RESEARCH

Laparoscopy-assisted ERCP (LA-ERCP) following bariatric gastric bypass surgery: initial experience of a single UK centre

Bharat Paranandi,¹ Deepak Joshi,¹ Borzoueh Mohammadi,² Andrew Jenkinson,² Marco Adamo,² Samantha Read,³ Gavin J Johnson,¹ Michael H Chapman,¹ Stephen P Pereira,¹ George J Webster¹

¹Department of Pancreatobiliary Medicine, University College London Hospitals, London, UK

²Department of Bariatric Surgery, University College London Hospitals, London, UK

³Department of Radiology, University College London Hospitals, London, UK

Correspondence to

Dr George J Webster,
Department of Gastroenterology,
University College London
Hospitals, 250 Euston Road,
London NW1 2PG, UK;
george.webster@uclh.nhs.uk

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ABSTRACT

Background Bariatric gastric bypass surgery is being increasingly performed, but endoscopic retrograde cholangiopancreatography (ERCP) in these patients poses a unique challenge because of a lack of per-oral access to the stomach. Small series suggest a higher technical success rate using laparoscopy-assisted ERCP (LA-ERCP) than with an enteroscopic approach via the Roux-en-Y anastomosis. We present initial experience of LA-ERCP in our unit.

Design Retrospective case series of consecutive patients undergoing LA-ERCP in our unit between September 2011 and July 2014. Data was retrieved from electronic, clinical and endoscopy records.

Results Seven LA-ERCPs were performed. All seven patients were female, with median age 44 years (range 36–71). Indications included symptomatic bile duct stones (5/7), benign papillary fibrosis (1/7) and retained biliary stent (1/7). 5/7 (71%) patients had had a prior cholecystectomy. To facilitate LA-ERCP, laparoscopic gastrostomy ports were created in all patients. Duodenal access, biliary cannulation and completion of therapeutic aim were achieved in all patients. 6/7 (86%) patients required endoscopic sphincterotomy. The median duration of procedures was 94 min (range 70–135). Median postoperative length of stay was 2 days (range 1–9). One patient developed mild postprocedural acute pancreatitis, and another patient developed a mild port-site infection. Otherwise, no procedure-related complications were seen. All patients remained well on follow-up (median 14 months (range 1–35) from date of ERCP), with no evidence of further biliary symptoms.

Conclusions Our early experience of LA-ERCP is that it is safe and effective. The technique may require particular consideration, as bariatric surgery is increasingly performed, in a patient group at significant risk of bile duct stones.

INTRODUCTION

Bariatric surgery, to facilitate weight loss in patients who are morbidly obese, is being increasingly performed in high-income countries. In 2011, it is estimated that over 340 000 operations were performed.¹ Of the modalities available, Roux-en-Y gastric bypass (RYGB) remains the most commonly performed bariatric procedure.¹

Cholelithiasis is common in patients who have undergone gastric bypass surgery for morbid obesity, and is seen in up to 40% of patients within 6 months of surgery.^{2–3} Rapid weight loss in this group of patients can lead to the production of lithogenic bile with increased levels of mucin and calcium, favouring the formation of gallstones.⁴ Up to 40% of individuals who develop cholelithiasis will become symptomatic.⁵ For this reason, elective cholecystectomy at the time of bariatric surgery is recommended by some centres, but it can be technically challenging, with a higher incidence of complications.^{6–9} There are many conflicting retrospective case series on this particular topic, with some suggesting that the high rates of gall bladder disease and subsequent need for emergency procedures necessitate performing concomitant gall bladder surgery at index gastric

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bypass.^{10 11} However, there is no expert or international consensus on cholecystectomy for this indication.

Endoscopic biliary intervention in patients following RYGB poses a unique challenge due to the alteration in upper gastrointestinal anatomy (see figure 1). It is often impossible to reach the duodenal papilla using a standard per-oral endoscopic approach, not least due to the long distance to the Roux-en-Y anastomosis.¹² Other endoscopic methods that have been used include single balloon, rotational or double balloon enteroscopy. Procedural success appears to be related to both accurate identification of the papilla and/or reaching the biliary-enteric anastomosis.⁸ However, the risk of complications with enteroscopic approaches is as high as 12%.⁸

An alternative approach is through laparoscopic formation of a temporary surgical gastrostomy (ie, laparoscopy-assisted endoscopic retrograde cholangiopancreatography (LA-ERCP)). This can be used as an access point or conduit through which to pass a side-viewing duodenoscope into the remnant gastric pouch. This method allows the endoscopist to thereafter approach the papilla in a conventional manner and use standard ERCP accessories.

We present our experience at University College London Hospitals, London, of LA-ERCP in patients with a prior history of RYGB surgery.

