Role of EUS for biliary drainage

ERCP

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Place, Date

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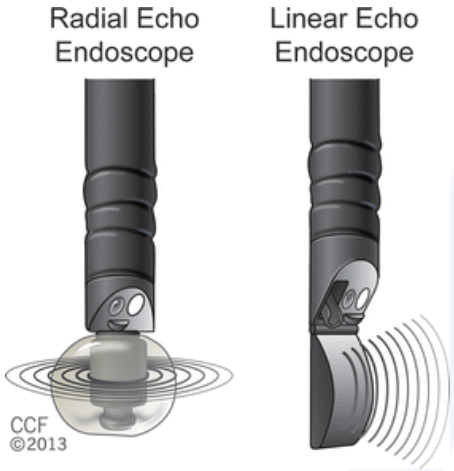
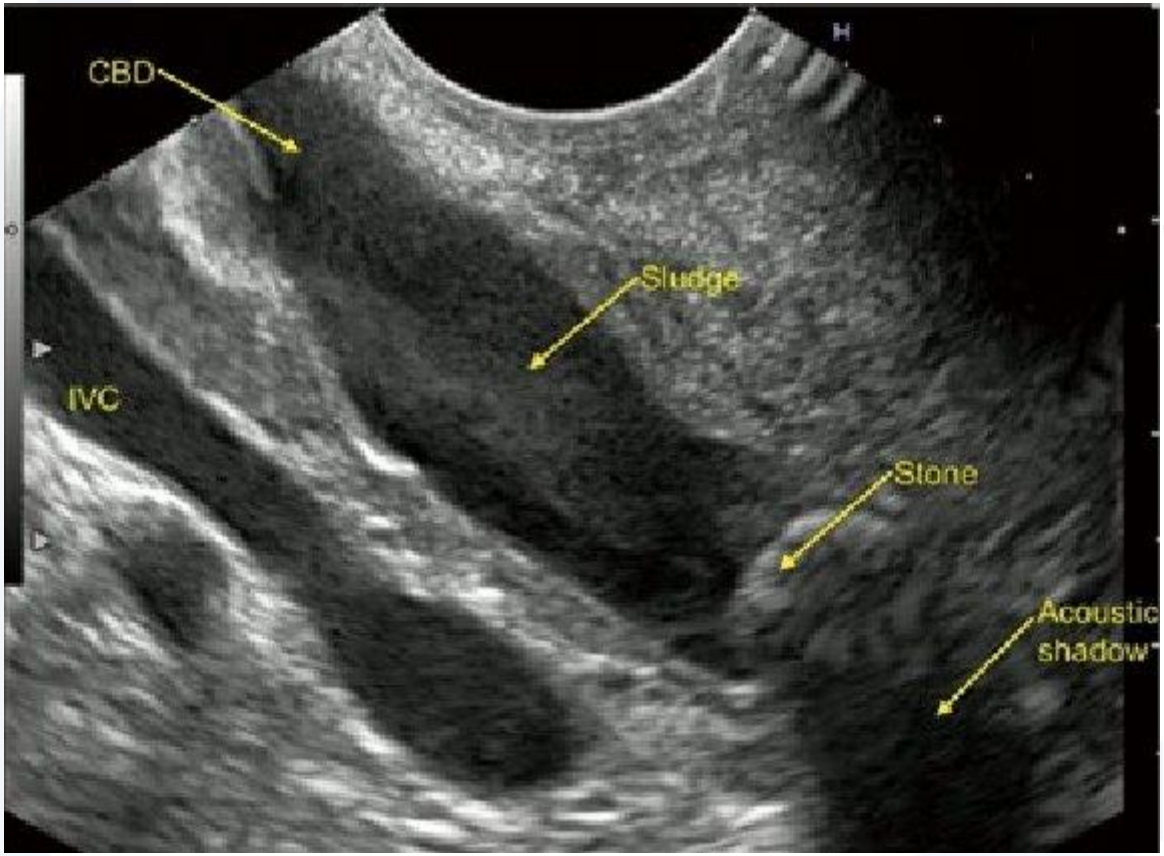
Agenda

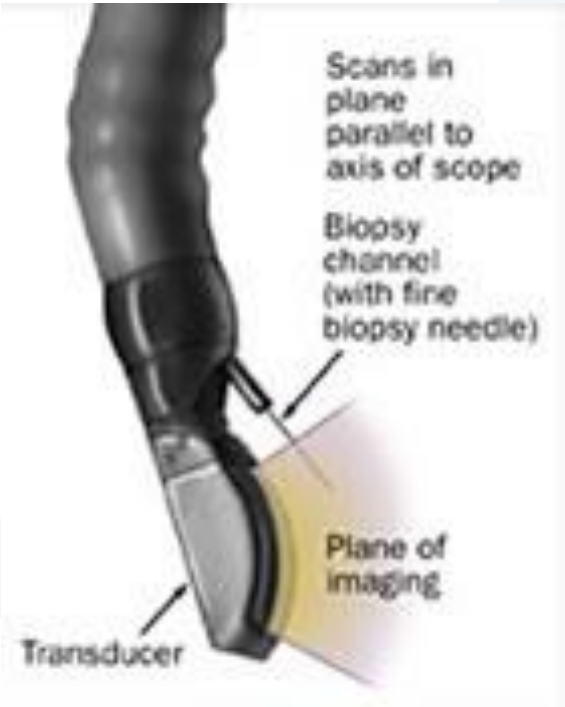
1. Introduction.
2. PTB vs EUSBD.
3. Indications.
4. Technical aspects.
5. Safety.
6. How do I do it ?
7. Conclusions.

