
بسم الله الرحمن الرحیم

EUS in Ampullary Tumors & Cholangiocarcinoma

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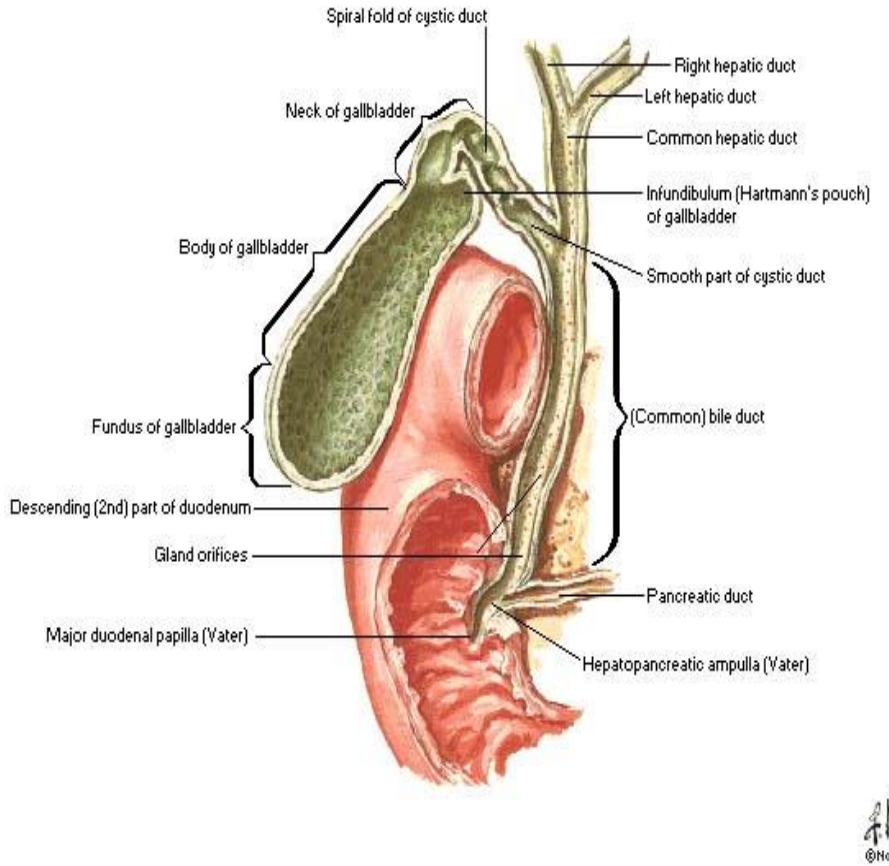
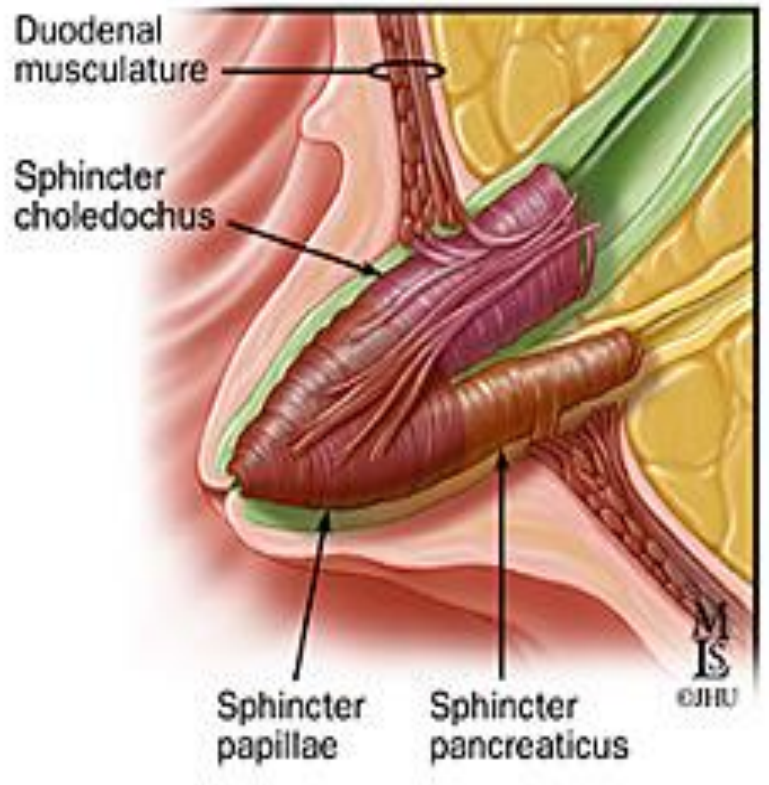
IR Iran

