

11. Morgan R, Adam A. Use of metallic stents and balloons in the esophagus and gastrointestinal tract. *J Vasc Interv Radiol* 2001;12:283-97.
12. Schembre DB. Recent advances in the use of stents for esophageal disease. *Gastrointest Endosc Clin N Am* 2010;20:103-21.

Department of Internal medicine, The Catholic University of Korea College of Medicine, Seoul, Korea.

Reprint requests: Sang Woo Kim, MD, Division of Gastroenterology, Department of Internal Medicine, Seoul St. Mary's Hospital, The Catholic University of Korea College of Medicine, 505 Banpo-dong, Seocho-gu, Seoul, 137-701, Korea.

Copyright © 2011 by the American Society for Gastrointestinal Endoscopy
0016-5107/\$36.00
doi:10.1016/j.gie.2011.01.040

EUS-guided choledochoantrostomy: an alternative for biliary drainage in unresectable pancreatic cancer with duodenal invasion

Everson L. A. Artifon, MD, PhD, FASGE, Luciano Okawa, MD, Jonas Takada, MD, Kapil Gupta, MD, Eduardo G. H. Moura, MD, PhD, Paulo Sakai, MD, PhD

São Paulo, Brazil; Minneapolis, Minnesota, USA

Endoscopic transpapillary biliary drainage is the criterion standard procedure for biliary decompression. However, ERCP can fail in 3% to 10% of cases.¹⁻⁴ In these cases, percutaneous transhepatic biliary drainage and surgical intervention are the alternatives.^{1,3,4} These al-

ternatives have significant morbidity.⁵⁻⁸ However, a more recent option is EUS-guided biliary drainage (EUS-BD). We describe a case of unresectable pancreatic cancer with biliary obstruction and extensive duodenal invasion that was successfully treated with a variation of the EUS-BD by performing a choledochoantrostomy.

Table 1. Baseline characteristics and follow-up

Time point	Early complications	Laboratory			
		TB (mg/dL)	DB (mg/dL)	AP (U/L)	GGT (U/L)
Before procedure		10.7	7.7	362	738
1 wk after	None	2.0	1.9	259	512
1 mo after	None	0.7	0.4	219	382

TB, Total bilirubin; DB, direct bilirubin; AP, Alkaline phosphatase; GGT, γ -glutamyl transferase.

CASE REPORT

A 77-year-old female patient presented with unresectable pancreatic cancer and obstructive jaundice (Table 1). A previous ERCP failed because of invasion of the duodenal bulb, leading to stenosis. Biopsy samples were obtained that showed an advanced adenocarcinoma.

The option of an EUS-BD was considered. Informed consent was obtained after discussing the risks, benefits, and alternatives with the patient and the family. EUS of the antrum showed a large, heterogeneous mass in the head of the pancreas with marked dilation of the common bile

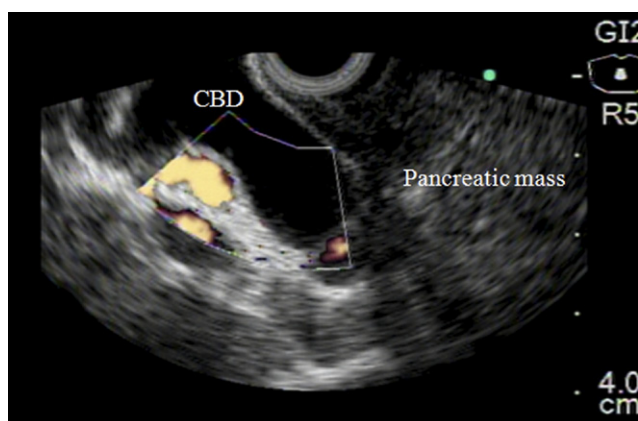


Figure 1. EUS image demonstrating dilated common bile duct.

