postoperative day.

Follow up

The surveillance chest/abdominal/pelvic CT and regular monitoring of Carcinoembryonic Antigen (CEA) blood levels were conducted at the intervals of 1, 3, 6, 9, 12, 15 and 18 months after surgery, revealing no evidence of local or distant metastatic recurrence (Figure 3).

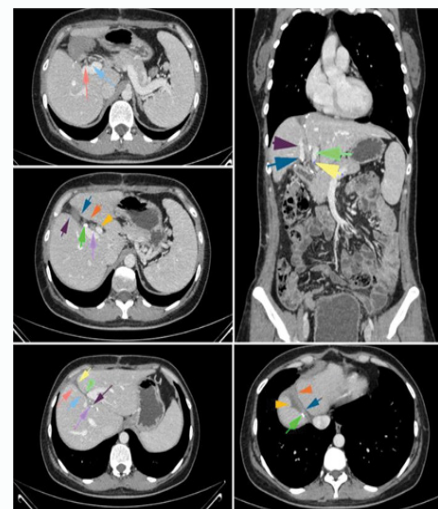


Figure 3: CT imaging at the 18th month after the surgery.

Discussion

In 2020, the global incidence of colorectal cancer reached nearly two million cases, 16,700 new patients were registered in Ukraine [7,16]. Liver represents the predominant site of colorectal cancer distant metastasis. Approximately half of all patients develop liver metastasis during the course of their disease [17]. For the past three decades surgical resection remains the only treatment modality with curative intent [18]. The evolution of metastatic CRC treatment is an example of continuous advancements within the oncological field. The pioneers of hepatopancreatobiliary surgery used conservative technologies in the treatment of primary tumor and liver metastases, due to limited knowledge in the anatomy and physiology of the organ and the low effectiveness of chemotherapy of that time [19,20]. At the end of the 1980s, liver resection was not recommended for patients

with more than four CRLM, since their life expectancy did not exceed 3 years [21,22]. However, the growing adoption of aggressive surgical approaches has expanded the indications for resection. And currently the resectability criteria were reduced to the assessment by a multidisciplinary team and preservation of adequate functional volume as well as quality of the future liver remnant.

Intraoperative ultrasound made it possible to remove metastasis located deeply in the parenchyma in an amount of up to 50 lesions during single surgical procedure [23]. Further understanding of the organ function, its anatomy, and the metastatic disease biology have stimulated surgeons and scientists to explore safer surgical techniques for patients with bilobar liver lesions. The organ's unique capacity to regenerate has led to development of two-stage liver resections for the patients who were previously considered inoperable [24]. At the same time, the group of surgeons introduced the technique of one-stage parenchymal sparing liver resections. That implied the tumors' detachment from intrahepatic vascular structures and blood flow control. It facilitated the identification of communicant vessels among hepatic veins, enabling the assessment of the inflow direction following the hepatic vein clamping [25]. Furthermore, the updated and comprehensive understanding of the liver's surgical anatomy, including the anatomy of Laennec's capsule, has contributed to the comprehension of the R1 vascular margin safety phenomenon [14,26].

Conclusion

We describe a successful case of parenchymal sparing liver surgery in a borderline resectable metastatic lesion adjacent to the portal bifurcation in the hepatic hilum. The tumor was removed with 180 degree left and right Glissonean pedicles skeletonization in the Laennec's capsule gap. Disease-free and recurrence-free 18 months postoperative follow-up demonstrates good oncological result. Laennec's approach provides new possibilities for safe liver resection due to the hepato-caval confluence colorectal metastatic lesions.

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