

## Cannulating the papilla from the reverse position. Therapeutic ERCP in patients with Billroth II gastrectomy

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### SUMMARY

Therapeutic ERCP in patients with Billroth II gastrectomy can be more difficult, because of a surgically altered anatomy and requires a very skilful endoscopist. Most endoscopists recommend the use of a side-viewing duodenoscope. Gastroscopes should be reserved as second choice after a failed attempt with the duodenoscope. Afferent loop intubation is successful in 72-94% of patients. The most serious complication during ERCP is bowel perforation (0,7-2%) caused by manipulations through the afferent loop, while trying to reach the papilla. Selective cannulation and sphincterotomy of the papilla is safely and successfully performed from the reverse position (5 to 6 'o clock position, for the common bile duct), with the use of a specifically designed Billroth II sphincterotome.

Because of the anatomical changes, diagnostic and therapeutic endoscopic retrograde cholangiopancreatography (ERCP) is more demanding, in technical terms, in patients with a Billroth-II (B-II) gastrectomy, as compared to the procedure in an intact upper alimentary tract. Conceivably the respective success rate of ERCP is 50-90% and 85-95%. The endoscopist performing ERCP in a B-II patient has to consider and overcome the following issues: I) to choose the appropriate endoscope, II) to intubate the afferent loop, III) to reach the duodenal stump and papilla, IV) to selectively cannulate the papilla and V) to perform an endoscopic sphincterotomy. The whole issue has been addressed by specialists shortly after the introduction of ERCP in 1968<sup>1</sup>

and endoscopic sphincterotomy in 1973.<sup>2</sup> However, interest in these issues continues to the present and will be discussed herein.

**I) Choosing the appropriate endoscope:** The choice between a forward and side-viewing endoscope, to access the papilla is a matter of a continuing debate. Each instrument has advantages and disadvantages. With a forward-viewing endoscope it is easier to identify, intubate, and negotiate the afferent limb, but the cannulation of the papilla may be more difficult because of the tangential view and the lack of an elevator.<sup>3</sup> The side-viewing instrument offers an "en face" view of the papilla, but reaching the papilla is more difficult and this may be impossible when the afferent loop is long.<sup>4</sup> After either type of gastrojejunostomy - Hofmeister and or Polya - the afferent and efferent jejunal limbs can be separated by a wide or a narrow bridge, depending upon the size of the stoma. The position of the limbs relative to each other varies, also causing difficulties during the ERCP.

This issue was addressed in a study of 274 ERCPs in 175 patients with a B-II gastrectomy, by using side-viewing therapeutic endoscope.<sup>4</sup> The forward-viewing scope was used in only 2% of the patients as a second choice and only after a failed approach with the side-viewing endoscope. When the afferent loop was accessible, the duodenal stump was reached in 95%, cannulation of the desired duct was obtained in 93%, and endoscopic treatment was achieved in 93% of the patients. Only three (1%) jejunal perforations were recorded with the duodenoscope.<sup>4</sup> Those results have been confirmed by a number of other publications,<sup>5-8</sup> with only a few exceptions.<sup>9</sup> In contrast, the use of a gastroscope has been associated with a lower success rate. In a series of 56 patients, the overall success rate of ERCP in B-II patients was only 63%.<sup>3</sup> Given the currently available therapeutic duodenoscopes (smooth and

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regular distal end) and an experienced endoscopist the risk of jejunal perforation is significantly low, as compared with that of forward-viewing endoscopes. Thus, most authorities recommend the routine use of side-viewing instrument for ERCP in B-II patients. Gastrosopes should be reserved as second choice after a failed attempt with the duodenoscope.

**II) Afferent loop intubation:** The first problem to tackle when attempting an ERCP in B-II patients is the identification of the afferent loop at the site of the gastrojejunostomy. Afferent loop intubation was successful in 72–94% of patients with B-II gastrectomy in three series.<sup>6,7,10</sup>

The procedure starts with the patient at the left lateral position. However, sometimes turning the patient to the supine or prone position may improve the axis and facilitate introduction of the scope into the stoma. The opening of the afferent loop is usually located along the lesser curvature (on the right) of the resected stomach. Typically, the endoscope tip is first turned to the right and then flexed downward. It must be advanced slowly to prevent rotation of the tip back into the stomach while sucking air during the advancement. When the axis of the anastomotic attachment is horizontal, the afferent loop is usually easy to intubate<sup>11</sup> (Fig. 1). If these maneuvers become unsuccessful, the stoma can be cannulated with a guide-wire, which is subsequently rigidified by a 10 French biliary bougie-type dilator. Then the scope can be pushed over the bougie, which acts as a straightener. All these maneuvers are safer and more successful if performed under radiologic monitoring.