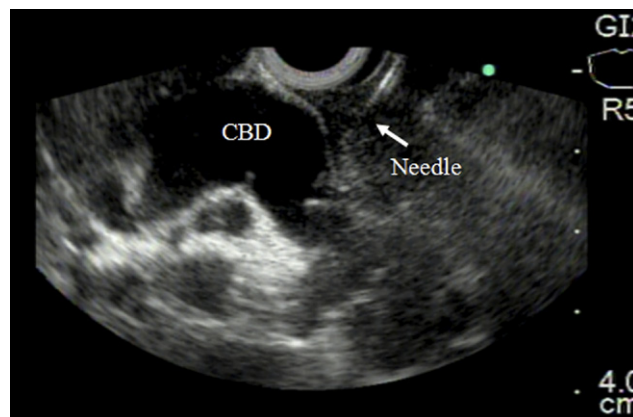


Figure 2. EUS image demonstrating common bile duct puncture with a 19-gauge needle.



Figure 3. EUS-guided cholangiography.

duct from the antrum because it was impossible to advance the echoendoscope to the duodenum.

The common bile duct was visualized from the antrum using a linear echoendoscope (GFUCT160; Olympus Medical, Tokyo, Japan) (Fig. 1). The dilated common bile duct above the tumor was punctured with a 19-gauge FNA needle (EUSN-19-T; Cook Endoscopy, Winston-Salem, NC) through the antrum (Fig. 2).

Bile was aspirated, and contrast was injected to demonstrate biliary opacification (Fig. 3). A 0.035-inch guidewire was passed into the biliary tree. The needle was withdrawn, maintaining the position of the guidewire, and a fistula was created using a wire-guided needle-knife (KD-441Q; Olympus Medical). A partially covered self-expandable metal stent (10 × 60 mm, Wallflex; Boston Scientific, Natick, Mass) was passed over the guidewire through the choledochoduodenal fistula and successfully deployed (Fig. 4).

Subsequently, an uncovered duodenal self-expandable metal stent (22 × 120 mm, Wallflex; Boston Scientific) was successfully placed across the duodenal stricture (Fig. 5).

There were no early or delayed complications, and the procedure was effective in relieving jaundice and duodenal obstruction at 1-week and 1-month follow-up (Table 1).

DISCUSSION

In patients with biliary obstruction in which standard endoscopic retrograde biliary drainage fails, alternatives include percutaneous transhepatic biliary drainage and surgical intervention.^{1,3,4}

Percutaneous transhepatic biliary drainage has a complication rate as high as 30%, including biliary fistulae, peritonitis, empyema, hematoma, and liver abscesses,^{1,9} with a high mortality rate (5%).⁸ Surgery is also associated with increased morbidity and mortality.^{7,9}

The EUS-guided rendezvous technique to obtain bile duct access was first performed by Mallory et al¹⁰ in 2004. EUS-guided choledochoduodenostomy in cases of distal bile duct obstruction^{1,3,11-15} and EUS-guided hepaticogastrostomy have also been described.¹⁶⁻¹⁹

