

EUS-guided biliary drainage: a Latin American experience

Drenagem biliar eco-guiada: experiência latino-americana

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SUMMARY

Our team was the firstly to perform an EUS biliary and pancreatic drainage in Latin america. When distal biliary obstruction (pancreatic and papillary lesions) occurs, EUS-guided fistulization between the common bile duct and duodenal bulb is an efficient and feasible strategy on achieving resolution of jaundice with low morbidity and mortality rates under experienced hands. EUS-guided hepaticogastrostomy and choledochoduodenostomy are advanced procedures on biliary and pancreatic endoscopy and together make up the echo-guided biliary drainage. Hepaticogastrostomy is indicated in cases of hilar obstruction, while the procedure of choice is choledochoduodenostomy in distal lesions. Both procedures must be done only after unsuccessful ERCP. The indication of these procedures must be made under a multidisciplinary view while sharing information with the patient or legal guardian. This study was conducted from june 2007 until march 2010.

Keywords: Endoscopic ultrasound, palliation, biliary.

RESUMO

Nossa equipe foi a primeira a realizar drenagem pancreático-biliar na América Latina. Na ocasião de obstrução distal (massas em cabeça de pâncreas e papila duodenal maior), a fistulização eco-guiada entre o colédoco médio e o bulbo duodenal é uma estratégia factível no alívio da icterícia e com baixa morbimortalidade em equipes experientes. A hepaticogastrostomia e choledochoduodenostomia eco-guiadas são procedimentos avançados na endoscopia

bilio-pancreática e compõe em conjunto a drenagem biliar eco-guiada. A hepaticogastrostomia é indicada nos casos de obstrução hilar, enquanto a choledochoduodenostomia é procedimento de escolha nas lesões distais. Convém lembrar que a drenagem biliar eco-guiada deve ser a segunda opção depois da falha da colangiografia endoscópica retrógrada. A indicação destes procedimentos deve ter alcance multidisciplinar e compartilhar a informação com o paciente ou responsável legal. Este estudo foi realizado entre junho de 2007 até março de 2010.

Unitermos: Ultrassom Endoscópico, Biliar, Palição.

INTRODUCTION

Endoscopic transpapillary biliary drainage is the procedure of choice for biliary decompression in patients with unresectable pancreatic cancer associated to obstructive jaundice^{1,2,3,4}. However, ERCP failure can occur in 3 to 10% of cases^{1,2,4}, even in experienced hands. This failure is related to operator inexperience, anatomic variation, tumor extension, prior surgery or incomplete drainage^{1,2,3,4}.

The alternatives for biliary drainage in unsuccessful ERCP cases include precut sphincterotomy when a pathologic lesion is suspected, second-attempted ERCP, percutaneous transhepatic drainage (PTBD) or surgery^{1,3,5}. However, PTBD has a complication rate of up to 30%, including biliary fistula, peritonitis, empyema, hematoma and liver abscesses^{1,6}. Furthermore, if subsequent internal drainage cannot be achieved, the patients would have to accept long-term external biliary drainage which can be uncomfortable and is non physiological, with significant

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impairment of quality of life. Surgery offers long-term patency but is associated with increased morbidity and mortality⁶.

Recently, EUS-guided biliary drainage has been shown in several reports as an alternative treatment for the management of patients with malignant obstructive jaundice, with acceptable success and complication rates^{7,8}. These techniques include EUS-guided transpapillary rendezvous technique, EUS-guided choledochoduodenostomy and EUS-guided hepaticogastrostomy.

EUS-guided biliary drainage has many advantages over PTBD^{1,3,4}. The proximity of the transducer to the bile duct during EUS is the major advantage⁴. Even in patients who have undergone total gastrectomy or partial gastrectomy with a Billroth II reconstruction, EUS can reveal the etiology of extrahepatic cholestasis, situations in that ERCP may not be possible^{1,3,4,5,9}. Other advantages include puncture of the biliary tree with color-Doppler information to avoid vascular injury, the lack of ascites in the interventional field and the lack of an external tube, improving the quality of life of the patients^{1,10}.

The main risk of EUS-guided biliary drainage is bile leakage, especially if stent insertion is unsuccessful¹. Burmester et al reported the failure of stent placement in 1 of their 4 patients, causing bile peritonitis³. They also reported that only local

peritonitis developed, which did not contribute to the death of the patient. Some investigators recommend the transhepatic approach to decrease the risk of biliary peritonitis in case of stent failure³. Other complications include pneumoperitoneum and minor bleeding^{1,2,5}.

The EUS-guided biliary drainage is being evaluated under research protocols in Sao Paulo University Medical School, aiming at standardizing the procedural technique, with emphasis to improve technical success rates and safety profile of the procedure. Our experience is shown in Table 1.

EUS-GUIDED BILIARY RENDEZVOUS

EUS rendezvous to obtain bile duct access for conventional ERCP was first reported in 2004, by Mallory et al¹¹. This technique is used solely to puncture the obstructed bile duct and pass a guide wire antegrade through the native papilla to allow subsequent ERCP.