Introduction

1. Diagnostic EUS >>>>> diagnostic ERCP
2. Therapeutic EUS for biliary drainage in case of failed ERCP







INDICATIONS EUS-BD
Limited number of cases

- Prospective study 1 year
- 1000 ERCP consecutive pts
- EUS-BD if ERCP failure
- Results
  - Failed ERCP 1,7%
  - EUS-BD 0,6%

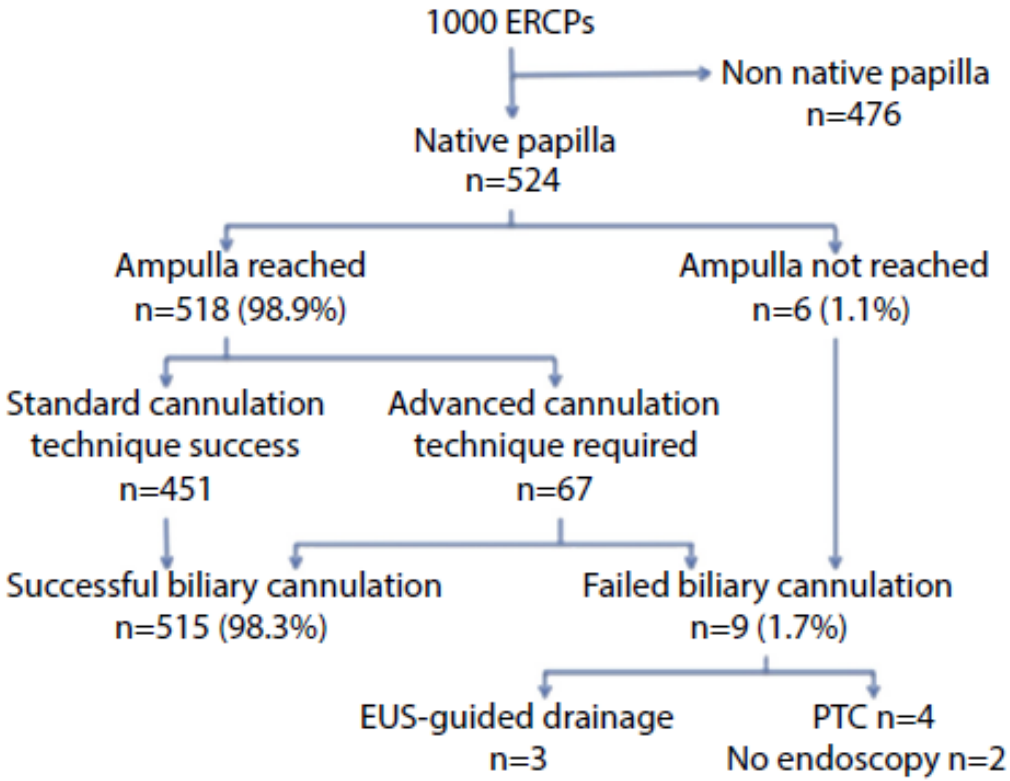


Figure 2. Management of 1000 consecutive patients presenting for biliary ERCP. *PTC,* percutaneous transhepatic cholangiography.

Biliary drainage: role of EUS guidance

Bronte A. Holt, MBBS, BMedSc, FRACP, Robert Hawes, MD, Muhammad Hasan, MD, Ashley Canipe, MD, Benjamin Tharian, MBBS, MD, MRCP, FRACP, Udayakumar Navaneethan, MD, Shyam Varadarajulu, MD

Orlando, Florida, USA

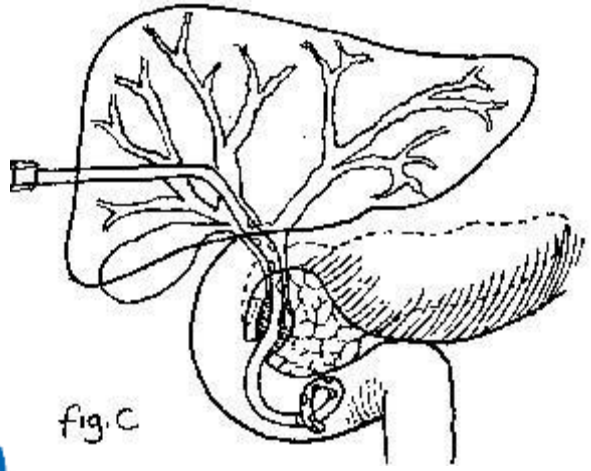
If ERCP fails ….

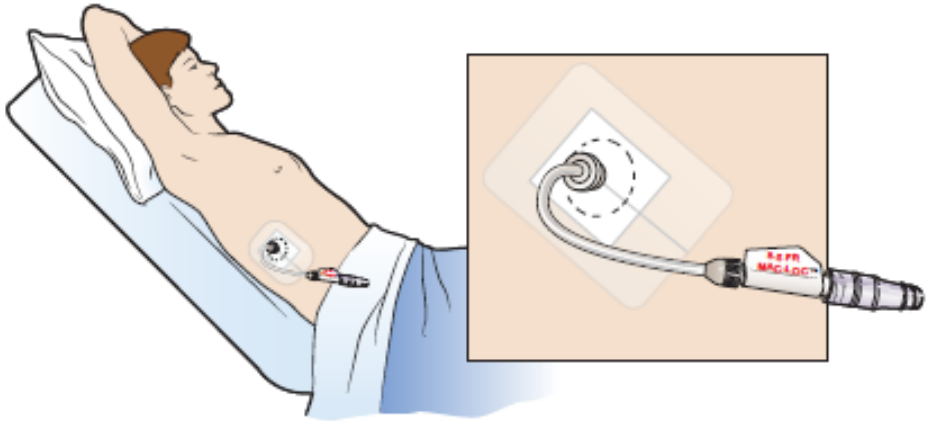
PTBD or EUSBD?

Law Ryan et al. Is it time to stop using percutaneous transhepatic biliary drainage? Endoscopy 2017, 49: 521-523

Is EUS-BD better than PTBD?

