

Rare hepatic artery anomaly (Michel type unclassified) in a patient who underwent radical gastrectomy for gastric cancer: a case report

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ABSTRACT

Hepatic artery variations are common clinical occurrences. Injury to these variant arteries during gastric cancer surgery is mostly caused by their unknown anatomy. These complications can cause serious problems and therefore, recognizing these variations in the preoperative period for minimizing the risk of injury is very important. In the present study, we present a rare hepatic artery anomaly found during a preoperative computed tomography evaluation of a patient who underwent gastric cancer surgery. Detailed examination of patients with preoperative computed tomography evaluation and obtaining three-dimensional angiographic image sections in the case of doubts is useful for preventing hepatic artery injuries.

Keywords: Hepatic artery variation, gastric cancer, 3D angiographic CT

Introduction

Hepatic artery variations are common clinical occurrences. Currently, these variations have become more important because of the increasing number of liver transplants from living donors, laparoscopic approaches for radical oncologic surgeries, and procedures such as trans arterial chemotherapy for hepatic tumors (1).

In 1928, Adachi described six types of divisions of the celiac trunk and superior mesenteric artery (SMA) based on 252 dissections of Japanese cadavers (2). In 1966, Michel et al. (3) performed a cadaver study of 200 cases and defined basic anatomic variations in hepatic arteries with only 55% standard anatomy. Hiat et al. (4) have performed 1000 cadaveric liver donor hepatic artery examination and reported 75% cases with normal anatomy. This ratio ranges from 55% to 79% in different series (1-5).

According to the Japanese guidelines, Japanese gastric cancer treatment guidelines 2010 (ver. 3) gastrohepatic ligament dissection is required for surgical treatment of gastric cancer (6). Knowing the variations that may occur in the hepatic artery during this dissection will be protective against future injury and possible postoperative complications. Possible variations observed in the contrast-enhanced three-dimensional (3D) computed tomography (CT) evaluation during the preoperative period will minimize the risk of hepatic artery injury during gastrectomy (7).

Here we aimed to present a rare hepatic artery anomaly found during preoperative CT evaluation in a patient who underwent distal subtotal gastrectomy+D2 lymph node dissection for gastric cancer.

Case report

A 66-year-old male patient was admitted to. Kartal Koşuyolu High Speciality Education and Training Hospital, Department of Gastroenterology Surgery polyclinic Kartal Koşuyolu High Speciality Training and Research Hospital with weight loss and loss of appetite, and upper gastrointestinal endoscopy indicated a diagnosis of gastric cancer in the lower

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third of the stomach with a pathological diagnosis of signet ring cell carcinoma. The preoperative thin-slice enhanced CT evaluation revealed a disease stage of T4N3. The images also demonstrated that the right hepatic artery (RHA) originated from SMA (Figure 1), and the left hepatic artery (LHA) was branched from the middle of the splenic artery (Figure 2). There was no common hepatic artery originating from the celiac trunk (Figure 3, 4).

After preoperative neoadjuvant chemotherapy, the patient underwent laparotomy and subtotal gastrectomy with D2 lymph node dissection (LND) with a stage IIIC (T4, N3a) final pathological diagnosis. During LND, hepatic artery variations observed were that LHA branched from the splenic artery passing through anterior side of the esophagus before entering the left liver lobe and RHA originated from SMA. The patient was discharged on postoperative day 7 uneventfully.

Because the present case was studied retrospectively, no signed informed consent was taken from the patient.



Figure 1. The right hepatic artery (RHA) branched from the superior mesenteric artery (SMA)



Figure 2. The left hepatic artery (LHA) branched from the splenic artery (SA)

Discussion

During radical gastric cancer surgery, particularly in patients who underwent neoadjuvant therapy, hepatic artery injuries are observed. Main causes of hepatic artery injury are related with direct tumor invasion or lymph node metastasis. But unknown variations in the hepatic artery are also an important cause for these injuries (7).

