



Prevention of inadvertent injury to aberrant hepatic artery arising from superior mesenteric artery during laparoscopic pancreaticoduodenectomy

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Dissection during laparoscopic pancreaticoduodenectomy (LPD) is a complex surgical intervention and requires a comprehensive understanding of anatomical relationships and vascular variations around the duodenum and hepatoduodenal ligament (HDL). While the process carries a risk of inadvertent injury to the adjacent vasculature throughout the procedure, safe dissection along the superior mesenteric artery (SMA) is extremely vital because nearly one-fifth of patients have an aberrant hepatic artery (HA) coming off of SMA (1). If exists, the replaced or accessory HA typically courses just right and inferior to the portal vein (PV). With an accompanying video, this paper aims to share the technique that we adopt to avoid injury to the aberrant HA during LPD.

We believe that adherence to some technical rules will significantly reduce the risk of an accidental arterial injury during the procedure:

1. Preoperative radiological evaluation: Vascular anatomy and variations of HA should be preoperatively assessed using high-quality computed tomography imaging. Both arterial and portal phase images should be obtained. The three commonest variations of HA coming off of SMA are accessory right HA, replaced right HA, and replaced common HA (Figure 1). It should also be noted that the aberrant vessel may have a short or long course beneath PV.

2. Landmark #1 to identify the aberrant HA: The first jejunal branch of the superior mesenteric vein is a reliable landmark to identify the area where SMA is encountered during the uncinata process dissection (Video). However, an aberrant HA often originates from a point closer to the root of SMA. Radiological assessment using multiplanar reconstruction images aids in determining the level at which the aberrant artery comes off.

3. Traction and counter-traction: Adequate retraction with a proper triangulation of organs and tissues is of paramount importance during advanced laparoscopic surgery. However, overtraction on PV may also cause axial displacement of the vein, which, in turn, can disrupt a surgeon's orientation to PV/aberrant HA relationship (Video: the asterisk shows the tip of the sealing device while dissecting on an incorrect area). Natural anatomical courses of vessels should be checked by releasing all the retractors if any suspicion arises.

4. Landmark #2 to identify the aberrant HA: It is easier to identify an aberrant HA during the dissection of HDL than when uncinata process is being dissected (Video). The artery can be found just beneath the common bile duct (CBD) immediately after the gastroduodenal artery is ligated and divided. It is now our practice to complete HDL dissection and secure HA, PV, CBD, and accessory/replaced HA (if any) by placing a tape around each. This should preferentially precede dissection over the inferior edge of the pancreas, infrapancreatic tunnel creation, and uncinata process dissection. Transection of the neck of the pancreas should not be delayed. Nevertheless, it is essential to know that earlier identification of an aberrant HA distally may not guarantee the prevention of injury to the artery during uncinata process dissection.

5. Nearby structures mistaken for the aberrant HA: A thick lymphatic vessel or a long lymph node may be mistaken for an accessory or replaced HA, especially when the uncinata process dissection has fairly advanced (Video). Looking for arterial pulsation helps discriminate between an artery and a lymphatic vessel. Continuity of the structure should also be viewed before placement of a sealing device at this region.

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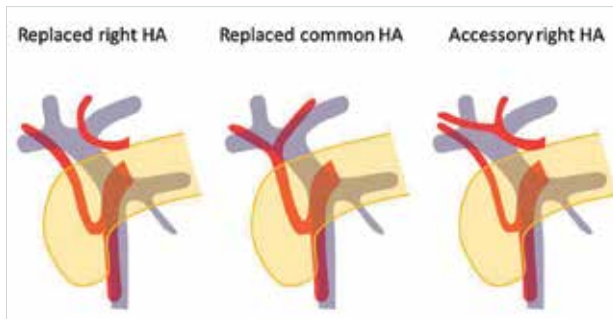


Figure 1. Three commonly encountered types of aberrant hepatic artery arising from the superior mesenteric artery

Video: The asterisk shows the tip of the sealing device while dissecting on an incorrect area.

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