

# Current controversies in management of bile duct injuries

## Introduction

“Bile duct injuries” (BDI) remain one of the most complex problems in hepatobiliary surgery, concerning a complication after a previous surgical procedure, most commonly a cholecystectomy or a liver resection. A lot of effort has been made for prevention of bile duct injuries, nevertheless, bile duct injuries rates have remained unchanged throughout the years. Multidisciplinary treatment has been advocated and a team of different specialists should be addressed for the integral management of this entity. Current problems in treating bile duct injuries remain.

- Whether the bile duct injury should be treated by endoscopy, radiology, surgery or a combination.
- When is the best timing for repair?
- Which is the role of the recent application of minimally invasive surgery for the repair of BDI?
- Who is the appropriate surgeon to repair a BDI? All these issues should be addressed and solved during a multidisciplinary approach to BDI.

## Different approaches to the treatment of bile duct injuries

According to the existing literature, endoscopic and/or radiologic management of BDI is feasible, whenever there's continuity in bile duct and not a complete transection. These approaches can include an endoscopic retrograde cholangiography to drain bile ducts after sphincterotomy or placement of endoprosthesis.<sup>1</sup> Approach by an endoscopic retrograde cholangiography allows biliary stenting or balloon dilatation, considered to be the first-line treatment in some referral centres. Usually the placement of a 7–8.5 French single plastic stent is the first step in a series of endoscopic rehabilitation protocol. If a single stent is not effective, placement of multiple stents or a large-diameter stent can be selected.<sup>2</sup> Patients undergoing endoscopic stent treatment has shown a safe and favourable long term outcome, although no consensus has been reached regarding placement of one single stent alone or sequential insertion of multiple stents, with studies finding benefits from both approaches.<sup>3,4</sup> Percutaneous transhepatic cholangiography allows identification of biliary tree anatomy and interventional radiology also allows placing stents in order to control bile leaks or drain infected bile collections.<sup>1</sup> This can be viewed as an initial treatment in order to relieve jaundice or even to palliate difficult cases in which multiple surgeries have not reached an ideal result. Some centres routinely place a transhepatic percutaneous stent in every isolated section of the biliary tree before surgery to aid in the identification of the particular ducts that need to be joined to the intestine at surgery.<sup>5</sup>

## Best timing for repair

Although there has never been a prospective, controlled, randomized trial addressing this issue; most experts agree that timing

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of surgical repair should be individualized, based on type of injury, coexistent comorbidities, septic complications, etc. In otherwise stable, non septic patients, operation can be performed on an early basis.<sup>1</sup> It seems still to be much debate regarding the appropriate choice of treatment when a BDI is recognized intraoperative. Most of the literature states that whenever a BDI is recognized during cholecystectomy and the surgeon lacks experience in biliary repair, he or she should call in a more expert surgeon for assistance or drain the surgical site and then transfer the patient to a centre that routinely cares for patients with BDI or a specialized Hepatobiliary and Pancreatic Department.<sup>6</sup> On the other hand, intraoperative repair of a BDI by an experienced hepatobiliary surgeon results in excellent long-term results whenever is available.<sup>7</sup>

## Role of minimally invasive surgery in BDI repair

Recent advance in laparoscopic techniques have recently allowed some surgical groups to perform minimally invasive BDI repair, by means of hepaticojejunostomy, showing safe and feasible results in initial series.<sup>8</sup> These late and least invasive approaches have shown faster patients recoveries, comparable results to open approach and have opened the gates widely to a wide range of applications of minimally invasive surgery in patients with BDI. Should it be the standard approach in the future is still to see, but at least they're already showing promising long-term results. These type of repair would need a new sort of surgeons: both trained in laparoscopic and hepatobiliary surgery. Also, we should start to see new series on patients treated by robotic BDI repair.

## Surgical repair and who should perform it

Finally, the issue regarding who should repair a BDI is also a controversial one. In literature, repair by primary or index surgeon, usually results in unsuccessful attempts at repair, complication of the injury and aggravation of the patient's condition.<sup>6</sup> Studies tend to agree in that early referral from the initial centre to a third level centre or one with an Hepatobiliary and Pancreatic Unit is always advisable, since progression of BDI severity from the moment of injury to that of referral still occurs in as much as half of the patients. Also, sepsis at referral and need for laparotomy before surgical repair are factors significantly associated with development of severe complications.<sup>6,9</sup>

Results in BDI repair are quite variable, but results are poorest when the injury is above the bifurcation or involves a combination of injuries to common bile duct and an aberrant duct type E4 and E5 Strasberg injuries.<sup>5</sup> In conclusion, to achieve the best results in BDI management, patients should be treated by a multidisciplinary team, including surgeons, endoscopists, and radiologists, to allow the better, most efficient diagnostic workup and treatment. Timing to BDI repair should always be made on a case by case scenario. Minimally invasive surgery can become an useful alternative for repairs and finally, an hepatobiliary experienced surgeon is always desirable to perform the repair.

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### Conflict of interest

Author declares that there is no conflict of interest.

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