Evaluation of Ampullary Neoplasms





Ampulla

- A difficult part of EUS
- Best to be done before ERCP
- Best tool for T staging
- May appear as hypo or hyperechoic lesions
- Occasionally polypoid intraluminal lesions

Features of Malignancy

1. Intraductal growth in CBD or MP
2. Muscularis propria invasion
3. LAP
4. Adjacent organ or vascular invasion
5. Ascites
6. Liver Metastases

If any of these present endoscopic resection is precluded

EUS may result in overstaging

Surgery vs Endoscopic Resection

- Heterogenous Tumors intestinal or bilary pancreatic origin
- The risk of metastatic lymph nodes arises as soon as the carcinoma invades beyond the sphincter of Oddi.
- The risk may be higher with tumors > 1cm but may occur with smaller tumors
- Preoperative assessment of tumor depth crucial in the process of deciding between surgery and endoscopic resection
- Need for EUS in all or selected Patients?

Alvarez-Sánchez María-Victoria et al. EUS and ampullary adenoma… Endoscopy International Open 2016; 04: E1319–E1321

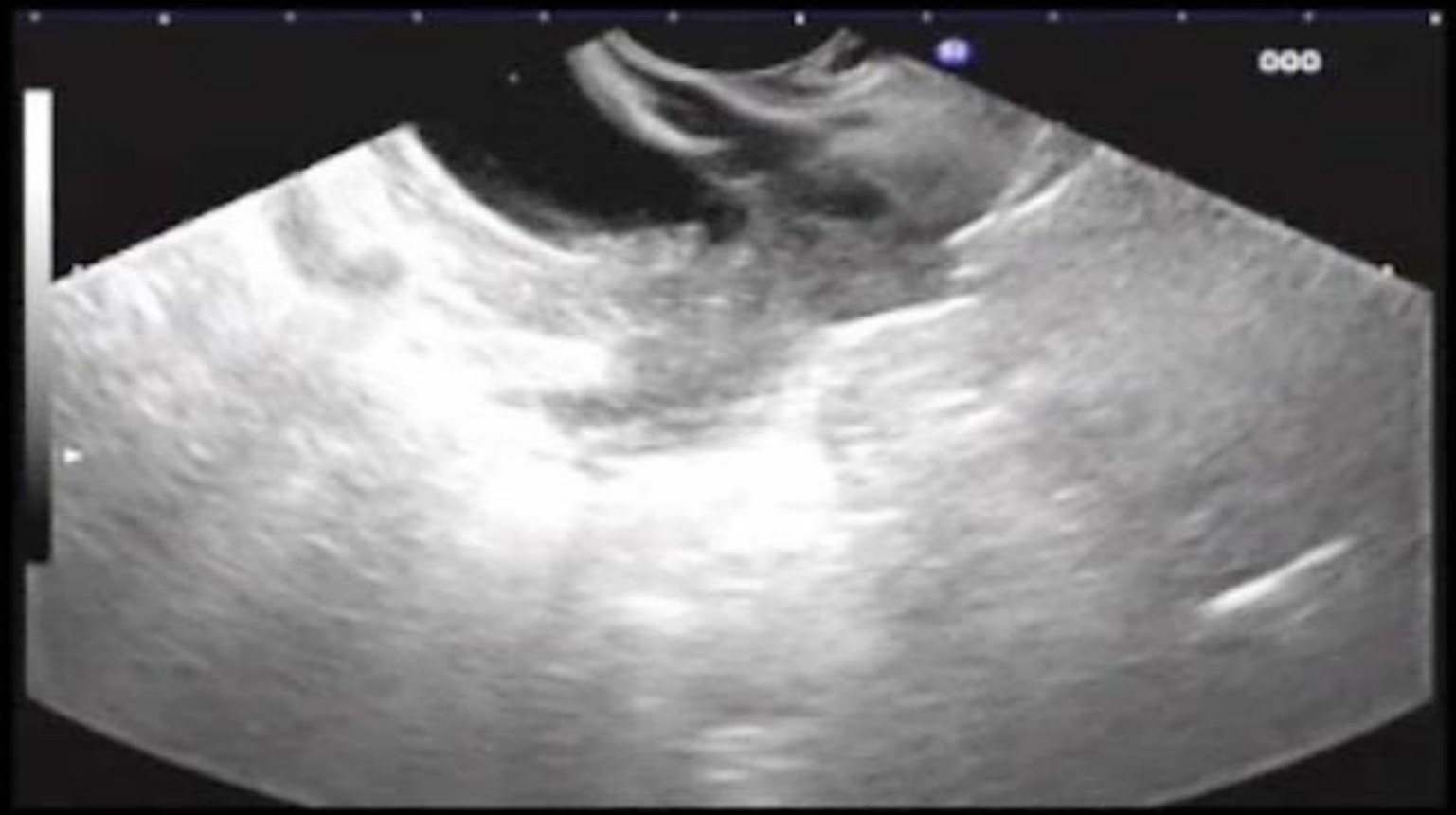
Choice of Instrument

- The image of the papilla may be less defined with the linear equipment
- No study has involved a direct comparison between linear and radial EUS for Tumor staging
- The choice of using these instruments depends mostly on the operator's preferences.
- Only IDUS has demonstrated superiority to EUS in terms of tumor visualization and staging but has draw back of non visualizing nodes and major vessels

