Incidence and risk factors for anastomotic and non-anastomotic biliary stricture in deceased donor liver transplantation

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Biliary complications remain one of the most outstanding factors influencing the long-term results after liver transplantation (LT). Biliary complications occur in 10–40% of patients and have an important impact on graft survival, hospital readmissions, the need for re-interventions and the overall costs of care. Among the variety of biliary complications occurring after LT, bile leakage and bile duct strictures (anastomotic and non-anastomotic) are the most common.

Bile leakage

Bile leakage has been reported in 2–21% of the patients after LT. It can be categorized as early and late events, and may be anastomotic or non-anastomotic sites. Bile leakage can later result in biloma because of extravasation of bile into the hepatic parenchyma or the abdominal cavity. Depending on the size of the leakage and the patient being asymptomatic or symptomatic, bile leaks can be managed conservatively, non-surgically or surgically.

Bile duct stricture

Bile duct strictures can be categorized into anastomotic strictures and non-anastomotic strictures. A combined presentation of both anastomotic strictures and NAS is not uncommon. Solitary strictures at the site of biliary anastomosis have been reported in 9–12% of patients after LT, with the majority occurring within the first 12 months after transplantation.

Major predictive risk factors for development of anastomotic strictures include donor age, prior anastomotic bile leak, duct-to-duct anastomosis and sex mismatch with a female donor–male recipient. Local ischemia caused by the surgical techniques is believed to be the main underlying

mechanism, leading to fibrotic scarring of anastomosis. To minimize the risk of local ischemia at the end of donor choledochal duct, the bile duct should remain surrounded by sufficient amount of tissue.

Non-anastomotic stricture (NAS)

NAS may occur at any location of the biliary tree (extrahepatic as well as intrahepatic) but is usually limited to large bile ducts in a multifocal pattern. The reported incidence of NAS in patients receiving a DBD liver graft varies between 1 and 20%. Being frequently therapy resistant, NAS remain to be the most challenging biliary complication.

Presentations of NAS vary extensively in anatomical localization and severity as well as in time of occurrence. Only 50% of the cases of NAS present within the first year after OLT, constituting early-onset versus late-onset (>1 year after LT) NAS. Early-onset NAS have shown to occur mostly around the hepatic bifurcation and common bile duct. In contrast to early-onset NAS, late-onset NAS are more frequently identified in the periphery of the liver, affecting small bile ducts in a more diffuse pattern. It seems that early-onset and late-onset NAS not only develop at different anatomical locations, but also are associated with different risk factors.

Retrospective studies have suggested that early onset NAS are prominently associated with ischemia-related injury, whereas late-onset NAS have been more frequently associated immunological factors.

Conclusion

Biliary complications remain to be a burden in liver transplantation. Biliary leakage and stricture formation are the most frequent types of biliary complications. NAS are frequently therapy resistant and leave long-term sequels. NAS have variable presentations in time and localization, suggesting different underlying mechanisms and pathogeneses.

References

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