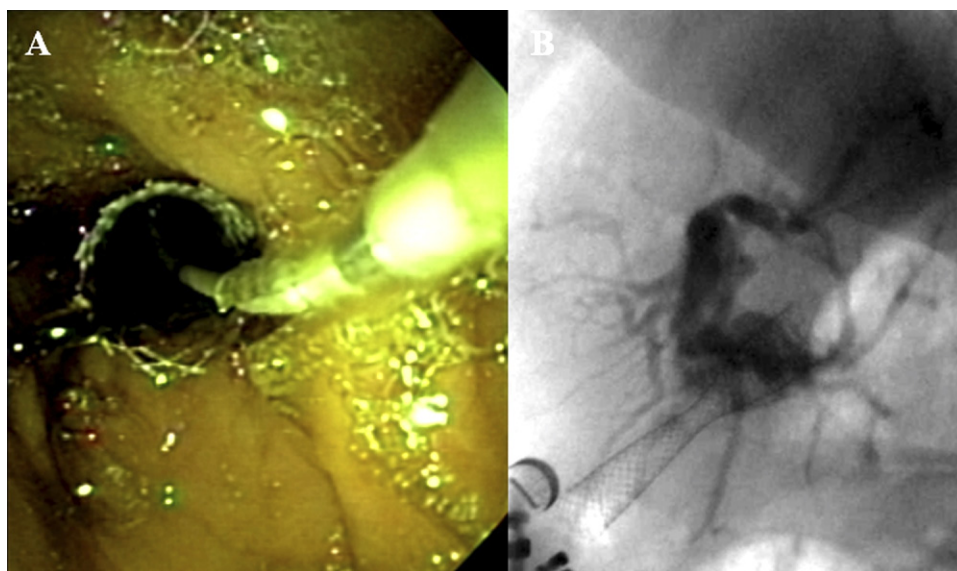


Figure 4. **A**, Endoscopic view of the partially covered self-expandable metal stent in the antrum. **B**, Radiologic image of the metal stent.

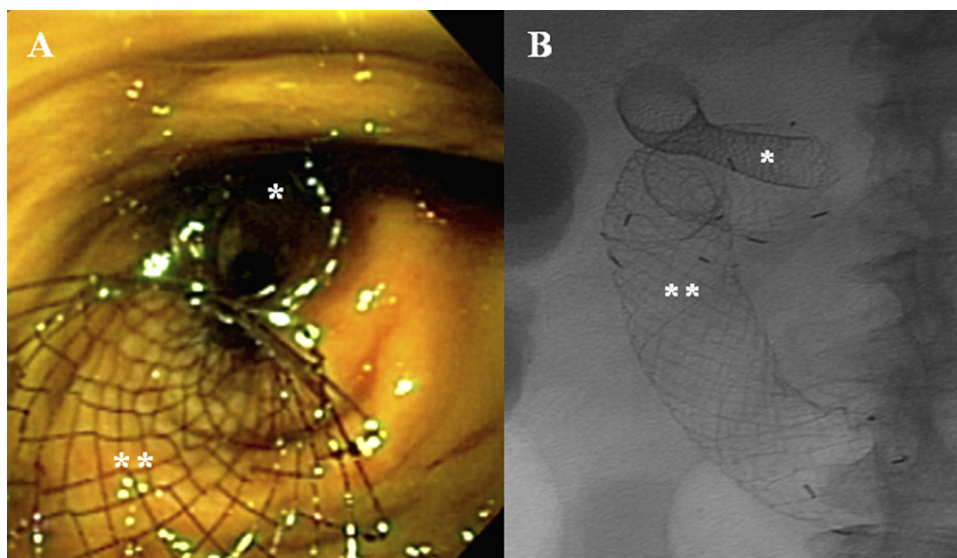


Figure 5. **A**, Endoscopic view of the partially covered self-expandable metal stent (*) and the duodenal self-expandable metal stent (**) in the antrum. **B**, Radiologic image of the cholecystoanastomosis metal stent (*) and the duodenal metal stent (**).

In our case, we performed a variation of the EUS-BD. The duodenal bulb invasion did not allow access of the bile duct from the duodenum, which was visualized from the antrum, and a choledochostomy was performed. This modification seems to be technically easier to perform than the hepaticogastrostomy because the echodoscope is in a more stable position, leading to a lesser chance of losing the guidewire, and more physiological because the biliary drainage is done through a common duct providing normal anterograde bile flow.

The complications with EUS-BD such as stent migration, pneumoperitoneum, and cholangitis^{14,19} were not seen in our case at 1 month. This case illustrates the success of EUS-BD, which is gaining more interest because of its minimally invasive nature and encouraging technical and clinical success rates. Large case series and prospective trials are needed to further assess this technique.

DISCLOSURE

All authors disclosed no financial relationships relevant to this publication.

Abbreviation: EUS-BD, EUS-guided biliary drainage.

