



Comment on: “*Liver transplantation for iatrogenic bile duct injury during cholecystectomy: a French retrospective multicenter study*”

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Comment on: Chiche L, Guieu M, Bachellier P, *et al.* Liver transplantation for iatrogenic bile duct injury during cholecystectomy: a French retrospective multicenter study. *HPB (Oxford)* 2022;24:94-100.

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We read with great interest the national retrospective multicenter observational study recently published by Chiche and collaborators (1) aiming to review liver transplants related to iatrogenic bile duct injury (BDI) during cholecystectomy and the risk factors for adverse outcomes in order to improve management of BDI. In this study, all liver transplantation (LT) patients between 1994 and 2017 for BDI during cholecystectomy were included. Thirty patients were included in 11 French LT centers representing 0.13% of LT indications over this period. The median age at cholecystectomy was 40 years [9–66 years], and the median age at transplantation was 52 (22–68 years). Symptomatic gallbladder stones represented 33.3% of the indications for cholecystectomy, while acute cholecystitis represented 30%. Near two-thirds (66.7%) of cholecystectomies were performed laparoscopically. The diagnosis of BDI was made intraoperatively in only 4 patients (13.3%) and early (<15 days) in 13 patients (43.4%). In 11 patients (36.6%) there was an associated vascular lesion, mainly (81.8%) of the right hepatic artery. BDI were classified according to the Strasberg classification, 76.7% were grades D and E, and 6.6% were grades B and C.

Twenty-five cases (83.4%) of BDI occurred in non-expert centers, and 20 (66.7%) were initially treated in these centers with an average delay of 24 months. Eleven hepatico-jejunal anastomoses were initially performed, nine (83%) of which were complicated by stenoses.

The time between the BDI and registry into a transplant

program was 8.5 years on average. The waiting period on list was on average 3 months. The average MELD score was 16. Eight patients (26.7%) required an expert component. The median time between BDI and LT was 11.7 years (6–32 years) in the absence of associated vascular lesion and this time decreased to 3 years (0.2–18 years) in case of vascular lesion ($P=0.006$). If BDI was performed in an expert center, the median delay between BDI and LT was 42.5 months and this delay increased to 144 months in non-expert centers ($P=0.03$). Post LT survival was 80% at 3-month, 76.5% at 1-year and 5-year. The mortality rate was 23.5% after LT.

Comments

Despite the observational and retrospective nature, this study is very interesting due to its multicentric nature and the period covered, approximately 30-year. In addition, this study emphasizes the long-term consequences of a rare but potentially life-changing complication occurring in a young population (40-year of median age). In fact, iatrogenic bile duct injury is a rare but serious complication of cholecystectomy, its incidence reaches 0.6% when performed by laparoscopy (2). Fortunately, the majority of BDI are treated without long-term sequelae. Some major BDI, especially if they are associated with vascular injuries, require complex surgeries (3) and can reach LT as a last option.

We note the importance of the presence of an associated

vascular lesion since it concerns a third of the patients arriving at LT, as well as the high proportion of major BDI grade Strasberg > C. This observation agrees with data from current literature since these BDI that are the most complex to repair initially.

The average time to diagnosis of BDI was 15 days post cholecystectomy. Diagnosis beyond 15 days was observed in 30% of cases and was not known in 13.3%. However, the average time between BDI and the initial treatment was 24 months. Authors do not give any explanation or precision in their study to explain this difference. In fact, often in cases of major BDI, the indicated surgical technique consists in biliary-digestive anastomosis and must be performed in an expert reference center in order to achieve the best long-term results (4). A recent study by E-AHPBA (5) compared early against delayed management, but all the patients included had repair by biliary-digestive anastomoses within a maximum of 6 months following cholecystectomy. The results on morbidity and mortality and biliary re-intervention after day-90 were similar. The biliary tract re-operation rate is between 3% and 5% within a follow-up of 24 months. In this current study, it would therefore be interesting to know the causes of such a significant delay during initial treatment. In addition, since LT takes place after a long delay, as a long-term sequelae of BDI, this observation does not explain the longer delay in non-expert centers before accessing a transplant program compared to expert centers.