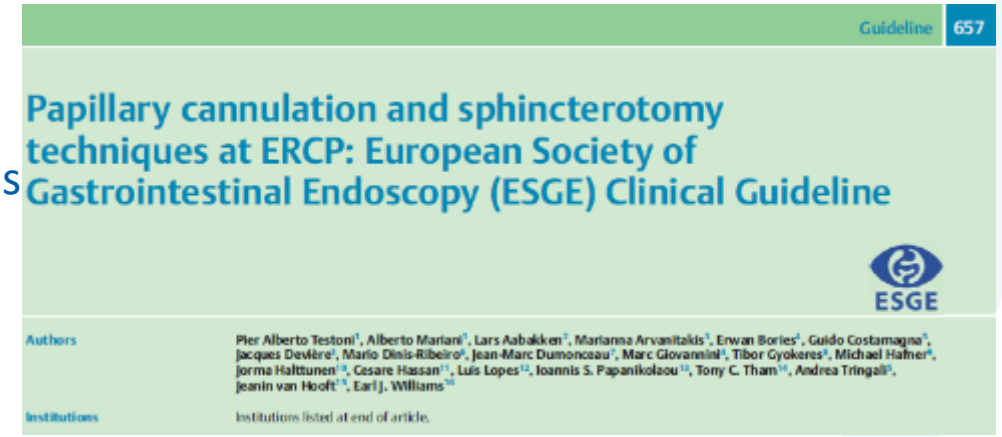
- Internal vs external drainage
  - No hydric losses
  - More confortable
  - Easy access in case of stent occlusion





EUS-BD vs PTBD

- A meta-analysis that compared PTBD vs. EUS-BD (3 RCTs and 3 retrospective studies; total, 312 patients) found that clinical success was similar with both techniques.
- With fewer adverse events in the EUS-BD group; severe adverse events accounted for this difference.
- The reintervention rates and costs were also lower with EUS-BD.



Guideline 657

Papillary cannulation and sphincterotomy techniques at ERCP: European Society of Gastrointestinal Endoscopy (ESGE) Clinical Guideline

ESGE

Authors

Pier Alberto Testoni[1], Alberto Mariani[1], Lars Aabakken[2], Marianna Arvanitakis[3], Erwan Bories[4], Guido Costamagna[5], Jacques Devière[3], Mario Dinis-Ribeiro[6], Jean-Marc Dumonceau[7], Marc Giovannini[8], Tibor Gyokeres[9], Michael Hafner[4], Jorma Halttunen[10], Cesare Hassan[11], Luis Lopes[12], Ioannis S. Papanikolaou[13], Tony C. Tham[14], Andrea Tringali[15], Jeanin van Hooft[16], Earl J. Williams[17]

Institutions

Institutions listed at end of article.

ESGE suggests that when biliary cannulation is unsuccessful with a standard retrograde approach, anterograde guidewire insertion either by a percutaneous or EUS-guided approach can be used to achieve biliary access. Which approach is utilized will depend on local expertise and facilities (low quality evidence, weak recommendation).

Baniya R, et al. Clin Exp Gastroenterol 2017; 10: 67 – 74

If EUS BD considered…

Indications

EUS-BD INDICATIONS

Primary therapy : Inaccessible papilla

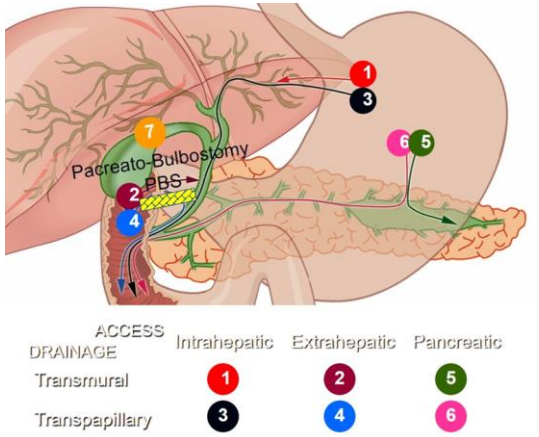
- Malignant obstruction (GOO)
- (Surgical) altered luminal anatomy

Secondary therapy

Biliary obstruction and prior incomplete biliary drainage when conventional endoscopic methods fail

- ERCP
- After PTBD, conversion to internal biliary drainage

Law Ryan et atl. Is it time to stop using percutaneous transhepatic biliary drainage? Endoscopy 2017, 49: 521-523



If EUS BD considered…

WHICH ROUTE?

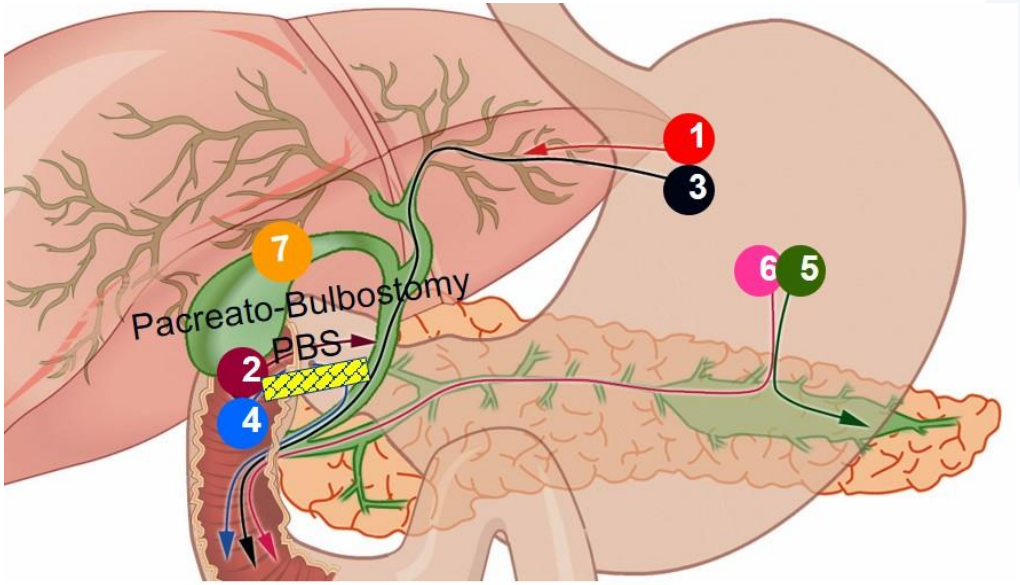
EUS-BD/PD: ACCESS ROUTES

- Transluminal techniques
  - CDS: Choledocoduodenostomy
  - HGS: Hepaticogastrostomy

- Transpapillary techniques
  - « Rendez-vous »