REFERENCES

- Ang TL, Teo EK, Fock KM. EUS-guided transduodenal biliary drainage in unresectable pancreatic cancer with obstructive jaundice. *JOP* 2007;8: 438-43.
- Artifon EL, Chaves DM, Ishioka S, et al. Echoguided hepatico-gastrostomy: a case report. *Clinics (Sao Paulo)* 2007;62:799-802.
- Burmester E, Niehaus J, Leineweber T, et al. EUS-cholangio-drainage of the bile duct: report of 4 cases. *Gastrointest Endosc* 2003;57:246-51.
- Kahaleh M, Hernandez AJ, Tokar J, et al. Interventional EUS-guided cholangiography: evaluation of a technique in evolution. *Gastrointest Endosc* 2006;64:52-9.
- Covey AM, Brown KT. Percutaneous transhepatic biliary drainage. *Tech Vasc Interv Radiol* 2008;11:14-20.
- Smith AC, Dowsett JF, Russell RC, et al. Randomised trial of endoscopic stenting versus surgical bypass in malignant low bile duct obstruction. *Lancet* 1994;344:1655-60.
- Lai EC, Mok FP, Tan ES, et al. Endoscopic biliary drainage for severe acute cholangitis. *N Engl J Med* 1992;24:1582-6.
- Pessa ME, Hawkins IF, Vogel SB. The treatment of acute cholangitis: percutaneous transhepatic biliary drainage before definitive therapy. *Ann Surg* 1987;72:389-92.
- Irisawa A, Hikichi T, Shibukawa G, et al. Pancreatobiliary drainage using the EUS-FNA technique: EUS-BD and EUS-PD. *J Hepatobiliary Pancreat Surg* 2009;16:598-604.
- Mallery S, Matlock J, Freeman ML. EUS-guided rendezvous drainage of obstructed biliary and pancreatic ducts: report of 6 cases. *Gastrointest Endosc* 2004;59:100-7.
- Giovannini M, Moutardier V, Pesenti C, et al. Endoscopic ultrasound-guided bilioduodenal anastomosis: a new technique for biliary drainage. *Endoscopy* 2001;33:898-900.
- Yamao K, Bhatia V, Mizuno N, et al. EUS-guided choledochoduodenostomy for palliative biliary drainage in patients with malignant biliary obstruction: results of long-term follow-up. *Endoscopy* 2008;40: 340-2.
- Hanada K, Iiboshi T, Ishii Y. Endoscopic ultrasound-guided choledochoduodenostomy for palliative biliary drainage in cases with inoperable pancreas head carcinoma. *Dig Endosc* 2009;21(Suppl 1):S75-8.
- Itoi T, Yamao K; EUS 2008 Working Group. EUS 2008 Working Group document: evaluation of EUS-guided choledochoduodenostomy (with video). *Gastrointest Endosc* 2009;69(2 Suppl):S8-12.
- Park do H, Koo JE, Oh J, et al. EUS-guided biliary drainage with one-step placement of a fully covered metal stent for malignant biliary obstruction: a prospective feasibility study. *Am J Gastroenterol* 2009; 104:2168-74.
- Giovannini M, Dotti M, Bories E, et al. Hepaticogastrostomy by echodendoscopy as a palliative treatment in a patient with metastatic biliary obstruction. *Endoscopy* 2003;35:1076-8.

17. Bories E, Pesenti C, Caillol F, et al. Transgastric endoscopic ultrasonography-guided biliary drainage: results of a pilot study. *Endoscopy* 2007;39:287-91.
18. Will U, Thieme A, Fuedner F, et al. Treatment of biliary obstruction in selected patients by endoscopic ultrasonography (EUS)-guided transluminal biliary drainage. *Endoscopy* 2007;39:292-5.
19. Savides TJ, Varadarajulu S, Palazzo L; EUS 2008 Working Group. EUS 2008 Working Group document: evaluation of EUS-guided hepaticogastrostomy. *Gastrointest Endosc* 2009;69(2 Suppl):S3-7.

Current affiliations: University of São Paulo Medical School (E.L.A.A., L.O., J.T., E.G.H.M., P.S.), Sao Paulo, Brazil, Department of Gastroenterology (K.G.), Hennepin County Medical Center, Minneapolis, Minnesota, USA.

Reprint requests: Everson L. A. Artifon, MD, PhD, FASGE, University of São Paulo Medical School, Av. Dr. Enéas de Carvalho Aguiar, 255 Cerqueira César, 05403-000 São Paulo, Brazil.

