Editorial

Bile duct mapping: Achilles heel for a safe laparoscopic cholecystectomy

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Laparoscopic cholecystectomy (LC) is one of the most frequent surgical procedures worldwide and is accepted as the gold standard for the management of symptomatic or complicated gallstone disease. Significant postoperative advantages have been described with this approach. However, from the beginning, was associated with a higher incidence of bile duct injuries (BDI) compared with the open procedure (1). On the other hand, common bile duct stones (CBDS) occur in 5–20% of patients undergoing cholecystectomy (2), and require further treatment. Most patients with CBDS are managed with laparoscopic common bile duct exploration and/or endoscopic techniques.

The proper intraoperative study of the bile ducts would have an impact to prevent BDI, diagnose or treat biliary disease. The mapping of the bile duct would help to: elucidate the biliary anatomy, confirm the suspected CBDS, confirm unsuspected CBDS, prevent BDI, and diagnose intraoperatively a BDI. The ideal technique that would fulfill all these situations should be safe, effective, applicable and cost-efficient.

Since the first description by Mirizzi (3) in 1937, intraoperative cholangiography (IOC) is the most frequent procedure to elucidate the biliary anatomy and confirm or diagnose CBDS (4). Although IOC is an invasive method with radiation exposure, it is associated with low morbidity and dynamic fluoroscopy may guide other laparoscopic strategies for the clearance of the bile duct (5,6). There is still debate whether it should be done routinely or selectively. The routine use of IOC could improve outcomes in BDI; it might prevent serious injuries or early detect them intraoperatively. Systematic IOC has a short learning curve and might increase the detection of anatomical biliary variations (7). Despite the potential benefits, the role of IOC in the prevention of BDI had low scientific evidence (8). Additionally, some drawbacks to its implementation, such as the know-how needed to interpret a cholangiography, the prolonged length of surgery or cost have been described (7). When critical view of safety is applied during LC the risk of BDI might be reduced (9).

Recently, Buddingh *et al.* (8) reviewed alternative methods for intraoperative assessment of biliary anatomy. These techniques include: cholecysto-cholangiography, dye cholangiography, light cholangiography, passive infrared cholangiography, near-infrared fluorescence cholangiography, hyperspectral cholangiography, and laparoscopic ultrasound (LUS). Probably, LUS appear to be the most suitable and promising method. In a systematic review, Dili *et al.* (10) highlighted the benefits and drawbacks of the method. LUS avoids a radiation exposure and represents a non-invasive study of the vascular and biliary system. In difficult situations, such as inflammation or a fibrosis process, LUS can guide the surgeon during the surgical procedure (10). However, the correct interpretation of the bile duct might be crucial and require a long learning curve. Especially when anatomical variations of the vasculo-biliary system are present.

To date remains undefined with a low level of scientific evidence, which is the best method to map the bile duct, prevent or early detect a BDI and confirm or diagnose CBDS. Nevertheless, the complementary use of the techniques commented previously (specially IOC and LUS),

would serve to perform a safe LC.

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