    Retrograde stent placement
  - Anterograde

    Transpapillar or transanastomotic anterograde stent placement

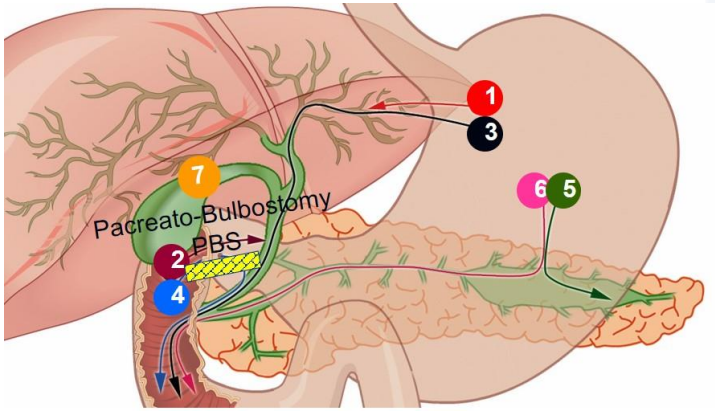


ACCESS / DRAINAGE	Intrahepatic	Extrahepatic	Pancreatic
Transmural	1	2	5
Transpapillary	3	4	6

Adapted from Perez-Miranda et al, W J GI Endosc 2010

RV indications

- Accessible papilla/anastomosis
- Safest technique but 25-50% failure rate
- Preferred for benign biliary obstruction

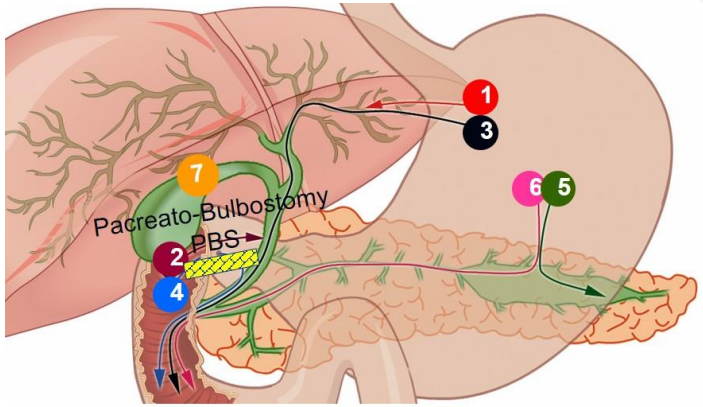


Authors	Year	No. of cases	EHBD approach success rate (%)	IHBD approach success rate (%)	Overall success rate (%)	Overall complication rate (%)
Mallery et al. [19]	2004	2	100 (2/2)	–	100 (2/2)	0 (0/2)
Kahaleh et al. [12, 22, 23]	2004/ 05/06	20	67 (2/3)	94 (16/17)	90 (18/20)	10 (2/20)
Tarantino et al. [24]	2008	8	40 (4/8)	–	50 (4/8)	13 (1/8)
Maranki et al. [16]	2009	14	57 (8/14)	83 (29/35)	84 (41/49)	16 (8/49)
Kim et al. [14]	2010	15	80 (12/15)	–	80 (12/15)	13 (2/15)
Shah et al. [25]	2012	50	–	–	74 (37/50)	8 (4/50)
Iwashita et al. [26]	2012	40	81 (25/31)	44 (4/9)	73 (29/40)	13 (5/40)
Dhir et al. [27••]	2012	58	98 (57/58)	–	98 (57/58)	3 (2/58)
Kawakubo et al. [28]	2013	14	100 (9/9)	100 (5/5)	100 (14/14)	12 (2/14)
Park et al. [29•]	2013	20	93 (13/14)	50 (3/6)	80 (16/20)	10 (2/20)
Khashab et al. [30••]	2013	13	100 (11/11)	100 (2/2)	100 (13/13)	15 (2/13)
Overall		254	86 (143/165)	76 (56/74)	82 (236/289)	10 (30/289)

Success 82%
Compl. 10%

CDS indications

- Specific anatomical requirements
  - Distal biliary obstruction
  - Impossible after gastrectomy or Whipple's
- Preferably for malignant biliary obstruction



