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CASE REPORT

Two-Staged Surgery for Metastatic Liver Tumor in Morbidly Obese Individual-Left Hemihepatectomy Following Placement of Laparoscopic Adjustable Gastric Band

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Abstract A 47-year-oldmale with a body mass index (BMI) 37.12 kg/m^2 was diagnosed with an ill-demarcated tumor within IVB segment of left lobe of the liver. Sixteen months earlier, he underwent laparoscopic gastric banding for morbid obesity (BMI 51 kg/m^2). One year after bariatric procedure, he was diagnosed with rectal adenocarcinoma. Following abdominoperineal resection of rectum with total mesorectal excision and 2 months course of adjuvant FOLFOX chemotherapy, he was scheduled for liver resection. Left hemihepatectomy was performed with no major complications; wound discharge was successfully treated in outpatient clinic. Twelve months following surgery, he remains disease free with no evidence of local recurrence, metachronic primary tumor, or distant metastases. This is first to our knowledge report providing data on the outcome of left hemihepatectomy performed in postbariatric patient. The role of bariatric surgery and utilization of the time necessary for neoadjuvant chemotherapy to reduce the excessive body mass and the degree of liver steatosis is discussed.

Keywords Morbid obesity · Metastatic liver tumor · Two-staged surgery · Gastric banding · Hemihepatectomy

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Introduction

Dramatic increase of obesity rate in the Western countries has been observed during the past two decades [1]. Therefore, the significant percentage of patients undergoing surgery for various indications is morbidly obese. At the same time, the popularity of restrictive and malabsorbtive bariatric operations—the only successful and effective methods of morbid obesity treatment—has been growing rapidly [2]. As a result of this popularity, the number of postbariatric patients has increased worldwide, and many new clinical questions regarding guidelines of consecutive reoperative surgery of these patients have been arisen.

Laparoscopic adjustable gastric banding has been accepted as a safe and efficient surgical technique for weight loss and the cure of obesity-related comorbidities [3, 4]. Although several studies have analyzed the problem of reoperative surgery in cases of band migration [5–7], there are, to our knowledge, no data on the outcome of other postlaparoscopic adjustable gastric banding (post-LAGB) operations requiring dissection in periband area such as left hemihepatectomy. Furthermore, there have been no reports regarding feasibility of major liver resections among obese, postbariatric patients. Herein, we present the case of morbidly obese patient with hepatic metastasis of rectal cancer who underwent extended left hemihepatectomy following prior laparoscopic adjustable gastric banding. Bariatric procedure was performed before the diagnosis of malignancy. Hereby, we discuss problem of intraoperative complications during post-LAGB reoperative surgery and potential liver steatosis barrier to an aggressive hepatic surgical approach.

Case Report

A morbidly obese 47-year-old male was presented in our department for evaluation of the possibility of liver resection for metastatic tumor of left lobe of the liver. His weight and body mass index (BMI) were 115 kg and 37.12 kg/m^2, respectively. Both ultrasound and computed tomography revealed tumor in segment IVB of the liver. His medical history included laparoscopic gastric banding for morbid obesity and abdominoperineal resection of the rectum performed in other hospital.