**III) Reaching the duodenal stump and papilla:** The length of the afferent loop varies depending on whether



**Fig. 1.** Afferent loop opening (arrow) on the right side of the anastomosis<sup>11</sup>

an antecolic (long tortuous loop) or retrocolic (short loop) gastrojejunostomy has been performed, with the latter one being most desirable during the ERCP procedure. The technique of the scope progression into the stump resembles that used during colonoscopy, with straightening maneuvers. Having the scope straightened allows precise maneuvers during the attempts to cannulate the papilla.

**IV) Selective cannulation of the papilla:** Because the endoscope approaches the papilla from below instead of from above the papillary anatomy in the B-II patient will be reversed. The cannulation technique must therefore be modified accordingly. This depends on whether a duodenoscope or gastroscope is used. Selective cannulation of the ampulla can be achieved in 63–98% of the patients<sup>6,10,12</sup>, with the highest success rate (98%) achieved with the use of the side-viewing endoscope.<sup>6</sup>

Using the duodenoscope, cannulation and injection of contrast media into the pancreatic duct is usually easy, because the duct joins the duodenum at a favorable angle. The papilla is seen “en face”, but the catheter approaches the papilla at a perpendicular angle, facilitating the cannulation of the pancreatic duct. Bile duct cannulation may be more technically demanding. Most endoscopists use a straight catheter (catheter without any curve at the tip, and with a 0,035 inch guide-wire), (Fig. 2) to improve the axis toward the biliary direction (5 to 6 o'clock position). The orientation of the catheter, towards the bile duct, may be further improved by slightly pulling back and bending the tip of the instrument towards the duodenal wall and pushing the catheter, while keeping its tip in touch with the orifice of the papilla. At



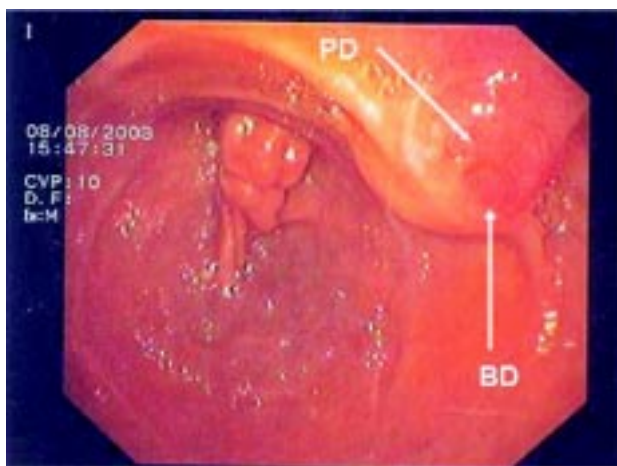
**Fig. 2.** Billroth II sphincterotomes<sup>11</sup>

this phase of the procedure the elevator is of great use, by creating a more tangential angle of cannulation, while the catheter is being carefully monitored with fluoroscopy. When the papilla is close to or within a duodenal “cul de sac” cannulation may be more difficult or sometimes impossible (Fig. 3).

With the forward-viewing endoscope the papilla is viewed tangentially and therefore is more difficult to access, particularly without an elevator (Fig. 4). However, cannulation of the bile duct is usually successful because of the tangential approach, at the 5 to 6 o'clock position (Fig. 5a). Cannulation of the pancreatic duct is achieved by inserting the catheter at the 11 o'clock position while aiming the catheter upward with a right to left orienta-



**Fig. 3.** View of the papilla in the Billroth II patient. BD: orifice of the bile duct, PD: orifice of the pancreatic duct. (Personal file)



**Fig. 4.** Totally reversed position of the papilla in Billroth II patient. BD: bile duct, PD: pancreatic duct. (Personal file)