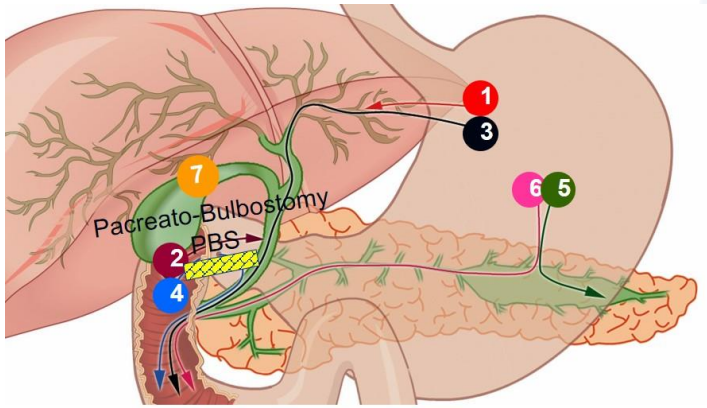
Authors	Year	No. of cases	Access method	Dilation method	Stent	Overall success rate (%)	Complication rate (%)	Adverse events
Giovannini et al. [10]	2001	1	NK	BD	PS	100 (1/1)	0	
Burmester et al. [41]	2003	2	Fistulotome	–	PS	50 (1/2)	50 (1/2)	Bile peritonitis (1)
Puspok et al. [42]	2005	5	NK	–	PS	80 (4/5)	0	
Yamao et al. [43]	2006	2	NK	BD	PS	100 (2/2)	0	
Fujita et al. [44]	2007	1	19G	BD, NK	PS	100 (1/1)	0	
Ang et al. [75]	2007	2	19G	Balloon, NK	PS	100 (2/2)	50 (1/2)	Pneumoperitoneum (1)
Tarantino et al. [24]	2008	4	19G, 22G	BD	PS	100 (4/4)	0	
Yamao et al. [46]	2008	5	NK	BD	PS	100 (5/5)	20 (1/5)	Pneumoperitoneum (1)
Itoi et al. [11]	2008	4	19G	BD	PS, NBD	100 (4/4)	25 (1/4)	Bile peritonitis (1)
Brauer et al. [36]	2009	3	19G, 22G	NK	PS	100 (3/3)	33 (1/3)	Pneumoperitoneum (1)
Horaguchi et al. [48]	2009	8	19G	BD, balloon	PS, NBD	100 (8/8)	13 (1/8)	Peritonitis (1)
Hanada et al. [15]	2009	4	19G	BD	PS	100 (4/4)	0	
Park et al. [49]	2009	5	19G	BD, NK	CMS	100 (5/5)	0	
Iwamuro et al. [50]	2010	5	NK	BD	PS	100 (5/5)	20 (1/5)	Severe abdominal pain and fever (1)
Siddiqui et aliqui [51]	2011	8	19G	NK	CMS	100 (8/8)	25 (2/8)	Duodenal perforation (1), abdominal pain (1)
Belletrutti et al. [52]	2011	4	19G	Balloon	PS, CMS	100 (4/4)	0	
Hara et al. [76]	2011	18	NK	BD	PS	94 (17/18)	17 (3/18)	Peritonitis (2), hemobilia (1)
Komaki et al. [37]	2011	15	19G	BD	PS	93 (14/15)	47 (7/15)	Cholangitis (4), peritonitis (2), stent migration (1)
Ramirez-Luna et al. [54]	2011	9	19G	BD, balloon, NK	PS	89 (8/9)	11 (1/9)	Biloma (1)
Park et al. [55]	2011	24	19G	BD, NK	PS, CMS	92 (24/26)	19 (5/26)	–
Fabbri et al. [56]	2011	15	19G	Balloon, NK	CMS	80 (12/15)	7 (1/15)	Pneumoperitoneum (1)
Kawakubo et al. [57]	2012	1	19G	BD, balloon	PS	100 (2/2)	0	
Katanuma et al. [58]	2012	1	19G	BD, NK	PS	100 (1/1)	0	
Attasaranya et al. [59]	2012	9	19G	BD	PS, CMS	56 (5/9)	44 (4/9)	–
Artifon et al. [60•]	2012	13	19G	BD, NK	CMS	100 (13/13)	15 (2/13)	Bleeding (1), bile leak (1)
Kim et al. [61]	2012	9	19G	BD, NK	CMS	100 (9/9)	50 (5/10)	Pneumoperitoneum (2), migration (2), peritonitis (1)
Song et al. [62]	2012	15	19G	BD, NK	CMS	87 (13/15)	23 (3/15)	Pneumoperitoneum (2), cholangitis (1)
Vila et al. [63]	2012	26	–	–	–	86 (19/26)	15 (4/26)	Biloma (1), bleeding (1), pancreatitis (1), cholangitis (1)
Tonozuka et al. [64]	2013	5	19G	BD, balloon, DS	CMS	100 (5/5)	0	
Khashab et al. [30••]	2013	15	19G, 22G	BD, balloon	PS, CMS	100 (20/20)	–	–
Hara et al. [65]	2013	18	NK	BD	CMS	94 (17/18)	11 (2/18)	Peritonitis (2)
Kawakubo et al. [66]	2014	44	19G, NK	BD, balloon, SR, DS	PS, CMS	95 (42/44)	14 (6/44)	Bile leak (3), stent misplacement (1), bleeding (1), pneumoperitoneum (1), perforation (1)
Overall						94 (282/300)	19 (53/280)	

19G 19-gauge FNA needle, *22G* 22-gauge FNA needle, *BD* biliary dilator, *CMS* covered self-expandable metallic stent, *DS* diathermic sheath, *NK* needle knife, *PS* plastic stent, *SR* stent retriever

Success 94%
Compl. 29%

HGS indications

- Specific anatomical features:
  - Hilar biliary/proximal obstruction
  - Prior distal gastrectomy or duodenal obstruction
- Dilemma in pts without prior surgery, distal obstruction:
  operator preferences and availability of equipment