Sixteen months earlier, at the time of laparoscopic gastric banding, the patient's weight, height, and BMI were 158 kg, 1,76 m, and 51 kg/m^2, respectively. Comorbidities included hypercholesterolemia and hip and knee pain. At that time, serum asparagine aminotransferase (AspAT), alanine aminotransferase (AlAT), and bilirubin levels were 23 IU/L, 28 IU/L, and 0.44 mg/dL, respectively. The patient had failed all conservative attempts at weight reduction and hence after multidisciplinary preoperative consultations was qualified for laparoscopic gastric banding. Adjustable gastric band was placed with the use of *pars flacida* technique. Neither preoperative upper GI endoscopy and abdominal ultrasound nor intraoperative inspection did not reveal pathological features apart from liver steatosis. The postoperative period was uneventful. Patient has been followed up for 12 months and demonstrated typical continued weight loss of 39 kg. Surprisingly, 1-year screening ultrasound examination and following computer tomography (Fig. 1) revealed 48×46×36-mm solid, ill-demarcated tumor within IVB segment of left lobe of enlarged, steatotic liver (Figs. 2 and 3). Concurrently, an elevated carcinoembryonic antigen (CEA) serum level (7.1 ng/mL) was observed. During diagnostic colonoscopy, anterior rectal wall 1.5 cm ulceration within 2 cm of anal verge was found. Tumor biopsy including pathological examination revealed rectal adenocarcinoma. Computed tomography scans of the entire abdomen and pelvis revealed no sign of adjacent organs infiltration neither regional nor distant metastasis. Following discussion of possible therapeutic options, patient was scheduled for combined abdominoperineal resection of rectum with total mesorectal excision. Both operation and postoperative period were uneventful. Final histopathologic examination revealed moderately differentiated, tubular rectal adenocarcinoma combined partially with mucinous type. No features of muscular layer and incision line infiltration were found, and 1-cm radial resection margin was confirmed. Two out of all excised lymph nodes were affected with metastases (pT2, N1; Dukes' C stage). According to oncological treatment protocols, adjuvant 2 months FOLFOX chemotherapy was applied.

At the end of chemotherapy course control, computed tomography confirmed the presence of single lesion in the left lobe of the liver. Patient was scheduled for liver resection. Then, serum AspAT, AlAT, and bilirubin levels were 19 IU/L, 18 IU/L, and 0.73 mg/dL, respectively. Following right subcostal incision laparotomy, intraoperative ultrasound was used to assess anatomical relation of the tumor and intrahepatic vasculature. Dense adhesions between the left liver lobe and the lesser omentum,