Copyright © 2011 by the American Society for Gastrointestinal Endoscopy
0016-5107/\$36.00
doi:10.1016/j.gie.2010.10.041

Multiple metastases to the pancreas from primary maxillary osteosarcoma: diagnosis with EUS-guided FNA

Ali Safdar Khan, MD, David R. Crowe, MD, Jessica M. Trevino, MD, Mohamad A. Eloubeidi, MD, MHS, FASGE

Birmingham, Alabama, USA

Primary pancreatic cancer is the fourth leading cause of cancer-related death in the United States among both genders.¹ Metastases to the pancreas are less common. Osteosarcoma is a relatively uncommon malignancy, and metastases to the pancreas are even more rare.² To our knowledge, there are no cases that were diagnosed by EUS-guided FNA (EUS-FNA). We report a case of osteosarcoma metastatic to the pancreas diagnosed with EUS-FNA with positive on-site pathology evaluation.

CASE REPORT

A 52-year-old woman presented in 2008 with swelling in the left maxilla. Biopsy of a mass in the upper left maxillary sinus showed osteosarcoma, osteoblastic type. The patient was treated with isophosphamide and etoposide. In 2010, a CT scan of the chest with contrast material revealed multiple pulmonary nodules and an irregular heterogeneous density in the head of the pancreas. Wedge resection of the lung nodules revealed metastatic osteosarcoma. EUS showed 2 lesions: 1 mainly solid mass in the body of the pancreas measuring 20 × 22 mm (Fig. 1) and 1 in the neck of the pancreas measuring 29 × 30 mm, with an anechoic cystic and necrotic center (Fig. 2). The pancreatic duct immediately adjacent to the mass appeared normal, measuring 1.7 mm. FNA of the mass in the body of the pancreas was performed with a total of 5 passes, the last 3 for immunostain evaluations. On-site cytopathology revealed malignant-appearing cells with evidence of osteoid production (Fig. 3). On cell block sections, the neoplastic cells were immunoreactive for vimentin (Fig. 4) and alpha-1-antichymotrypsin and negative for cytokeratin, confirming osteosarcoma metastatic to the pancreas (Fig. 5).

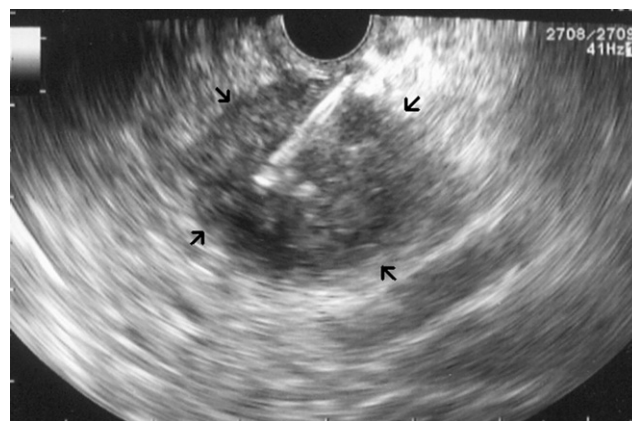


Figure 1. The EUS image shows a distinct mass measuring 20 × 22 mm (arrows) in the pancreatic body. The pancreatic duct immediately adjacent to the mass appears normal and measures 1.7 mm (not shown in the figure). (Olympus UC-30P echoendoscope scanning at 7.5 MHz.)

DISCUSSION

Osteosarcoma accounts for <1% of tumors diagnosed in the United States. Approximately 900 new cases are diagnosed each year³ in a bimodal distribution, with a peak in early adolescence and again above age 65.⁴ Secondary metastases to the pancreas are relatively rare. In a large study of 4,955 autopsy specimens, only 81 had secondary pancreatic tumors (of which only 2 were sarcomas).² Some older literature had previously placed the incidence of tumors metastatic to the pancreas between 3% and 12%.^{5,6}

Avcu⁷ described a Tru-Cut biopsy-proven vertebral osteosarcoma metastasizing to the pancreas, and Aarvold⁸ described osteosarcoma metastatic to the duodenum and