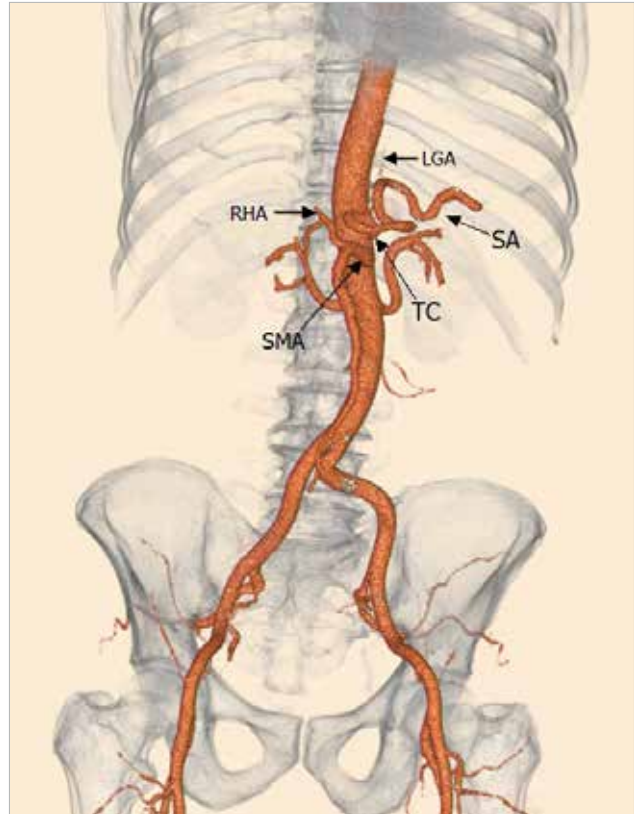


Figure 3. Three-dimensional angiographic image of the branches of the abdominal aorta
TC; Truncus coeliacus, SMA; Superior mesenteric artery, SA; Splenic artery, RHA; Right hepatic artery, LHA; Left hepatic artery

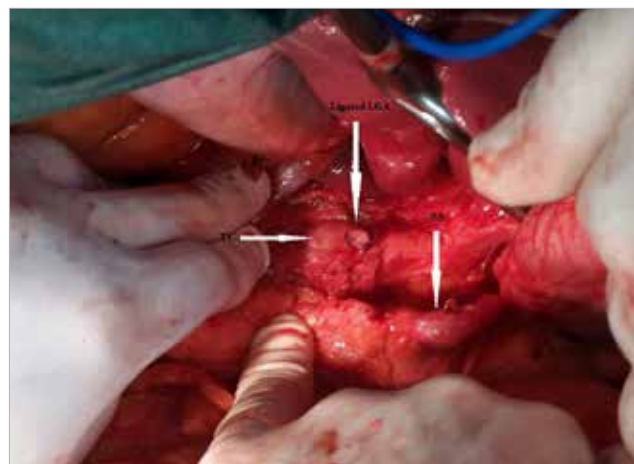


Figure 4. Truncus coeliacus (TC) with the splenic artery (SA) and ligated left gastric artery (LGA)

When performing D2 LND, care must be taken in patients with variant RHA from SMA while dissecting lymph nodes 12 and 13, and care must be taken in patients with replaced LHA from any trunk while dissecting lymph nodes 1,3,7,8, and 11 (8). In the present case, we reported that there were variations in both right and left hepatic arteries and no common hepatic artery from the celiac trunk; this makes LND more difficult than that for arteries with a standard anatomy.

In different series, hepatic artery variations were reported between 21% and 45%. In 1966, Michel et al described 10 different variations in the hepatic artery. Hiatt et al. (4) modified this classification and have identified six different variations in the hepatic artery. The variation observed in the present case does not fit into any of these classifications (2-5).

Conclusion

The risk of hepatic artery injury during D2 LND is higher in arteries with different anatomical structures than in those with anormal variation. Detailed examination of the patients with preoperative CT evaluation and obtaining 3D angiographic image sections in case of doubt would reduce the risk of injury.

Informed Consent: Written informed consent was not obtained from patients due to the retrospective design of study.

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