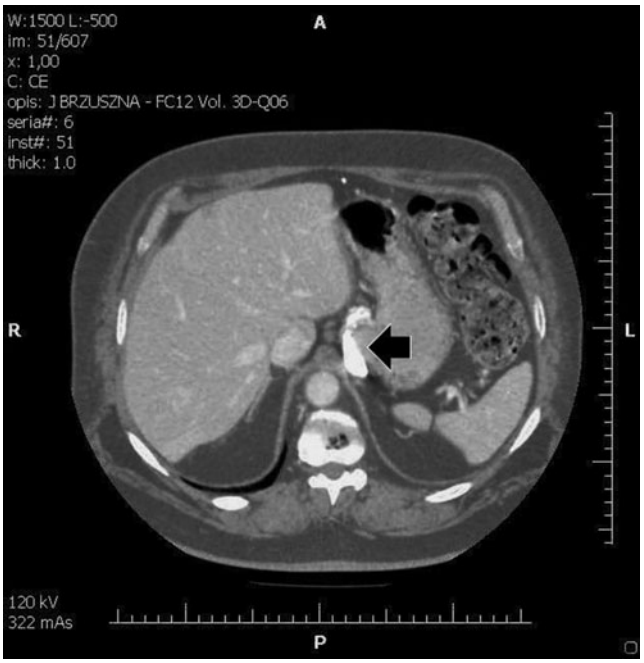

Fig. 1 Gastric band placed around the upper part of the stomach

Fig. 2 Tumor within IVB segment of left lobe of enlarged, steatotic liver

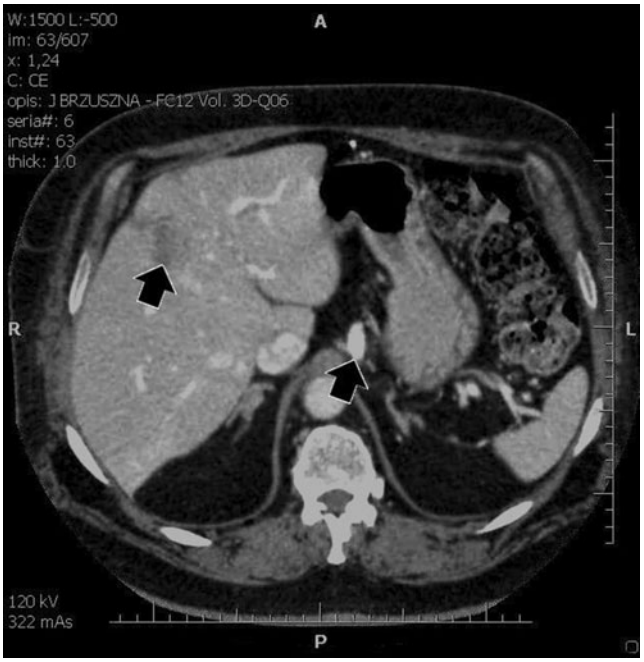

Fig. 3 CT scan of the abdomen pointing a liver tumor and gastric band

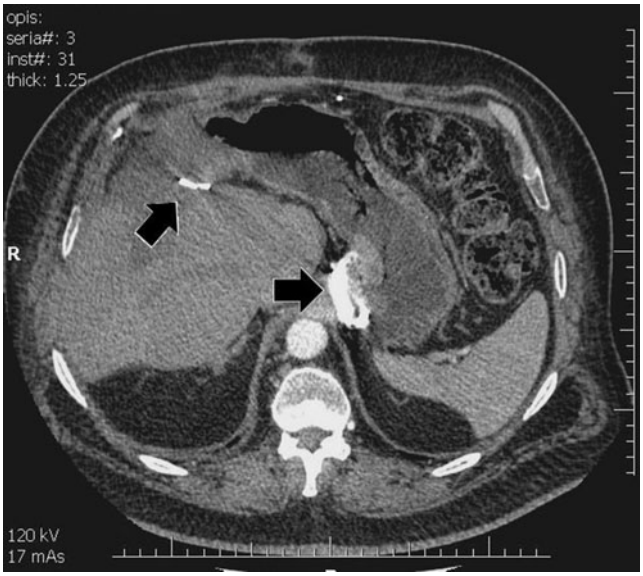

Fig. 4 CT scan showing the surgical clips placed on the residual part of liver and intact gastric band

abdominal wall, and stomach were found and transected with diathermy knife. The same technique was used to mobilize the left liver lobe to the level of inferior vena cava. There was no bleeding and gastric band was left intact in place. The sutures, securing the band in place, were identified and left intact; band position was precisely inspected. Remaining procedure steps including ligation of left branch of portal vein and left hepatic artery and subsequent transsection of liver parenchyma (clamp and crush technique) with concomitant cholecystectomy were performed to complete left hemihepatectomy without segment I resection. Altogether, segments II, III, IVA, and IVB were resected. There was no need for blood transfusion, total operative time was 130 min, and patient left hospital on seventh postoperative day. Recovery period was complicated with superficial wound infection treated successfully in outpatient clinic. He was appointed for the control visit in the department, where the gastric banding was originally performed. There was no need for readjustment of the gastric band. Pathological examination of the excised tumor revealed adenocarcinoma metastasis of 5 cm in size with the 2 cm margin of healthy parenchyma. Focal areas of necrosis and hematoma following prior chemotherapy were found. In the normal parenchyma, moderate level of steatosis was confirmed. Up to date, the patient has been followed up for 9 months and remained disease free with no evidence of local recurrence, metachronic primary tumor, or distant metastases (Fig. 4). So far, blood CEA concentration has remained within normal range.

Discussion

From surgical point of view, gastroesophageal junction is one of the most difficult anatomical regions. The placement of the lap band and possible postoperative distention of the upper part of the stomach may trigger an intense foreign body reaction with creation of dense adhesions between the capsule of the left lobe of the liver and the serosa of stomach. Thus, every procedure following gastric band placement can be challenging [5–7]. During left hemihepatectomy following gastric band placement, all the adhesions should be carefully transected with monopolar or bipolar coagulation to minimalize bleeding. The sutures securing the band should be identified and left intact to facilitate keeping the band in place. Care should be taken to avoid postoperative prosthesis infection. Therefore, adequate hemostasis and biliostasis following dissection of hepatic parenchyma as well as antibiotic prophylaxis are essential.