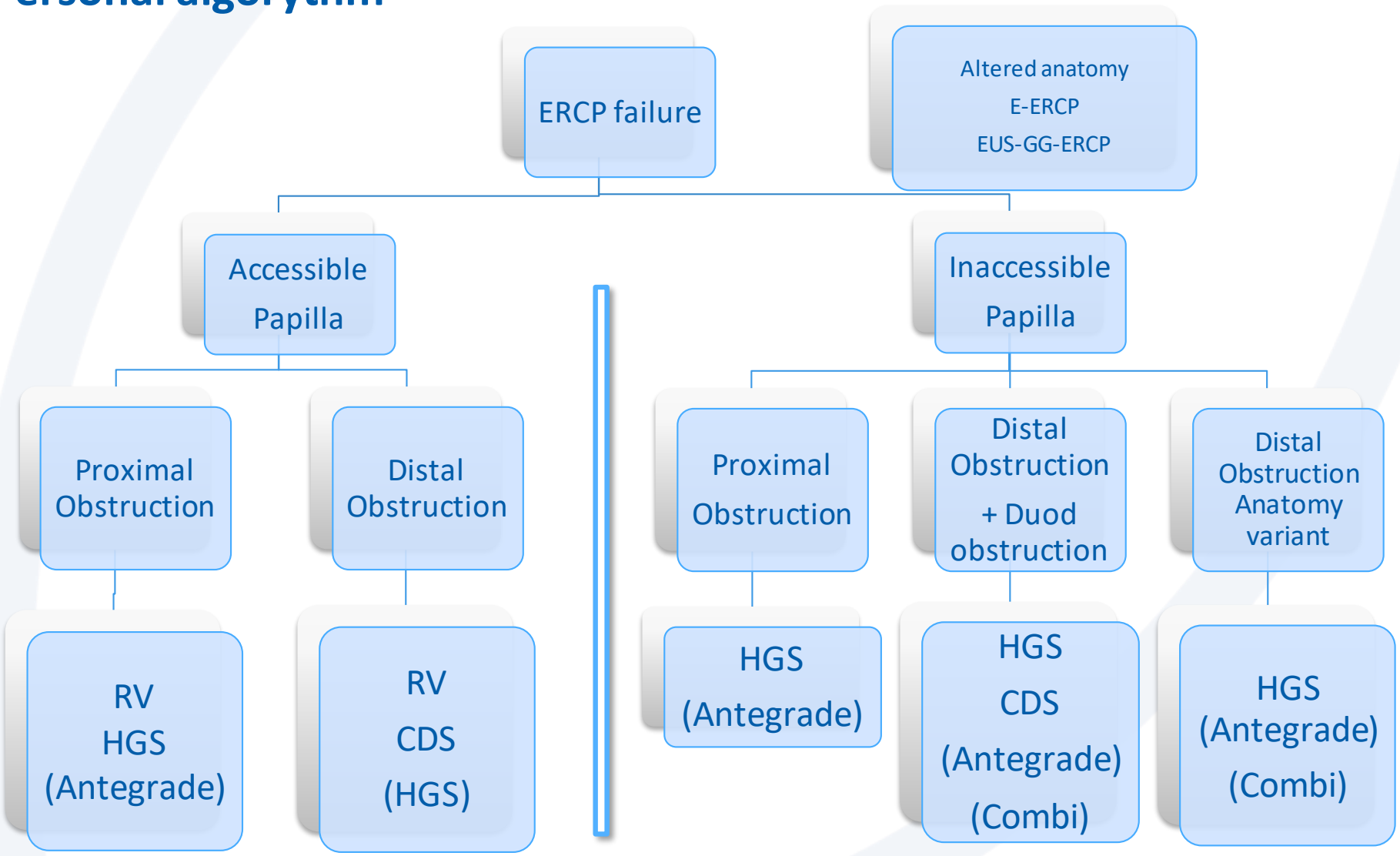


Authors	Year	No. of cases	Access method	Dilation method	Stent	Success rate (%)	Complication rat (%)
Burmester et al. [41]	2003	2	Fistulotome	None	PS	100 (2/2)	0 (0/2)
Giovannini et al. [70]	2003	1	19G	NK	PS	100 (1/1)	0 (0/1)
Artifon et al. [71]	2007	1	19G	BD, balloon	CMS	100 (1/1)	0 (0/1)
Will et al. [72]	2007	8	19G	BD, balloon	PS, CMS	88 (7/8)	25 (2/8)
Bories et al. [13]	2007	11	19G, 22G	Cystotome	PS, CMS	91 (10/11)	36 (4/11)
Park et al. [49]	2010	9	19G	BD, NK	CMS	100 (9/9)	22 (2/9)
Iwamuro et al. [77]	2010	2	NK	BD	PS	100 (2/2)	50 (1/2)
Park et al. [73]	2010	5	NK	BD	CMS	100 (5/5)	0 (0/5)
Belletrutti et al. [52]	2011	3	19G	Balloon	PS, CMS	67 (2/3)	0 (0/3)
Ramirez-Luna et al. [54]	2011	2	19G	NK, BD	PS	100 (2/2)	50 (1/2)
Park et al. [55]	2011	31	19G	NK, BD	PS, CMS	100 (31/31)	19 (6/31)
Fabbri et al. [56]	2011	1	19G	NK, balloon	CMS	0 (0/1)	0 (0/1)
Attasaranya et al. [59]	2012	16	19G	BD	PS, CMS	81 (13/16)	38 (6/16)
Kim et al. [61]	2012	4	19G	NK, BD	CMS	75 (3/4)	50 (2/4)
Vila et al. [63]	2012	34	–	–	–	65 (22/34)	29 (11/34)
Tonozuka et al. [64]	2013	3	19G	BD, balloon	CMS	100 (3/3)	0 (0/3)
Khashab et al. [30••]	2013	–	19G, 22G	BD, balloon	PS, CMS	100 (5/5)	–
Kawakubo et al. [66]	2014	20	19G	BD, balloon	PS, CMS	95 (19/20)	30 (6/20)
Overall		153				87 (137/158)	27 (41/153)

19G 19-gauge FNA needle, *22G* 22-gauge FNA needle, *BD* bougie dilator, *NK* needle knife, *PS* plastic stent