EUS-guided biliary rendezvous can be done through a transduodenal route to the common bile duct or through a transgastric route to the intrahepatic ducts.

Technical success rate is about 80%¹². Complications are uncommon, but duodenal perforation and fluid leaks have been described¹².

Table 1: HCFMUSP experience in EUS-guided biliary drainage (from June 2007 until March 2010).

Patient	Gender	Age	Indication	Procedure	Laboratory	
					Initial TB (mg/dL)	TB (mg/dL) 1 week follow-up
1	Female	46	Hilar Cholangiocarcinoma	EUS-HG	22	10
2	Female	88	Pancreatic Cancer	EUS-CDS	18	5
3	Male	75	Hilar Lymphadenopathy	EUS-HG	15	7
4	Male	52	Pancreatic Cancer	EUS-CDS	28	4
5	Female	41	Hilar Cholangiocarcinoma	EUS-HG NO SUCCESS	19	5
6	Male	64	Hilar Cholangiocarcinoma	EUS-HG	11	4
7	Female	67	Pancreatic Cancer	EUS-CA	19	8
8	Female	51	Pancreatic Cancer	EUS-CDS	9	2
9	Male	59	Pancreatic Cancer	EUS-CDS	31	10
10	Male	87	Pancreatic Cancer	EUS-CDS	22	9
11	Male	81	Pancreatic Cancer	EUS-CDS	16	5
12	Female	95	Pancreatic Cancer	EUS-CDS	12	4

Variables presented. TB: Total Bilirubin; EUS-CDS: EUS-guided choledochoduodenostomy; EUS-HG: EUS-guided hepaticogastrostomy; EUS-CA: EUS-guided choledocoantrastomy.

Advantages of this procedure include achievement of biliary drainage at a single session by using conventional ERCP techniques, and possibly fewer complications than other EUS transluminal drainage approaches. However, a limitation of this technique is that it can be attempted only in patients in whom the papilla is endoscopically accessible.

EUS-GUIDED CHOLEDOCHODUODENOSTOMY

Giovannini et al performed a choledochoduodenal fistula under EUS guidance in a patient with pancreatic cancer using a needle knife followed by transduodenal stenting¹³. Since then, many studies described this procedure, with high success rates (92%) and low rate of procedure-related complications (19%)⁷.

EUS-guided choledochoduodenostomy (EUS-CDS) has to be done after failure of ERCP and must be performed by an experienced endoscopist. Prophylactic antibiotics are administered prior to the procedure.

The CBD is visualized using a linear echoendoscope positioned in the duodenal bulb. Color doppler US is used to identify regional vascular anatomy. The dilated bile duct is punctured with a 19 gauge FNA needle. The puncture position is chosen based on EUS evaluation, above the tumor and distal to the duodenal bulb (Figures 1 and 2).

To confirm successful biliary access, bile can be aspirated and iodine contrast injected under fluoroscopy to demonstrate biliary opacification (Figure 3).

A 0.035-inch guidewire is introduced through the EUS needle, using fluoroscopy, and attempts to pass the wire through the papilla to the duodenum are made. When this maneuver has

Figure 1 – EUS linear image demonstrating CDB dilatation



Figure 2 – EUS linear image demonstrating CBD puncture

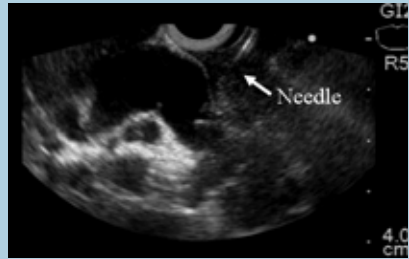
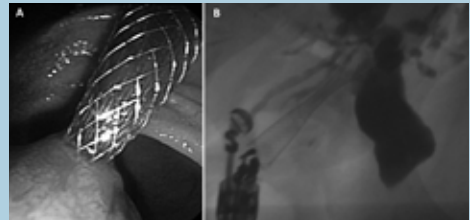


Figure 3 – EUS-guided cholangiography



Figure 4 – A: endoscopic view of transduodenal SEMS, B: radiologic image of the metal stent

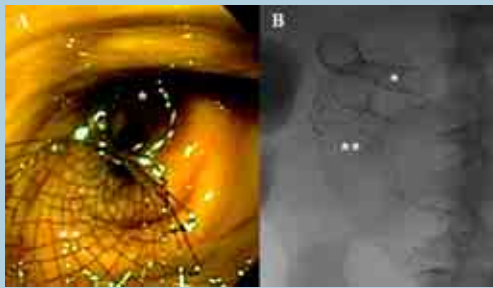


no success, the needle is withdrawn and a wire-guided needle knife is used to perform a puncture in the duodenal wall. A partially covered self-expandable metallic stent (C SEMS) is passed over the guide, through the choledochoduodenal fistula, without any dilatation procedure (Figure 4).