Liver is the most common site of distant metastases. Colorectal liver metastases account for nearly half of all metastatic lesions in this organ. Liver resection remains the only one method of potentially curative treatment of patients with colorectal liver metastases. It can prolong patients' life expectancy with 5-year survival increased up to 58%. Patients who were not submitted to the surgical treatment of colorectal liver metastases have a median survival of less than 12 months [8–11]. Better understanding of hepatic segmental anatomy, development in surgical techniques and postoperative care enabled more patients to undergo extended anatomical liver resections. Despite the data showing that increased body mass index does not

increase perioperative risk in noncardiac surgery, morbid obesity is one of the factors making liver surgery especially challenging [12].

The data presented in a paper analyzing the results of liver surgery show that both operating time and hospital stay are longer, and amounts of transfused blood is higher when patients are morbidly obese [13]. It is a result of increased risk of liver resection in morbidly obese, especially among patients with steatosis or steatohepatitis. Hepatic steatosis is the most common hepatic condition associated with obesity [14, 15]. In particular, it is estimated that approximately 20% of patients planned for liver resection have some degree of steatosis [16]. The effects of liver steatosis on the outcome of hepatic resection remain ill-defined. However, some reports show that even mild hepatic steatosis increases the incidence of primary liver dysfunction or nonfunction, decreases patient survival rate, and is associated with increased risk of postoperative mortality and morbidity [16]. Body mass index has been proved to have significant correlation with prevalence and severity of steatosis. Majority of patients with BMI above 28 kg/m^2 have been demonstrated to be affected by this liver pathology [17]. The results of liver transplantation performed in the group of morbidly obese recipients were significantly worse than in the lean patients. Morbid obesity was found to be independent predictor of mortality. Therefore, it was recommended that morbid obesity (BMI >35 kg/m^2) should be considered as a relative contraindication for major liver operations [18]. It has been proved that two-staged strategy (implementation of adjustable gastric banding as a primary procedure) is effective in obtaining weight loss and lowering the degree of liver steatosis prior to the performance of liver resection for benign tumor [19]. In our morbidly obese patient, laparoscopic gastric banding operation was performed prior to the diagnosis of colorectal cancer liver metastasis. It is very difficult to advocate the postponing of liver surgery for malignancy to achieve weight loss and improvement of anatomical and histological condition. However, neoadjuvant chemotherapy prior to the liver resection may facilitate the resectability of liver with colorectal metastases [20].

Some chemotherapy regimes (for example with irinotecan) increase the risk of liver steatosis and steatohepatitis and can lead to hepatic parenchyma damage. Despite these facts, many authors believe that the treatment of most patients with liver metastases—those with resectable metastases as well as those with initially unresectable metastases—should start with chemotherapy. If drugs are well chosen and the duration of treatment is carefully monitored, benefits largely outweigh potential disadvantages [21].

Some authors recommend implementing a dietary weight reduction and exercise program with locoregional treatment to improve the performance status of these patients before elective liver surgery [22]. In case described above, the laparoscopic gastric banding allowed to achieve body mass index reduction from primary 51.00 to 37.12 kg/m^2. Still being morbidly obese with recently finished course of chemotherapy with FOLFOX regimen (5-fluorouracil, leucovorin, and oxaliplatin), patient was considered a high-risk candidate for major liver resection. In authors' opinion in similar cases, any delay necessary for significant weight loss and hepatic steatosis reduction with the use of nonbariatric methods cannot be justified. The development of laparoscopic surgical methods of substantial weight reduction opens a new perspective in possibility of liver resections in morbidly obese individuals. Maybe time necessary to finish a course of chemotherapy could be utilized for concomitant reduction of accessory body mass, as it more and more often happens in patients waiting for solid organ transplantation [23].

Conflict of interest The authors declare that they have no conflict of interest

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