METHODS

This is a retrospective case series of consecutive patients undergoing LA-ERCP in our tertiary referral unit from September 2011 to June 2013. Data were retrieved from electronic, clinical and endoscopy records.

INTERVENTION

All LA-ERCP procedures were undertaken in the operating theatre (OT) with a mobile endoscopy stack and Olympus TJF duodenoscopes (Olympus KeyMed, Southend-on-Sea, UK), in addition to standard ERCP accessories. The laparoscopic procedure involved formation of a closed pneumoperitoneum to a pressure of 12 mm Hg with a Veress needle. A 15 mm trocar was placed in the epigastrium and two 5 mm trocars were placed in the right and left flanks for surgical access. A 15 mm gastrostomy port was secured with purse-string sutures. The duodenoscope was inserted via the port into the gastric remnant and advanced conventionally into the duodenum. Standard

Figure 1 Anatomy of the upper gastrointestinal tract following Roux-en-Y gastric bypass (RYGB) surgery. With permission from the Merck Manual of Diagnosis and Therapy, edited by Robert Porter. copyright 2010–2014 by Merck Sharp & Dohme, a subsidiary of Merck & Co., Whitehouse Station, New Jersey, USA. Accessed 26 June 2014. Available at <http://www.merckmanuals.com/professional/>

therapeutic ERCP technique was then performed. Following completion of the ERCP, closure of the gastrostomy was achieved with a double layer of 2-0 Vicryl sutures. The LA-ERCP procedure is depicted in figure 2.

Periprocedural prophylactic intravenous antibiotics and non-steroidal anti-inflammatory drugs (NSAIDs) were administered routinely in all patients.

RESULTS

We performed seven LA-ERCPs on seven patients between September 2011 and July 2014. Individual patient data are presented in table 1.

All of our patients were female with median age 44 years (range 36–71 years). All had undergone previous RYGB procedures for morbid obesity with formation of a long Roux limb (>150 cm). Median time

Figure 2 The LA-ERCP procedure. CBD, common bile duct; LA-ERCP, laparoscopy-assisted endoscopic retrograde cholangiopancreatography.

Table 1 Demographics and procedure details of LA-ERCP case series

	Patient 1	Patient 2	Patient 3	Patient 4	Patient 5	Patient 6	Patient 7
Gender	F	F	F	F	F	F	F
Age	36	54	37	71	44	42	68
ASA status	2	2	1	2	1	2	1
Time from bariatric surgery to LA-ERCP (months)	6	27	27	116	32	72	22
Prior biliary intervention	LC, ERCP	LC	LC	Nil	OC	LC	Nil
Indication for LA-ERCP	Jaundice and CBD stone(s)	Suspected SOD type 1	Suspected SOD type 2	Jaundice and CBD stone(s)	Biliary pain and CBD stone(s)	Jaundice and cholangitis	Biliary pain and CBD stone(s)
Desired duct cannulation—successful?	Y (CBD)	Y (CBD)	Y (CBD and PD)	Y (CBD)	Y (CBD)	Y (CBD)	Y (CBD)
Intervention at LA-ERCP	Stent removal, BT	EST, BT	SOM, EST, BT	EST, BT	EST, BT	EST, BT	EST (needle knife), BT
Diagnosis at LA-ERCP	CBD stone(s)	BPF	CBD stone(s)	CBD stone(s)	BPF	CBD stone(s)	CBD stone(s)
Approximate procedure time (min)	105	100	135	70	94	80	90
Complication	Nil	Mild acute pancreatitis	Nil	Nil	Nil	Port-site infection	Nil
Follow-up post LA-ERCP (months)	28	23	14	14	35	2	1

BPF, benign papillary fibrosis; BT, balloon tawl; CBD, common bile duct; EST, endoscopic biliary sphincterotomy; LA-ERCP, laparoscopy-assisted endoscopic retrograde cholangiopancreatography; LC, laparoscopic cholecystectomy; OC, open cholecystectomy; PD, pancreatic duct; SOD, sphincter of Oddi dysfunction; SOM, sphincter of Oddi manometry.

interval from Roux-en-Y to LA-ERCP was 27.3 months. A total of 6/7 (86%) patients were tertiary referrals from other units within the UK; only one of whom had a previous ERCP (via the per-oral route) attempted during this same treatment episode (which had failed due to inability to negotiate the gastric bypass).

Indications for ERCP included symptomatic bile duct stones (5/7), benign papillary fibrosis (1/7) and retained biliary stent (1/7). A total of 5/7 (71%) patients had previously undergone cholecystectomy. All cases with relevant cross-sectional imaging had been reviewed in our specialist benign pancreatobiliary multidisciplinary meeting. All patients were noted to be ASA grade 2, and all patients received general anaesthesia (with endotracheal intubation) administered by a consultant anaesthetist.