Success 87%
Compl. 27%

Personal algorythm



+ internalization PTBD, benign conditions with repeat treaments

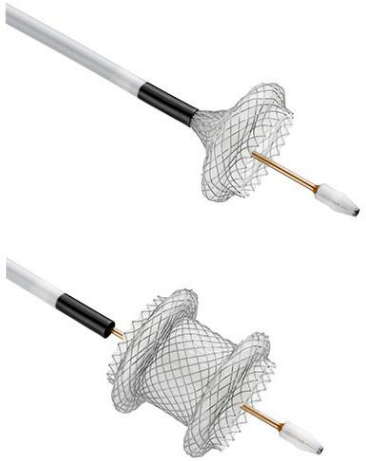
Acta Endosc. (2018) 48:22-24

If EUS BD considered…

Tips and tricks

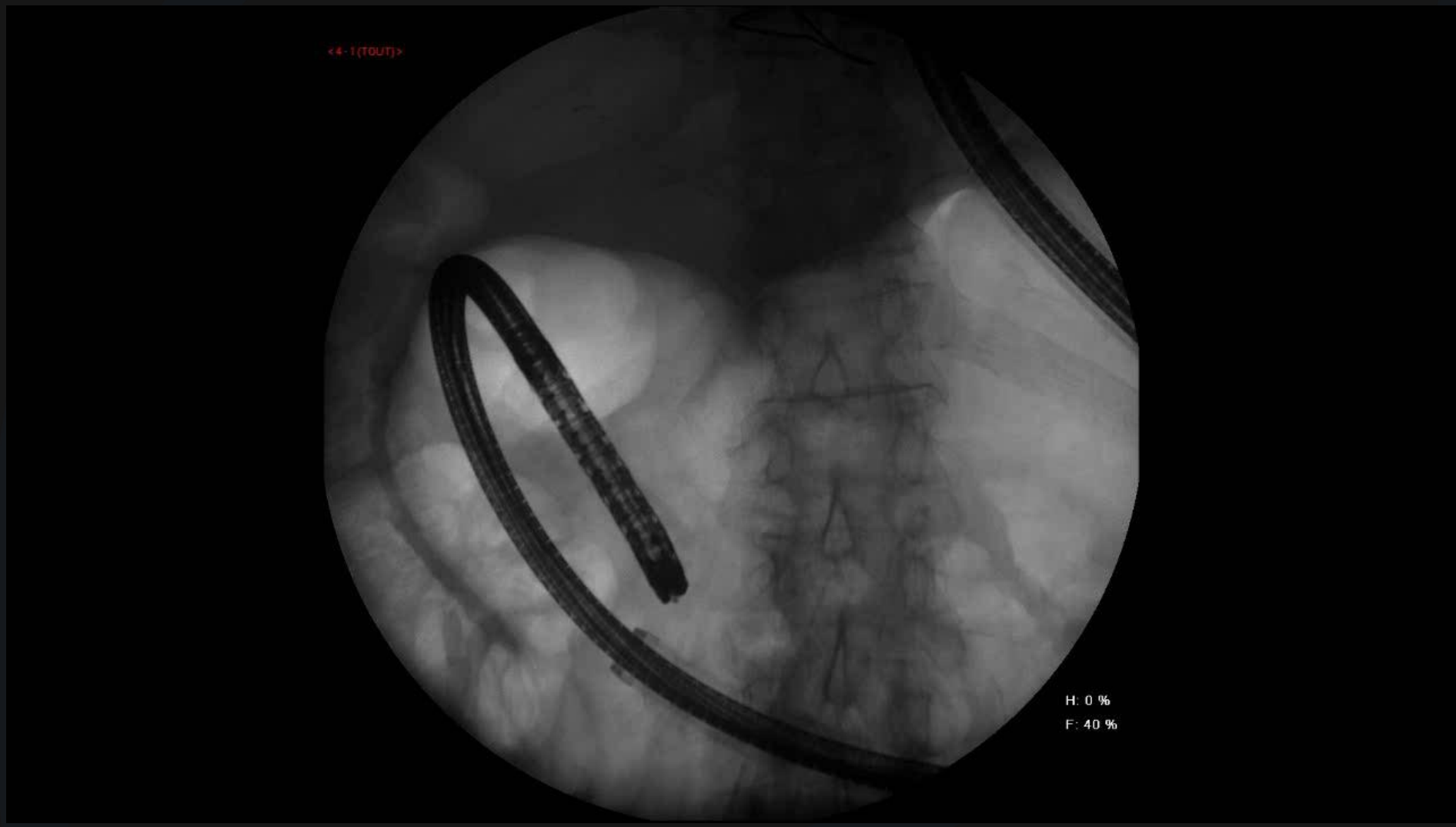
Tips and tricks

- General
  - CO^2 insufflation
  - Fluoroscopy preferable



- CDS
  - Through the bulb!!!
  - Either Hot Axios or 19G needle + Cysto/dilation and cSEMS
  - Axial cautery safer, avoid needle knife
  - Take care of duodenal obstruction

CDS

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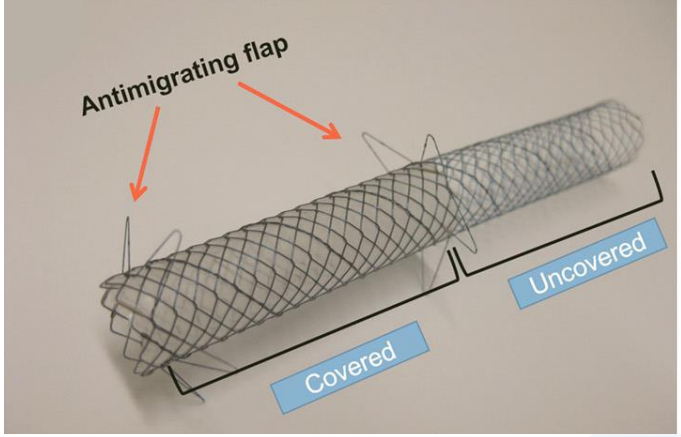
Tips and tricks



- General
  - CO^2 insufflation
  - Fluoroscopy
- HGS
  - Avoid cardia/esophagus
  - Doppler to check vessels
  - Puncture centrally
  - Cystotome or Dilatation
  - Special stents: Gyobor…
  - Leave 2 cm in the stomach
  - Consider plastic stent


D1:
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BG:19 65/-/2/4/1/-/- CG:35 M/1/M/2/3/8 1k/5.0M
EG-3830UT Res. Endoscope 50mm


