

# Benign Biliary Strictures and Leaks



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## KEYWORDS

• Bile leaks • Biliary stenosis • ERCP • Biliary stents • Cholangioscopy

## KEY POINTS

- Endoscopic approach plays a major role in the management of a vast majority of bile duct injuries (BDIs), including the most severe ones.
- These patients should be managed in highly specialized centers with a multidisciplinary environment and availability of multitechnical approaches.
- Biliary stricture calibration is successfully obtained with multiple plastic stents placement and serial exchanges for 1 year.
- Fully covered self-expandable metal stents (FCSEMS) represent a reasonable alternative to multiple plastic stents, particularly for biliary stenosis associated with chronic pancreatitis. Uncovered self-expandable metal stents (SEMS) are strictly contraindicated for any benign biliary stenosis.
- Autoimmune cholangiopathy (AIC) and primary sclerosing cholangitis (PSC) represent major diagnostic challenges whereby endoscopic retrograde cholangiopancreatography (ERCP) and cholangioscopy play a pivotal role.

## INTRODUCTION

Benign biliary strictures are secondary to surgery, chronic pancreatitis (CP), PSC, or autoimmune cholangitis. Biliary leaks mainly occur after surgery and, rarely, abdominal trauma.

BDIs occurring during surgery represent a major clinical problem associated with significant morbidity and mortality. Laparoscopic cholecystectomy is the leading cause of iatrogenic BDIs occurring in 0.3% to 0.5% of the cases.<sup>1,2</sup> They can also develop after hepatic surgery, such as hepatic resection and liver transplant, or follow nonbiliary surgery or nonoperative procedures in areas located close to the biliary tract.<sup>3,4</sup> Less frequently, abdominal trauma can also result in BDIs.<sup>5</sup>

BDIs can range from nonsevere bile duct leaks or strictures to more severe injuries including complete transection or occlusion of the main ducts. Different classifications

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Gastrointest Endoscopy Clin N Am 25 (2015) 713–723

<http://dx.doi.org/10.1016/j.giec.2015.06.004>

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described in this article have been developed to evaluate their severity<sup>6,7</sup> and guide physicians in planning the most appropriate medical or surgical therapeutic intervention for each patient. ERCP and associated nonsurgical techniques play a pivotal and still growing role in their management.

Benign strictures due to CP may also benefit from endoscopic therapy, whereas those associated with PSC or AIC represent, in addition to potential therapy,<sup>8</sup> one of the few diagnostic indications of ERCP (and cholangioscopy) for characterization of undetermined strictures and differential diagnosis from malignancy.

This article covers the current indications and capabilities of ERCP (and associated nonsurgical techniques) for the management of benign biliary strictures and leaks.

## POSTOPERATIVE BILIARY STRICTURES AND LEAKS

Although most BDIs occur after cholecystectomy, other liver surgeries such as hepatectomies and liver transplant represent sources of major injuries. The early injury often results from complex dissection, poorly defined anatomy, or management of preoperative bleeding by clipping or diathermy.<sup>1,3,5,7</sup>

Delayed injury may arise from ischemia of the bile ducts, and stenoses may develop clinically up to decades after the original insult. Whatever their cause and timing and even if endoscopy has become pivotal in their management, these patients should be initially managed in tertiary referral centers and referred to multidisciplinary teams of endoscopists, radiologists, and surgeons having extensive experience. “Don’t further mess the biliary system” by inappropriate attempts to repair should be the rule, keeping in mind that these complications often occur in young patients undergoing a minor surgery and that inappropriate management may affect at long term their quality of life.<sup>9,10</sup>

Even if multiple classifications have been published,<sup>2,6,7</sup> the most useful for endoscopists is the one described by the group of Amsterdam,<sup>7</sup> which is particularly relevant for postcholecystectomy injuries. BDIs were classified into 4 groups defined as follows:

- Type A: Cystic duct leaks or leakages from aberrant or peripheral hepatic radicles
- Type B: Major bile duct leaks with or without concomitant biliary stricture
- Type C: Bile duct strictures without leakage
- Type D: Complete transection of the duct with or without excision of a portion of the biliary tree

Type A leaks arise from the cystic duct and the ducts of Luschka after cholecystectomy. They are usually associated with low output and may require complete filling of the biliary tree with contrast to be demonstrated.

They respond favorably to biliary decompression achieved (and preferably) by transient stent placement (4–8 weeks), endoscopic sphincterotomy (recommended in case of associated common bile duct [CBD] stones), or placement of a nasobiliary catheter, often associated with an endoscopic sphincterotomy (ES).<sup>10,11</sup> The last is less comfortable for the patient but may be useful, particularly when leaks occur from peripheral radicles, the nasobiliary catheter (NBC) being inserted into the segment from which the leak originates. As for any leak, percutaneous drainage of biloma may be required in addition to endoscopic therapy. These treatments, combining biliary decompression and removal of a persisting obstacle or drainage of a biloma in selected cases, allow resolution of the leak in more than 90% of the cases.<sup>12</sup>

Leakages from major bile ducts (type B), at the level of the CBD after cholecystectomy or choledocal anastomosis or of the intrahepatic ducts after liver surgery,

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