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Duct of Luschka Bile Leak Following Deceased Donor Liver Transplant

Authors' Contribution:
Study Design A
Data Collection B
Statistical Analysis C
Data Interpretation D
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Patient: Female, 41-year-old
Final Diagnosis: Primary sclerosing cholangitis
Symptoms: Abdominal pain
Medication: —
Clinical Procedure: —
Specialty: Transplantology

Objective: Unusual or unexpected effect of treatment
Background: Biliary leak is a relatively uncommon but potentially severe complication of liver transplantation. Duct of Luschka (also known as subvesical bile ducts) is a term that refers to a number of accessory biliary ducts. While leaks from Ducts of Luschka are well-described in the field of hepatobiliary surgery, only 2 case reports of such leaks exist in the setting of liver transplant.
Case Report: We report the first case of a Duct of Luschka biliary leak seen after DCD liver transplant in a 41-year-old woman with cirrhosis secondary to primary sclerosing cholangitis. The patient underwent surgical re-exploration in the immediate postoperative period due to bilious output from a surgical drain. A Duct of Luschka was found intraoperatively at the gallbladder fossa and was oversewn. Apart from immunosuppression-related neutropenia, the patient recovered uneventfully.
Conclusions: Given the variability in preoperative detection of subvesical bile ducts, accessory bile duct leak remains an important consideration in the liver transplant perioperative period. The prevalence of Ducts of Luschka and the relative risk of leakage from such subvesical bile ducts in liver transplants compared to cholecystectomies are unclear. Further research into anatomical accessory bile duct variants and preoperative techniques for detecting such ducts is warranted.

Keywords: Bile Ducts • Intraoperative Complications • Liver Transplantation

Full-text PDF: <https://www.amjcaserep.com/abstract/index/idArt/933505>

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Background

Duct of Luschka is a term that has been used to describe a number of anatomical variants of accessory bile ducts. The term originates from the writings of German anatomist Hubert von Luschka in 1863 when he described a network of small biliary ducts which surrounded the gallbladder but were also present in peritoneal and hepatic tissue. A recent systematic review argues for the abandonment of the term “Duct of Luschka” given discrepancies between Hubert von Luschka’s original description and the number of anatomical variants of accessory biliary ducts for which the term has been used to describe [1].

Nomenclature aside, biliary complications occur in up to 10-20% of patients following liver transplant [2]. While leaks are commonly anastomotic in nature [3], leakage secondary to subvesical bile duct trauma during the course of liver transplant is a potential complication. Currently, there are a handful of reports of biliary complications secondary to subvesical bile duct injury following liver transplantation. We report the ligation of a leaking Duct of Luschka seen on subsequent exploratory laparotomy following deceased donor liver transplant using a donation after circulatory death (DCD) liver graft.

Case Report

A 41-year-old woman with a MELD score of 16 presented as a candidate for liver transplant due to cirrhosis secondary to primary sclerosing cholangitis (PSC). Orthotopic whole-liver transplant with a DCD graft occurred the next day using a Roux-en-Y hepaticojejunostomy (RYHJ). RYHJ was chosen over duct-to-duct anastomosis due to the patient’s history of extensive PSC and concern for stricture in the common bile duct (CBD). There were no intraoperative complications. Two Jackson-Pratt (JP) drains were placed and, upon leaving the operating room, she was hemodynamically stable. Several hours post-operatively, bilious output was noted to be draining from the patient’s medial JP drain.

In response, the patient was brought back to the operating room for exploration. Bile was noted to be emanating from a small subvesical bile duct arising from the gallbladder fossa, with a biliary collection directly adjacent to it. The subvesical bile duct was oversewn with polydioxanone suture and reinforced with 4-0 Prolene suture. The RYHJ and cystic stump were both intact without leakage. Her abdominal cavity was irrigated with saline, and the original JP drains were left in place.

Otherwise, her postoperative period was largely uncomplicated, with LFTs appropriately trending downwards. Her initial immunosuppression regimen included tacrolimus, Cellcept, and methylprednisolone. Cellcept was later switched to Myfortic

due to gastrointestinal intolerance. She also experienced pedal edema that was treated with furosemide. Donor and recipient were cytomegalovirus (CMV)-positive. CMV, *Pneumocystis jirovecii*, and antifungal prophylaxis consisted of 3 months of valganciclovir, trimethoprim-sulfamethoxazole, and clotrimazole, respectively. Her only complication following discharge was neutropenia, thought to be secondary to valganciclovir, so her Myfortic dosage was lowered. At subsequent postoperative appointments, she was recovering well, with minor abdominal pain at her incision site, likely neuropathic in nature.

Discussion

To date, there are 2 published case reports of bile leaks due to Duct of Luschka injury following liver transplant [4,5]. Since there is no widely accepted nomenclature for classifying accessory bile ducts termed Ducts of Luschka, it is difficult to assess the heterogeneity of the anatomy seen in these case reports. The Schnellendorfer 2012 review put forward a set of recommendations for classifying subvesical bile ducts, which could provide a more cohesive framework for describing such bile ducts going forward [1].

Currently, most data concerning accessory bile ducts come from cholecystectomies, as these are performed at a much higher volume than liver transplants. Thus, there are no clear data on the prevalence of Duct of Luschka injury during liver transplantation. Given Ducts of Luschka are likely to have similar prevalence in the donor transplant population compared to the general population, the relative risk of such an injury during liver transplant can be extrapolated from the prevalence of such accessory ducts in the general population. Reported estimates on the prevalence of Ducts of Luschka vary. A study of 128 right hepatectomies found such accessory ducts in 4.6% of patients [6]; however, other studies have described prevalences ranging from 0.1% to 55% [1]. The difficulty in detecting ducts, both prospectively and retrospectively, as well as large variation in study designs, likely account for this wide range of prevalence values. Even if one were to ascertain a true prevalence, the risk of subsequent bile leak is still highly dependent on the type of liver transplant performed (eg, orthotopic vs partial), and whether the transplant includes a donor cholecystectomy.

Preoperative detection of subvesical bile ducts would be invaluable for surgical planning so as to avoid biliary leak complications secondary to inadvertent damage to such ducts. However, preoperative detection of Ducts of Luschka is inconsistent. In the aforementioned anatomical study, all patients with subvesical ducts were pre-operatively assessed with cholangiography but none of the ducts were detected, even when retrospectively reassessing the imaging studies [6]. The mainstay

approach to preoperative detection of subvesical ducts prior to laparoscopic cholecystectomy is endoscopic retrograde cholangiopancreatography (ERCP), but most ducts are not discovered until subsequent investigation of bile leakages [7].

While ERCP is both the diagnostic and therapeutic mainstay for evaluating and treating suspected post-transplant bile leak, special consideration must be made for the workup/treatment of patients that have undergone RYHJ, as was the case with our patient. Percutaneous transhepatic cholangiography (PTC) may be preferable to ERCP in the setting of RYHJ given the altered anatomy. If ERCP or PTC fail to address the problem, surgical exploration and repair is the recommended approach [8]. Due to the high index of suspicion for a major biliary leak in the immediate postoperative period, we decided to forgo ERCP/PTC for surgical exploration.

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Conclusion

Given the variability in preoperative detection of subvesical bile ducts with conventional imaging techniques, the leakage of accessory bile ducts in liver transplant procedures is a potential complication that should be continually assessed in the perioperative period. Further research into anatomical variations of subvesical bile ducts, differences in their prevalence between the general/transplant populations, and preoperative techniques for detecting such ducts may help to minimize subvesical duct leak as a complication following liver transplant.