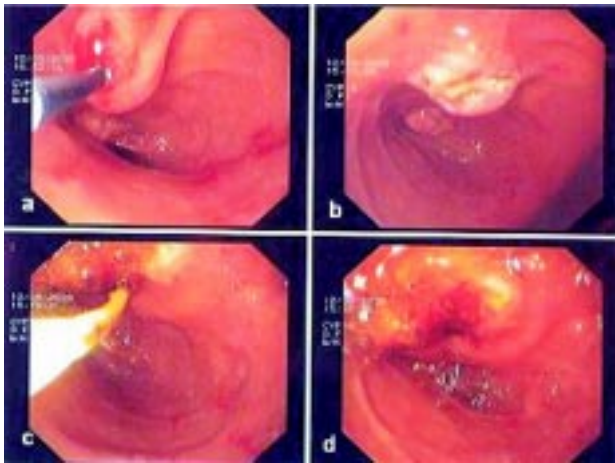
tion. The bile duct is usually easier to cannulate than the pancreatic duct as the catheter is automatically directed towards the axis of the bile duct.

Causes of failure, during 185 ERCPs with a side-viewing endoscope in 110 patients with previous B-II gastrectomy were categorized as follows: I) Difficulty to enter the afferent loop (10%). II) Impossible to reach the duodenal stump (10%). III) Failure to cannulate the papilla (6%). IV) Endoscope related bowel perforation (6% of the ERCPs, 10% of the patients).<sup>10</sup> This is an unacceptably high complication rate, compared with other series<sup>13</sup> such those of Demarquay et al. (0,7%), Aabakken et al. (1%), and Costamagna et al. (2%).

**V) Endoscopic sphincterotomy:** The standard sphincterotomy is not suitable for sphincterotomy in B-II patients as the cutting wire is directed toward the posterior wall of the duodenal stump. The B-II sphincterotomy has a cutting wire oriented at the reverse position of the standard sphincterotomy (Fig. 2). Sphincterotomes designed to facilitate this orientation have been available for more than twenty years. The Costamagna's group<sup>2</sup> improved the standard sphincterotomy with a new one (a sigmoid-shaped catheter with long distal tip for deep cannulation into the common bile duct), routinely used since 1988.<sup>14</sup> Several other groups have developed similar sphincterotomes.<sup>15,16</sup> A double-lumen B-II sphincterotomy that accommodates a guide-wire (Fig. 2b) can be used when free selective cannulation with the sphincterotomy fails (Fig. 5a,b).

An alternative approach to performing sphincterotomy is to use the needle-knife sphincterotomy after inserting a 7-French plastic stent in the bile duct. The stent serves as guide rail for making the incision at the 5 to 6 o'clock position.<sup>7,17</sup> Balloon dilatation (BD) of the papilla, to remove bile duct stones in patients with a B-II gastrectomy has also been suggested as an alternative technique, in order to avoid problems of endoscopic (Fig. 5a-d) sphincterotomy (EST).<sup>8,18</sup> In the only randomized trial, complete stone removal from the common bile duct was achieved in 88% of BD patients vs 83% of EST patients. Complications occurred in 39% of EST patients and in 19% of BD patients (Table 1).<sup>8</sup> Therefore, BD could be an alternative to EST for removing stones from the common bile duct, in patients with a B-II gastrectomy.

The most serious or even fatal complication after ERCP in B-II patients is bowel perforation, during endoscope manipulations through the afferent loop, trying to reach the papilla. If the papilla is reached, cannula-



**Fig. 5 a-d.** Double-lumen Billroth II sphincterotome for selective cannulation of CBD (fig. 5a) and sphincterotomy (fig. 5b). Insertion of the balloon catheter in the CBD (fig. 5c) and presence of small CBD stones in the duodenal stump (fig. 5d). CBD: common bile duct. (Personal file)

**Table 1.** Early complications (< 15 days after ERCP) after EBD and EST in patients with a prior Billroth II gastrectomy<sup>s</sup>

	EBD (n= 16)	EST (n= 18)
Bleeding	0	3
Fever	2	2
Pancreatitis	1	0
Perforation	0	1
Respiratory insufficiency	0	1
Total	3 (19%)	7 (39%)

(There were no statistically significant differences in complication rates between the two treatment groups. EBD: endoscopic balloon dilatation, EST: endoscopic sphincterotomy).

tion can almost always be achieved. Complications rates after reaching the papilla are similar to those with an intact upper alimentary tract, provided that the procedure is performed by an experienced biliopancreatic endoscopist.

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