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Case Report

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Recognition of the Totally Replaced Cystic Artery from the Superior Mesenteric Artery at the Time of Orthotopic Liver Transplant: A Case Report

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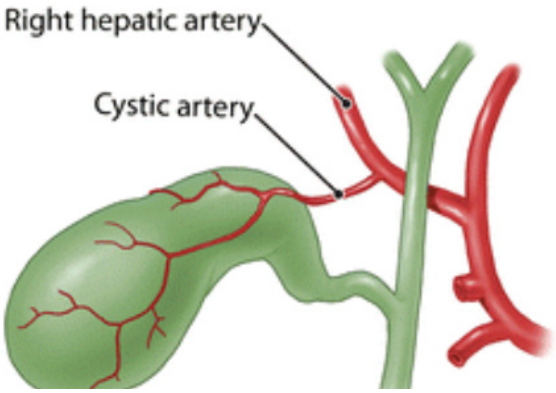
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Introduction



Note*: Content available from Surgical and Radiologic Anatomy [3].

Image 1: Normal cystic artery.

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The cystic artery typically arises from the right hepatic artery, a branch of the proper hepatic artery that originates from the Celiac Trunk (CT) (Image 1). Previous reports have shown instances of the cystic artery arising from the left hepatic artery, gastroduodenal artery, proper hepatic artery, common hepatic artery, and Superior Mesenteric Artery (SMA) [1]. The SMA variation is an infrequently reported anatomic variant, with a comprehensive review reporting 20 cases and two recent systematic reviews reporting an additional 17 cases of single/replaced cystic arteries with a prevalence of 1.09-1.25% [2-5].

These variations in arterial anatomy are hypothesized to result from complex embryological development beginning during the third gestational week when the hepatic and cystic diverticula form [2]. Between the fourth and seventh weeks of gestation, longitudinal anastomoses connect the vitelline arteries, and the 10th and 13th segments give rise to the CT and SMA, respectively [2]. The branching patterns of the CT and SMA are dependent on persistence and regression of various portions of the anastomosis, as well as growth and rotation of the liver, pancreas, stomach, and duodenum [2].

In this case report, aberrant cystic arterial supply to the gallbladder was found during donor cholecystectomy in a patient receiving orthotopic liver transplant.

Case Presentation & Procedure

A 60-year-old female underwent orthotopic liver transplant. The liver was procured from a 23-year-old individual following Donation After Cardiac Death (DCD) with Normothermic Regional Perfusion (NRP) using the Trans Medics Organ Care System (OCS).

The allograft anatomy was described as an accessory Rt hepatic artery which originated from the donor Superior Mesenteric Artery (SMA). That was reconstructed to the donor celiac trunk.

At that time of back table preparation of the liver allograft, it was noted that the cystic artery originated from the donor SMA, and there was no replace Right hepatic artery. The liver allograft otherwise had normal hepatic arterial anatomy (Image 2).

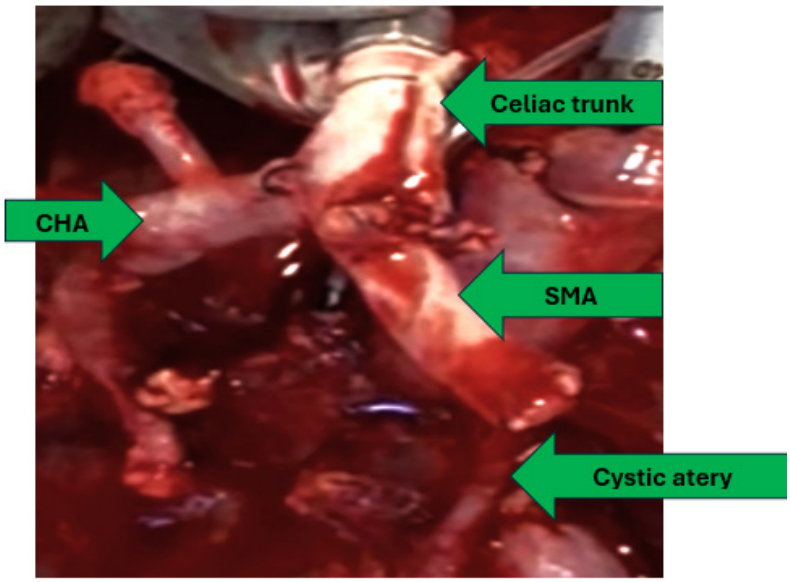


Image 2: Aberrant cystic artery arising from the Superior Mesenteric Artery (SMA), Common Hepatic Artery (CHA).

Discussion

Variations in vascular anatomy, such as aberrant cystic artery from the SMA, can result in challenges during hepatobiliary cases. Cystic artery origin from the SMA is uncommon and may be difficult to anticipate during routine procedures. Recognition of these variants is particularly important during cholecystectomies and pancreaticoduodenectomies in which damage to aberrant cystic arterial supply can result in hemorrhage, injury to surrounding structures, and return to the operating room. Special consideration also needs to be made during radiological interventions, as aberrant arterial supply can complicate Trans-Arterial Chemoembolization (TACE) and hepatic artery infusion pump placement. Careful attention to the vasculature during such procedures is imperative to minimize the potential for iatrogenic injury and perioperative complications.

Conclusion

In this case report, we describe an instance of a totally replace cystic artery arising from the SMA that was noted during an orthot-

opic liver transplant at the time of donor cholecystectomy. As this arterial anatomy variation is exceptionally rare, identification and careful dissection is integral to minimize post operative complications.

Acknowledgement

None.

Conflict of Interest

None.

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