In this study, 66% of patients were treated initially in non-expert centers during cholecystectomy and especially during the initial post-BDI treatment. With current means in expert centers, there is multidisciplinary care with access to MRI for staging and preoperative analysis of the BDI as well as post-repair endoscopic and interventional radiological care. With all the progress made in recent years in these two disciplines many options are often offered in the initial treatment of BDI. These minimal invasive treatment options constitute the strength of expert centers and probably allow (6,7) to reduce long-term sequelae and to avoid LT.

In this article the place of intraoperative cholangiography is not at all discussed or mentioned. Cholangiography is an aid to understanding the biliary anatomy but has not shown its interest for the reduction of BDI during cholecystectomy. Recently, indocyanine green (ICG) fluorescence has aroused interest in the understanding of biliary anatomy and the reduction of BDI (8) which remains

a rare complication that occurs in 0.3% to 0.6% of cases (9).

A limitation of the study is the underestimation of the number of patients concerned. Indeed, as specified in the discussion, approximately 20% of patients registered on the transplant list following the consequences of BDI died on waiting list and therefore were not included in the study. It is therefore important to consider offering priority on the waiting list to BDI patients in regards to patients with a low MELD score. Finally, the authors report a higher rate of complication and post-transplant mortality than for other etiologies. This probably reflects the technical difficulties encountered due to past surgical treatment and the fact that patients arrive at LT as a last option, often with a severity that is not well-expressed by the different scores.

In conclusion, the study emphasizes the heavy impact in terms of quality of life, morbidity and mortality after LT following complications of a “benign” surgery, in a young population. As underlined in this work, liver transplantation comes as a last resort, partly explained by the failure of previous treatment leading to secondary biliary cirrhosis. In view of the current data, it is important to transfer BDI to an expert center, even for the initial care, in order to offer multidisciplinary care starting with a complete analysis allowing to specifies the type of wound in order to offer the best endoscopic or radiological treatment when possible, otherwise optimal surgical management. The goal is to minimize long-term sequelae as much as possible, but also to reduce the delays before registration in a transplant program when necessary and therefore reduce the resulting morbidity and mortality.

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conflicts of interest to declare.

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References

1. Chiche L, Guieu M, Bachellier P, et al. Liver transplantation for iatrogenic bile duct injury during cholecystectomy: a French retrospective multicenter study. *HPB (Oxford)* 2022;24:94-100.
2. Halbert C, Pagkratis S, Yang J, et al. Beyond the learning curve: incidence of bile duct injuries following laparoscopic cholecystectomy normalize to open in the modern era. *Surg Endosc* 2016;30:2239-43.
3. Li J, Frilling A, Nadalin S, et al. Management of concomitant hepatic artery injury in patients with iatrogenic major bile duct injury after laparoscopic cholecystectomy. *Br J Surg* 2008;95:460-5.
4. Brunt LM, Deziel DJ, Telem DA, et al. Safe Cholecystectomy Multi-society Practice Guideline and State of the Art Consensus Conference on Prevention of Bile Duct Injury During Cholecystectomy. *Ann Surg* 2020;272:3-23.
5. A European-African HepatoPancreatoBiliary Association (E-AHPBA) Research Collaborative Study management group; Other members of the European-African HepatoPancreatoBiliary Association Research Collaborative. Post cholecystectomy bile duct injury: early, intermediate or late repair with hepaticojejunostomy - an E-AHPBA multi-center study. *HPB (Oxford)* 2019;21:1641-7.
6. de'Angelis N, Catena F, Memeo R, et al. 2020 WSES guidelines for the detection and management of bile duct injury during cholecystectomy. *World J Emerg Surg* 2021;16:30.
7. Schreuder AM, Busch OR, Besselink MG, et al. Long-Term Impact of Iatrogenic Bile Duct Injury. *Dig Surg* 2020;37:10-21.
8. Pesce A, Piccolo G, La Greca G, et al. Utility of fluorescent cholangiography during laparoscopic cholecystectomy: A systematic review. *World J Gastroenterol* 2015;21:7877-83.
9. Rystedt J, Lindell G, Montgomery A. Bile Duct Injuries Associated With 55,134 Cholecystectomies: Treatment and Outcome from a National Perspective. *World J Surg* 2016;40:73-80.

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