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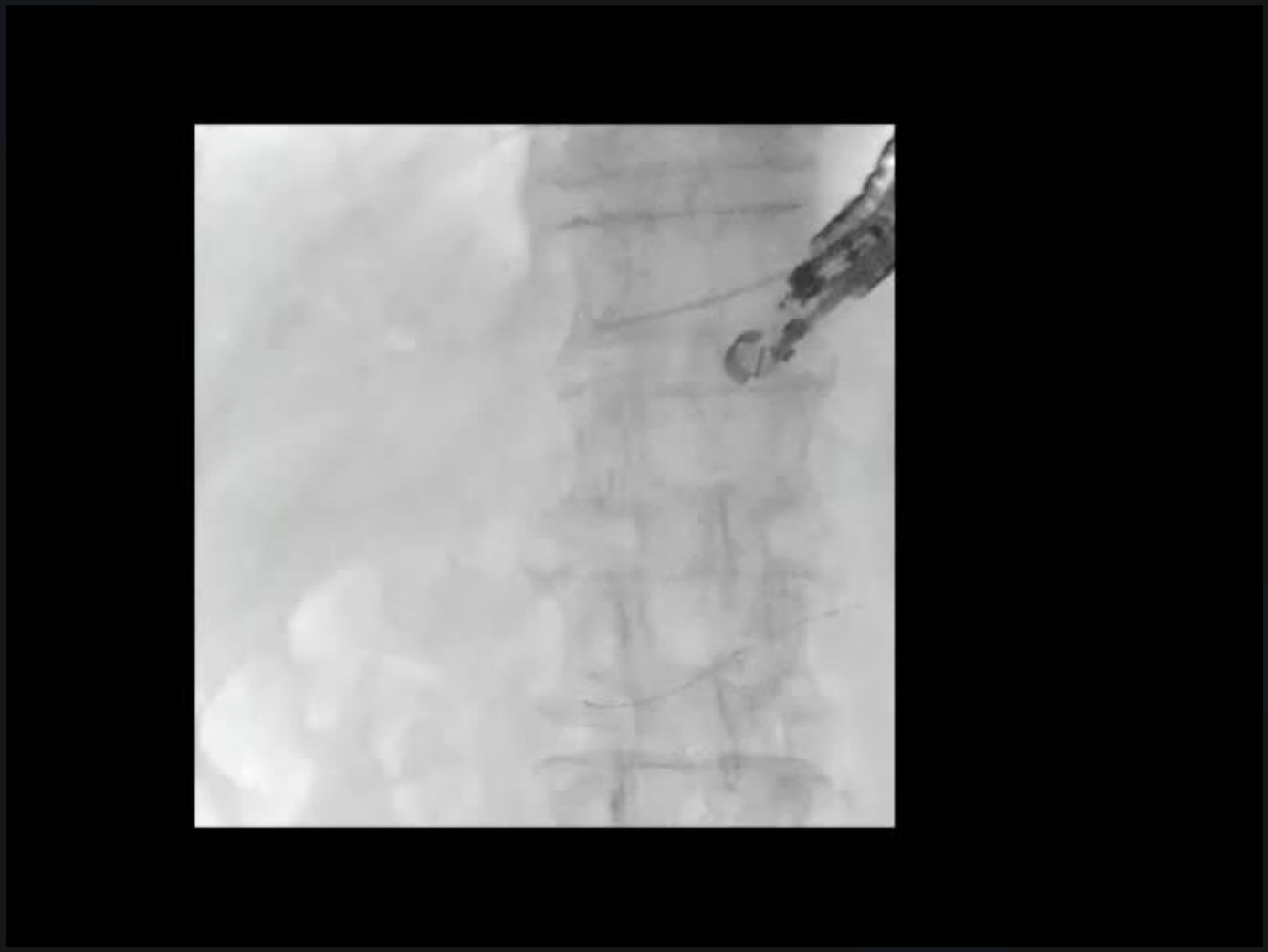
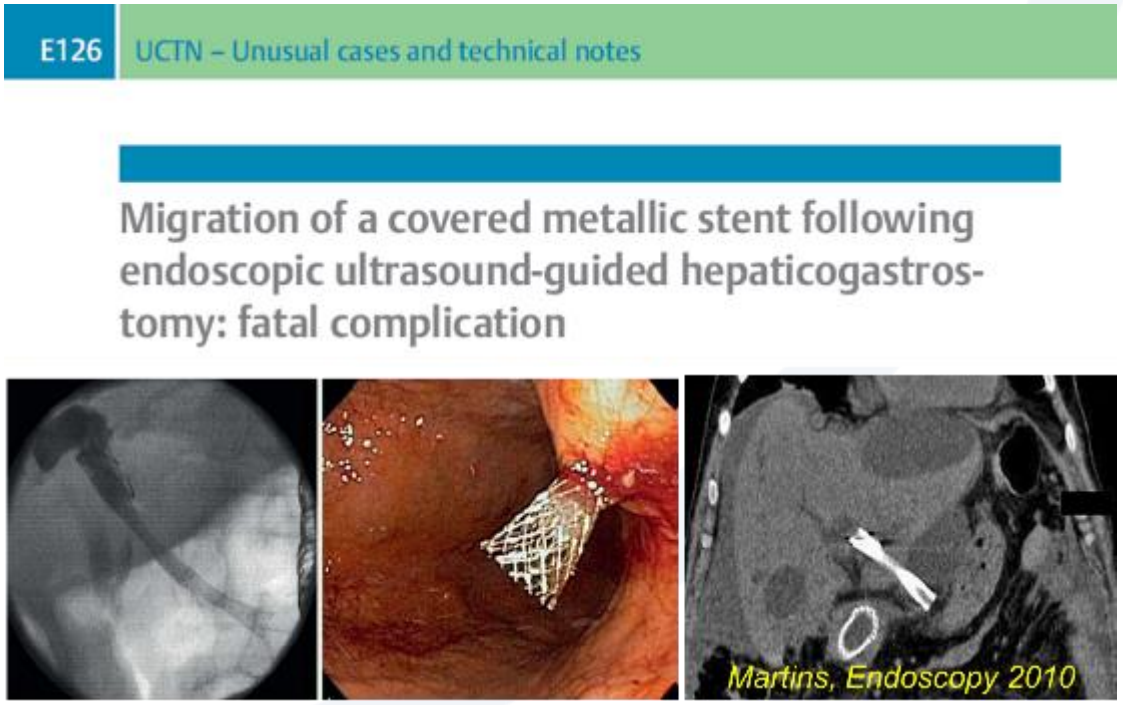
DEPREZ,Pierre
ENDOBASE examination



Complications

- pneumoperitoneum: CO2 insufflation!
- Bile peritonitis
- Shrinkage or migration
- Haemorrhage
- Cholangitis
- Obstruction/leakage of stent
- Migration of stent
- Failed drainage
- Biliary gastritis
- Fatal outcome



Ogura et al WJG 2015

INDIVIDUAL EUS-BD LEARNING CURVE

	EARLY $n = 40$	LATE $n = 40$	p
Age (years)	79.2 ± 9.5	73.6 ± 7.1	0.681
Sex (M/F)	70%/30%	65%/35%	0.459
Technical Success	70 %	97 %	*0.001*
Clinical Success	65 %	82 %	*0.04*
Complications	45 %	18 %	*0.007*

Vazquez-Sequeiros, DDW 2016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AP

Conclusions

- ERCP still standard choice

- EUSBD better than PTBD
- Algorythms developed in
  - Previous failed ERCP
  - Surgical anatomy
  - Duodenal obstruction

- Choice between RV/anterograde stenting/HGS or CDS
  - Indication/anatomy
  - Expertise
- Pancreas more demanding technique…