



How to deal with replaced common hepatic artery during laparoscopic pancreaticoduodenectomy

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Abstract: Replaced common hepatic artery (RCHA) constitutes a rare but serious anatomical variation of the hepatic artery during laparoscopic pancreaticoduodenectomy (PD). Hereby, we report a technique to deal with such a situation during laparoscopic PD for cancer.

Keywords: Replaced common hepatic artery (RCHA); laparoscopic pancreaticoduodenectomy (laparoscopic PD); pancreatic cancer

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Introduction

Anatomic variations of the common hepatic artery constitute a serious technical issue during pancreaticoduodenectomy (PD) (1-3). The incidence of replaced common hepatic artery (RCHA) has been reported in the literature to range from 0.4% to 4.5% (4-8). Inadvertent injury during PD may lead to major post-operative complication or death due to liver failure or bilioenteric anastomotic disruption.

Currently, pre-operative CT angiography is considered to gold standard to identify the vascular anatomy of the hepatic artery (6) allowing surgeons to plan the better surgical strategy. However, in the literature can be find very few reports of how to deal with RCHA during open PD and none during laparoscopic PD.

The aim of the present manuscript is to report our approach to RCHA in case of laparoscopic PD.

Case description

This is the case of a 72-year-old female with a past medical history of arterial hypertension, insulin-dependent diabetes and myocardial infarction. The patient presented with a painless jaundice. The CT scan showed a small tumoral lesion of the head of the pancreas with dilatation of the

common bile duct. The CT-angiography showed a type B RCHA (6), the tumor was at distance from the portal vein. The Endoscopic ultrasound with fine needle core biopsy confirmed a resectable adenocarcinoma of the head of the pancreas. The CA 19-9 was normal. The case was discussed at the HBP multidisciplinary meeting and proposed for a laparoscopic PD.

Methods

Standard technique for PD (1)

The patient is placed in the supine position with the legs in abduction. Under general anesthesia, the pneumoperitoneum is induced at a pressure of 12 mmHg using a Hasson's technique in peri-umbilical area, the remaining trocars are inserted under direct vision, two 10–12 mm trocars on both sides of the first one, a 5 mm trocars on both flanks and one 10 mm trocar for the smoke-suction system (AirSeal[®]) in subxiphoid area after having tackled falciform ligament with a stay suture. The position of the surgeon depends on the stage of the procedure. We used 3D flexible laparoscope. Patient is placed in supine position with legs in abduction. The technique for laparoscopic PD was standardized as following (1): opening



Figure 1 The present video described how to deal with a replaced common hepatic artery during laparoscopic pancreaticoduodenectomy (9).

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of the gastrocolic ligament, mobilization of the right colonic flexure, extensive Kocher maneuver, superior mesenteric artery (SMA) dissection, section of the stomach at the level antrum, lymphadenectomy of the hepatic pedicle extended to the hepatic artery and coeliac trunk, creation of the retro-pancreatic pre-portal tunnel, ligation and division of the gastro-duodenal artery (GDA), division of the first jejunal loop at the Treitz ligament, division of the bile duct, division of the pancreas, excision of the mesopancreas following the SMA. The reconstruction was achieved by: termino-lateral manual hepaticojejunal anastomosis with 5/0 resorbable monofilament, pancreaticogastrostomy, latero-lateral linear gastro-jejunostomy on a second jejunal loop and finally a latero-lateral linear jejuno-jejunal anastomosis.

Preservation of the RCHA (Figure 1)

The SMA was identified at its origin above the left kidney vein and dissected toward the mesentery following the periadventitial plane. The origin of the RCHA on the SMA was identified at about 2 cm from the Aorta and followed toward the hepatic pedicle as far as possible. Then the dissection was pursued on the right border of the hepatic pedicle in view to clearly identify: the portal vein, the common bile duct and the distal part of the RCHA which were isolated individually with vessel loop. At this point to obtain an optimal freedom of the specimen in view to divide the GDA, the intervention was continued in a standard fashion, therefore the stomach was sectioned as well as the first jejunal loop at the Treitz ligament, the bile duct

and pancreas at the neck. At this stage of the operation, it was possible to pursue the isolation of the RCHA and particularly of the GDA that was controlled with two not absorbable clips and divided; due to the close proximity of the tumor to the GDA it was not possible to obtain back flow control with a clip, therefore it was sutured with a 3/0 barbed suture. Finally, the right gastric artery was divided, and the resection of retro-portal lamina completed, such maneuvers allowed to free the RCHA from the specimen.

Results

The post-operative was uneventful, the patient was discharged at on postoperative day 12. The pathological report showed a well differentiated pancreatic adenocarcinoma pT2 N1 (1/32) R0 (>1 mm vascular margin).

Discussion

The presented paper reported a laparoscopic technic to deal with a rare anatomical variation of the CHA during PD.

The combination of an artery first approach to SMA (1), early proximal (at the hepatic hilum) and distal (at the SMA origin) identification of the RCHA and gradual mobilization of the head of the pancreas, in view to obtain a favorable access to the GDA, are the keys for a safe isolation of the RCHA. Moreover, keeping the dissection of the RCHA on the periadventitial plan allowed to reach an R0 resection.

In conclusion, the present paper showed that laparoscopic PD is feasible in patients presenting a RCHA.

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Footnote

Conflicts of Interest: All authors have completed the ICMJE uniform disclosure form (available at <http://dx.doi.org/10.21037/dmr.2019.03.03>). ER serves as an unpaid editorial board member of *Digestive Medicine Research* from Sept. 2018 to Sept. 2020. The other authors have no conflicts of interest to declare.

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appropriately investigated and resolved. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee(s) and with the Helsinki Declaration (as revised in 2013). Written informed consent was obtained from the patient for publication of this manuscript and any accompanying images and video.

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