Clinical Imaging 52 (2018) 189–192

Contents lists available at ScienceDirect

Clinical Imaging

journal homepage: www.elsevier.com/locate/clinimag

Implications of the replaced right hepatic artery originating from the gastroduodenal artery in the setting of a pancreatic head mass

Akhil Chawla[a,b,*], Michael H. Rosenthal[a,c], Thomas E. Clancy[a,b]

[a] Dana-Farber Cancer Institute, Boston, MA, United States
[b] Division of Surgical Oncology, Brigham and Women's Hospital, Harvard Medical School, United States
[c] Department of Radiology, Brigham and Women's Hospital, Harvard Medical School, United States

ARTICLE INFO

Keywords:
Pancreas
Pancreaticoduodenectomy
Anatomic variation
Replaced hepatic artery

ABSTRACT

Purpose: The anatomic variability of the hepatic artery has important implications in the treatment of periampullary cancers. The purpose is of this report is to describe the importance of the replaced right hepatic artery originating from the gastroduodenal artery, which is typically removed during a pancreatic head resection, and to demonstrate how this variant can markedly alter treatment planning and intraoperative decision making.
Materials and methods: In this report, two cases of a replaced right hepatic artery originating from the gastroduodenal artery are described in the setting of a borderline-resectable pancreatic adenocarcinoma identified on preoperative CT imaging.
Results: The importance of identifying this variant preoperatively is highlighted. In addition, the implications involved in preserving the replaced right hepatic artery are emphasized, requiring preservation of a portion of the gastroduodenal artery within the pancreatic parenchyma during pancreaticoduodenectomy.
Conclusion: The location of this variant in the setting of a pancreatic head malignancy mandates its attention by a multidisciplinary team of radiologists, radiation oncologists, medical oncologists, and surgeons, prior to pancreaticoduodenectomy.

1. Case 1

A 74-year-old female presented to her primary care physician with two-weeks of epigastric pain, bloating, and belching. CT imaging revealed a 3 × 2.4 × 3 cm hypoattenuating mass within the head of the pancreas, with surrounding lymphadenopathy and no evidence of metastatic disease. Subsequent endoscopic ultrasound identified the mass within the pancreatic head with surrounding lymphadenopathy. Cytology results were positive for malignant cells.

She was then referred to our center for multidisciplinary consultation. Based on the presence of peripancreatic lymphadenopathy, neoadjuvant chemotherapy was recommended. She underwent four cycles of FOLFIRINOX treatment. Eight-week surveillance CT scan with pancreas protocol demonstrated a decrease in size of the concerning lymph nodes, without significant change in the size of the pancreatic mass. There was no vessel involvement of the mass. However, the right hepatic artery (RHA) was identified to be originating from the gastroduodenal artery (GDA). The proper hepatic artery (PHA) was identified to be giving off the left hepatic artery (LHA), with no identifiable branch supplying the right lobe of the liver. Given its location within the pancreatic head, the mass was found to be encasing the distal GDA, (Fig. 1). However, there was no evidence of definite involvement of the replaced RHA or its origin.

The patient did not have evidence of tumor progression after four cycles of neoadjuvant chemotherapy. The imaging demonstrating a potential plane between the pancreatic mass and the replaced RHA. Therefore, the mass was deemed to be potentially resectable. The patient was explored for possible pancreaticoduodenectomy, and intraoperatively the replaced RHA was identified coursing posterolateral to the common bile duct (CBD). The GDA was dissected within the head of the pancreas to the replaced RHA without injuring the artery or affecting the oncologic margins of the resection (Fig. 2A). Preservation of flow to the replaced RHA was possible via ligation of the GDA distal to the replaced RHA origin (Fig. 2B) The remainder of the resection was uneventful and reconstruction was then performed in standard fashion, with Roux-en-Y pancreaticojejunostomy and hepaticojejunostomy placed anterior to both the GDA and replaced RHA (Fig. 2C).

This patient had an uneventful postoperative course. Pathology demonstrated poorly differentiated adenocarcinoma with lymph node positive disease. All margins were negative for disease. She is currently

* Corresponding author at: Department of Surgery, Brigham and Women's Hospital, Harvard Medical School, 75 Francis St, Boston, MA 02215, USA.
E-mail address: achawla3@partners.org (A. Chawla).

https://doi.org/10.1016/j.clinimag.2018.07.024
Received 22 May 2018; Received in revised form 26 July 2018; Accepted 31 July 2018

