Editorial

Clinical value of intra-operative ultrasonography during laparoscopic cholecystectomy

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The correct identification of biliary anatomy and bile duct injury (BDI) prevention represent important topics of debate in laparoscopic cholecystectomy (LC), which is considered the first widely accepted "gold standard" laparoscopic approach in general surgery. The article entitled "Laparoscopic ultrasonography as an alternative to intra-operative cholangiography during laparoscopic cholecystectomy" is an interesting review analyzing the clinical value of intra-operative laparoscopic ultrasound (LUS) during cholecystectomy. Laparoscopic BDI is associated with a significant morbidity and mortality, increased healthcare costs and frequent medico-legal litigation (1). It has been demonstrated that the primary cause of BDI is the misinterpretation of the biliary anatomy (71–97% of patients) (2). In order to better identify the anatomy of biliary tree during LC, various methods have been described and proposed, including intra-operative cholangiography, near-infrared fluorescence cholangiography (NIRF-C) (3-6) and LUS. We would like to highlight several discussion points in this manuscript. First of all, the authors identified 18 reports from 2000 to 2016 with 13 prospective non-randomized trials and five retrospective trials. No randomized controlled trials were conducted (7). The article focused on the role of LUS regarding the correct identification of anatomical biliary mapping, especially in such difficult situations (i.e., acute or chronic inflammatory disease, fibrosis) where the anatomy is altered, the ability to prevent or detect bile duct injuries during surgery, the capacity to identify intra-operatively common bile duct stones. Overall, the rate of identification of biliary tree with LUS ranged from 92–100%, with only four manuscripts providing an accurate identification rate of all biliary ducts. The results underlined the advantage to use LUS both before and after Calot's dissection. The preliminary Calot's dissection is very important to better visualize the extrahepatic biliary tree. The authors reported that a preliminary dissection of Calot's triangle led to an overall increase in the identification of biliary structures, 84% *vs.* 98% before and after Calot's dissection, respectively (8).

Gwinn *et al.* (9) reported that LUS was also very helpful in avoiding conversion to open surgery in 91% of patients, without bile duct injuries observed. Concerning the ability of the technique to prevent or detect BDI, there are very few reports. Across the studies reviewed, Dili *et al.* (7) no reported BDIs and only two studies emphasized the importance of combining the critical view of safety (CVS) method (10) with LUS. We think that the correct establishment of the CVS still represents the crucial method for a safe LC, as recently reported by Research Institute Against Cancer of the Digestive System (IRCAD) Recommendations Group (11). At the same time, any effort to reduce the risk of biliary injury and to improve the establishment of CVS is considerably appreciated. Concerning the detection of biliary stones, a recent meta-analysis confirmed that LUS is superior to intraoperative cholangiography (IOC) in detecting bile

duct stones (12), with only exceptional false positive. In general, LUS is a safe and cost-effective procedure and may represent a useful tool to guide the surgeon during dissection, but we think that the true problem of LUS is represented by the difficult learning curve. Machi *et al.* (13) reported that 50–100 operations were necessary for a surgeon to be able to correctly assess the biliary anatomy using LUS. We think that an educational program with a certain learning period is necessary for LUS. For these reasons, the method remains under-used, as confirmed by the lack of randomized controlled trials and the presence of limited studies.

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Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

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