Duodenal bulb invasion is a limitation of EUS-guided choledochoduodenostomy, because it can difficult the CBD visualization and the tumoral growth can obstruct the stent. In these cases, EUS-guided hepaticogastrostomy can be done,

but dilation of the left biliary system is not always present, what can difficult the procedure. In some patients, visualization of the CBD from the antrum can allow an alternative of a choledochostomy (Figure 5).

Figure 5 – A: endoscopic view of the PC-SEMS (*) and the duodenal SEMS () in the antrum/B: radiologic image of the choledochostomy metal stent (*) and the duodenal metal stent (**)**



This modification of the EUS-guided biliary drainage has been first performed by our group in a case of unresectable pancreatic cancer with biliary obstruction and extensive duodenal invasion. It seems to be technically easier to perform and more physiological than a hepaticogastrostomy. This case has already been submitted for publication.

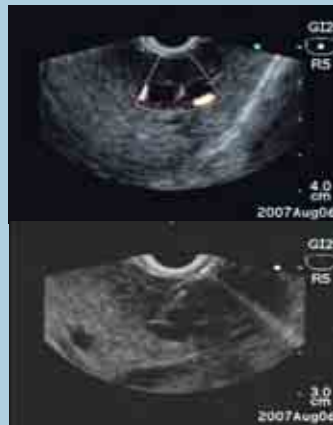
EUS-GUIDED HEPATOGASTROSTOMY

Giovannini et al., in 2003, described the first EUS-guided hepaticogastrostomy, in a patient with proximal metastatic biliary obstruction¹⁴. Other authors have also reported successful outcomes of this technique in which an anastomosis is created between the dilated left intrahepatic biliary system and the cardia or the lesser curve of the stomach^{15,16}. Artifon et al. and Borjes et al., in 2007, described the successful use of partially covered metallic stent in EUS-guided hepaticogastrostomy². This modification seems to reduce complication rates. This procedure has technical success rate of 90% to 100% and clinical success rate of 75% to 100%. Complications are rare, and include stent migration, bile leaks and cholangitis⁹. A fatal complication has been described by Martins et al., in 2010, after migration of the hepaticogastrostomy stent¹⁷.

The procedure is performed using a linear array EUS, placed against the cardia or lesser curve of the stomach. EUS is performed to evaluate for a dilated left intrahepatic biliary system. Vascular anatomy is shown by the power or

color Doppler. Then, a dilated peripheral branch of the left intrahepatic system, that is closest to the EUS transducer, is accessed by using a 19 gauge needle (Figure 6).

Figure 6 – A: EUS image demonstrating dilated left biliary branch/B: EUS image demonstrating puncture of a left biliary branch (intrahepatic approach)



To confirm successful biliary access, bile can be aspirated and iodine contrast injected under fluoroscopy to demonstrate biliary opacification (Figure 7).

Figure 7 – EUS-guided cholangiogram



A 0.035-inch guidewire is introduced through the EUS needle, using fluoroscopy, and attempts to pass the wire through the native papilla to the duodenum are made. When this maneuver has no success, the needle is withdrawn and a wire-guided needle knife is used to perform the fistula between the left intrahepatic branch and the stomach. A partially covered self-expandable metallic stent (PC-SEMS) is passed over the guide, through the hepatogastric fistula, without any dilatation procedure (Figure 8).

Figure 8 – A: radiologic image of the PC-SEMS/ B: endoscopic view of the metallic stent in the cardia



A LATIN AMERICAN EXPERIENCE

EUS-guided biliary drainage has been done in Sao Paulo Medical School since early 2007, in strict study protocols. We present here our experience in a single tertiary referral Institution from June 2007 until March 2010. Nowadays, clinical studies in EUS-guided biliary drainage, approved by ethical committees, are in progress, with remarkable results. We recommend that this method should be made by very experienced endosonographers and in defined protocols. Final results will be shown in future publications. However, our current experience at a public Institution is demonstrated in Table 1.

The short follow-up (1 week) seen in Table 1 is only to demonstrate the immediate improvement in jaundice. However, several patients of our protocols already have months of monitoring. Complications, life quality and survival are aims of these studies.

We had just one drainage failure in the EUS-guided hepatogastrostomy group. This patient was sent to PTBD. We would inform the readers that the above cases demonstrated only the patients performed in a protocol at University of Sao Paulo and it was not included the total of patients made by the endosonographer with expertise in the technique (ELAA) in a private Institution in which the procedure is made as well from 2006.

CONCLUSION

EUS-guided biliary drainage is an effective and minimally invasive option for malignant biliary obstruction, after ERCP

failure. It is feasible, but it is technically challenging and requires experienced endosonographer, proficient in ERCP. Standardization of the procedural technique and development of new specific devices are important to improve success and safety rates. EUS biliary drainage is suitable in those patients with advanced pancreatic cancer, presenting difficult cannulation or duodenal invasion of the second portion. Finally, clinical trials comparing the different types of EUS-guided biliary drainage and the PTBD and surgery are imperative.

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