Pancreatoduodenectomy With Reconstruction of an Aberrant Right Hepatic Artery☆,☆☆

Reconstrucción de la arteria hepática derecha aberrante en la duodeno-pancreatectomía cefálica

Hepatic arterial vascularization presents great anatomic variability. The vascular configuration described as normal is found in only 55%–75.5% of cases,[1,2] which means that a large percentage of patients present an anatomic variation. Amongst them, the most frequent variation is the right hepatic artery (RHA), branch of the superior mesenteric artery (SMA).[1,3] This variation can involve a single right hepatic artery, called ''aberrant'', that originates in the SMA; instead, there may be 2 coexisting right hepatic arteries (one branch originating in the SMA, called ''accessory'', and another of the proper hepatic artery).

The importance of the presence of a variant hepatic artery in pancreatic surgery has been commented in several publications.[4] An RHA that irrigates in the SMA has a close relationship with the head of the pancreas since its course is adjacent and occasionally passes through its parenchyma. Due to this disposition, it is susceptible to being infiltrated by tumors of the pancreatic head.[5] Furthermore, the absence of collateral vascularization and the inadvertent sectioning of an RHA branch of the SMA during a pancreaticoduodenectomy (PD) can lead to ischemia and necrosis of the right liver lobe. Finally, once the gastroduodenal artery is dissected,[6] the RHA branch of the SMA becomes the main source of vascularization of the distal common bile duct.

We present a case of distal cholangiocarcinoma with infiltration of an aberrant RHA (ARHA) that was satisfactorily resolved with arterial reconstruction without the use of vascular stents.

The patient is a 54-year-old woman who had been studied for obstructive jaundice and treated with percutaneous transhepatic cholangiography. CT angiography demonstrated a tumor that was obstructing the distal common bile duct and detected the infiltration of an ARHA. No liver metastases or infiltration of the SMA were observed. These findings indicated the need for a PD (Figs. 1 and 2).

To identify the RHA branch of the SMA, we carefully dissected the hepatoduodenal ligament after having palpated the free edge of the ligament, which confirmed the presence of arterial pulse. Using an extended Kocher maneuver, we observed the SMA at its origin and confirmed the absence of tumor infiltration. In the same manner, we carefully dissected the common bile duct to decrease the risk of inadvertently ligating the RHA branch of the SMA, which in this area is located postero-lateral to the common hepatic duct.

As part of the lymph node dissection, skeletization of the portal vein and common hepatic artery was performed. ARHA was confirmed as there was no right hepatic artery stemming from the proper hepatic artery.

In cases of infiltration by the tumor mass, as seen in our patient, or in those with an intrapancreatic pathway, the artery should be sacrificed with the PD surgical specimen and later reconstructed.

We used vascular micro-bulldog clamps on the common hepatic artery, proper hepatic artery and the ARHA to dissect the gastroduodenal artery (GDA), while preserving as much of its length as possible. In our case, we obtained 15 mm up until the bifurcation of the superior pancreaticoduodenal arteries. Afterwards, we dissected the isthmus and confirmed the inclusion of the ARHA branch of the SMA in the tumor mass.