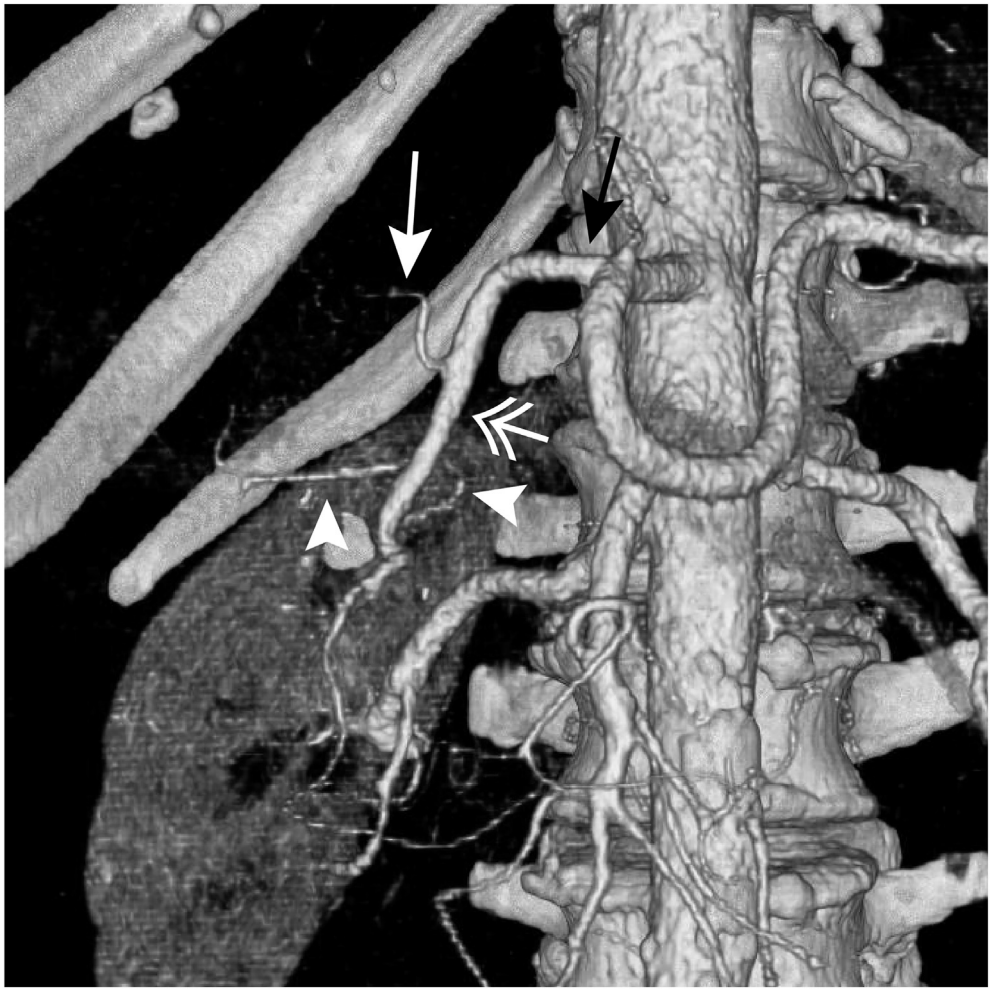

Fig. 1. Coronal 3D rendering of CT scan with IV and oral water contrast demonstrates the RHA originating from the GDA. This looping vessel was in close proximity to the pancreatic mass. CHA *black arrow*, GDA *double white arrow*, LHA *white arrow,* RHA *white arrowheads.*

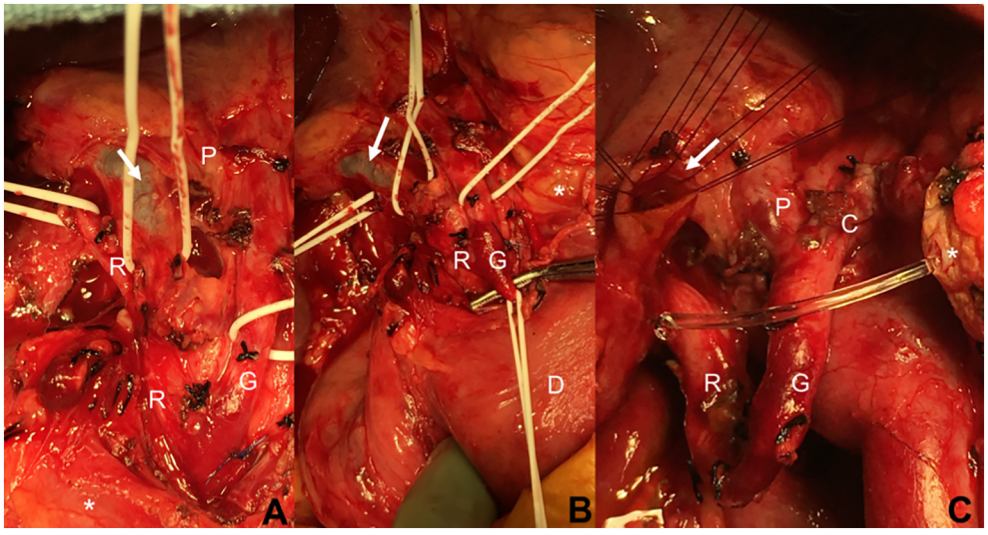

Fig. 2. Dissection of the porta hepatis reveals RHA posterolateral to the CBD. Dissection within the pancreatic parenchyma demonstrates its take off from GDA (A). Isolation and ligation of the GDA is performed, distal to the origin of RHA, shown at the level of the clamp (B). After the resection of the specimen, preparation for reconstruction is performed. Shown are the pancreatic duct with stent inserted and the hepatic duct. The pancreaticojejunostomy and hepaticojejunostomy will lie anterior to the preserved replaced RHA and its GDA origin (C). Hepatic duct *arrow*, CHA *C*, duodenum *D*, GDA *G*, RHA *R*, pancreas *asterisk*, PHA *P*.

scheduled for adjuvant chemotherapy.

2. Case 2

A 57-year-old female presented to her PCP with four-weeks of intermittent epigastric abdominal pain, nausea, anorexia, itching, and dark urine. CT scan of the abdomen revealed a 3.5 cm mass in the head and uncinate process of the pancreas abutting the superior mesenteric artery (SMA) with diffuse biliary ductal dilatation. The common bile duct width measured 15 mm with an abrupt tapering at the level of the pancreatic head. She underwent endoscopic retrograde cholangiopancreatography and endoscopic ultrasound, demonstrating the irregular