Duodenal access, biliary cannulation and completion of therapeutic aim were achieved in all patients. A total of 6/7 (86%) patients required biliary sphincterotomy. The seventh patient had a prior sphincterotomy. All patients were given antibiotics prophylactically, and 6/7 (86%) patients received prophylactic NSAIDs. The median duration of procedures was 94 min (range 70–135). Median post-operative length of stay was 2 days (range 1–9). One patient developed mild postprocedural acute pancreatitis, and another patient developed a mild port-site infection. Otherwise, no procedure-related complications were seen. All patients remained well on follow-up (median 14 months (range 1–35) from date of ERCP), with no evidence of further biliary symptoms.

DISCUSSION

We present our initial experience of LA-ERCP via a laparoscopic transgastric approach for patients with previous RYGB. Technical and clinical success was achieved in all seven patients.

The indications for LA-ERCP in the majority of our patients were symptomatic choledocholithiasis, the prevalence of which is increased in this cohort of patients.³ Two patients underwent LA-ERCP for suspected sphincter of Oddi dysfunction (SOD)—both patients were found at LA-ERCP to have alternative explanations for their symptoms. There is a single published retrospective case series examining the management of SOD in patients who have undergone RYGB,¹³ but no convincing evidence of an association between the two.

The published experience of LA-ERCP suggests a high technical success rate (90%–100%) with a low total complication rate (<5%).^{14–20} LA-ERCP is associated with a significantly higher rate of papilla identification and biliary cannulation as well as therapeutic success when compared with alternative enteroscopic approaches such as balloon enteroscopy-assisted ERCP (BEA-ERCP).¹⁴ Although laparoscopic procedures are more invasive and carry the additional risk of abdominal surgery and general anaesthesia, LA-ERCP has been shown to be the superior approach when compared with BEA-ERCP because of the lack of need for a second procedure, equivalent morbidity and hospital stay, decreased endoscopist time and decreased cost.¹⁴ A limitation of BEA-ERCP is that even when the ampulla can be reached via the Roux-en-Y anastomosis, biliary cannulation and

completion of therapeutic aim is much less reliably achieved than with LA-ERCP.

Despite the published success of LA-ERCP, and our own experience, there are technical and organisational challenges. For instance, LA-ERCP must be undertaken in the confines of an OT to facilitate the surgical procedure. This requires advanced planning and coordination of surgical, anaesthetic, radiology and endoscopy teams to perform LA-ERCP. A mobile endoscopy stack, duodenoscope, electrocautery unit and all the necessary accessories must be transported from the endoscopy unit to the OT, an environment that may be unfamiliar to the endoscopy staff. Fluoroscopy quality may be less good than what the ERCPist is familiar with, usually requiring a mobile 'C arm'. An entire endoscopic session needs to be devoted to this single procedure, in our experience.

Duodenoscope handling is unusual, with most of the endoscope shaft outside the patient. This reduces endoscopic stability, with only approximately 20 cm of endoscope length from the gastrotomy port to the ampulla. Access to the first part of the duodenum can also be challenging, as the endoscopist needs to orientate the duodenoscope directly towards the pylorus rather than back towards the oesophagogastric junction. A particular problem is presented by the necessary closure of the gastrotomy at the end of the procedure. This largely precludes the placement of a prophylactic pancreatic duct (PD) stent, which may, otherwise, have a role in reducing post-ERCP pancreatitis in high-risk patients.^{21 22} In more than 85% of cases, unflanged 3–5 Fr pancreatic stents migrate spontaneously after 2–3 weeks.^{23 24} Following gastric bypass, it might be that a lower rate of spontaneous migration of stents would occur, and further surgery (with gastrotomy formation) would be needed in the setting of non-migration. In addition, postsphincterotomy bleeding or incomplete endoscopic therapy (eg, biliary stent placement for stones) would require a repeat LA-ERCP.

Our early experience of LA-ERCP is that it is safe and effective. We have demonstrated, in line with international data, that LA-ERCP is a valid technique to gain access to the biliary tree following RYGB procedures. This technique may require particular consideration, as bariatric surgery is being increasingly performed, in a patient group at significant risk of bile duct stones.

Contributors BP: conception and design of the project; acquisition, analysis and interpretation of data; writing of manuscript. DJ, BM, AJ, MA, SR, GJJ, MHC, SPP: assisted with data acquisition for specific patients, critical appraisal of manuscript, approval of final version. GJW: conception and design of the project, critical revision of manuscript. Lead supervisor.

Competing interests None declared.

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