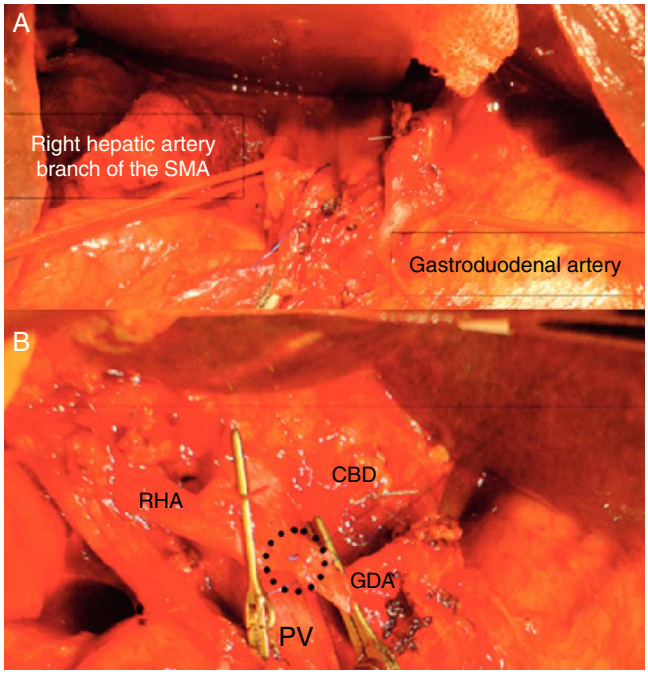

Fig. 1 – (A) Dissection of the aberrant right hepatic artery and the gastroduodenal artery; (B) end-to-end anastomosis, with the aberrant right hepatic artery (RHA), gastroduodenal artery (GDA), portal vein (PV), common bile duct (CBD). The broken line indicates the anastomosis between the RHA and the GDA.

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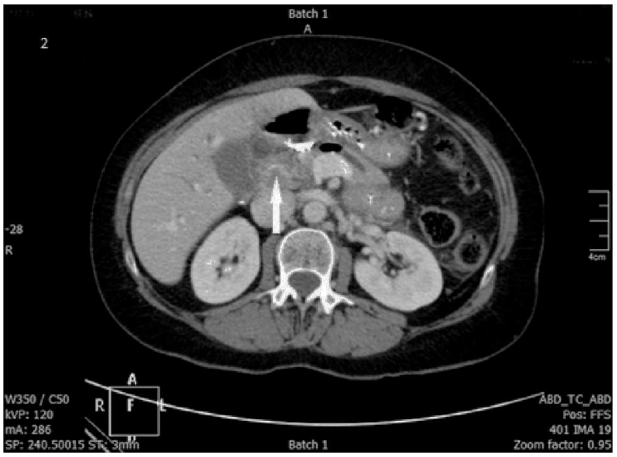

Fig. 2 – Abdominal CT angiography: the arrow indicates the infiltration of the right hepatic artery by the mass in the head of the pancreas.

Lastly, the dissection of the retroportal lamina allowed us to cut the ARHA distal to its origin in the SMA, isolating the entire tumor in the surgical specimen. The ARHA was reconstructed with an end-to-end anastomosis to the proximal stump of the GDA using prolene 6/0 PS simple interrupted stitches. This technique allowed us to avoid vascular grafts. Last of all, lymph node dissection was completed in the hilar and interaortocaval regions and Roux-en-Y reconstruction was carried out. The flow of the reconstructed artery was 73 ml/min (flow meter by Medi-Stim AS, Oslo, Norway). In the postoperative period, a hematoma was detected in the surgical bed, which was resolved conservatively. The patient was discharged on the 17th day post-op.

The pathology study demonstrated evidence of a cholangiocarcinoma that measured 1 cm (stage 1B, pT2, N0, M0, grade G2). The resection margins presented no evidence of malignancy. After 14 months of follow-up, the patient continues to show no evidence of tumor.

Although arterial infiltration has classically been considered a contraindication for surgical resection of pancreatic cancer, with this case report we show that a PD procedure is an option for ARHA. In any case, this type of surgery involves more extensive dissection for the arterial reconstruction, which entails a longer operative time and a higher risk of blood loss, with the resulting impact on post-surgical morbidity.[6] The reconstruction of the ARHA with the transposition of the stump of the gastroduodenal artery enables a single vascular anastomosis to ensure the hepatic arterial flow and that of the hepatic-jejunal anastomosis, while avoiding the use of prosthetic material and reducing the risk of infection. Last of all, this technique makes it easier for surgeons to extend the pancreatic resection margins, making R0 resection possible.[5]

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