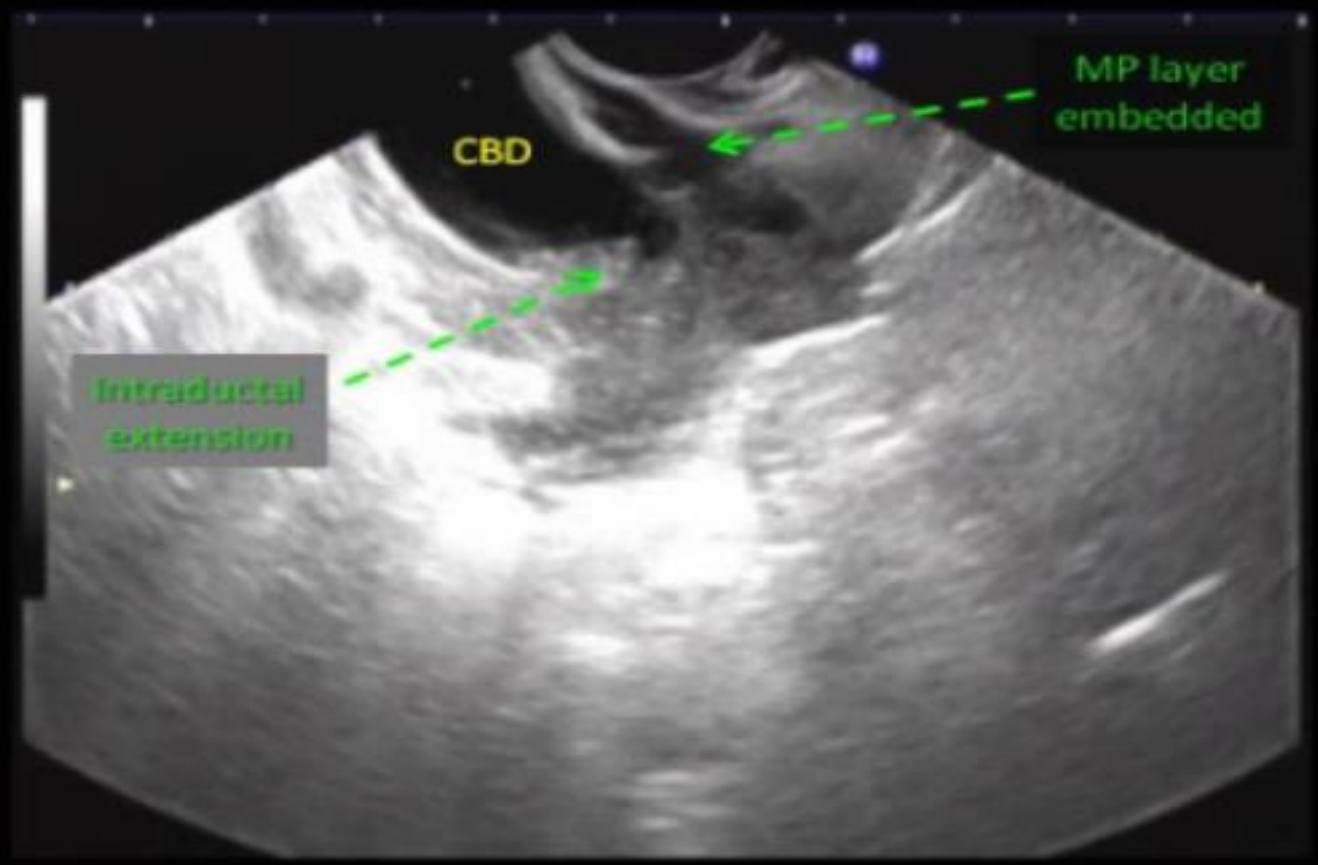
FAP

- Up to 80% may develop adenoma in ampulla or periampulla
- Up to 8% life long risk of malignancy
- Forward and side view endoscopy every 3 years with biopsy
- Up to 545 of normal papilla may have adenoma at biopsy

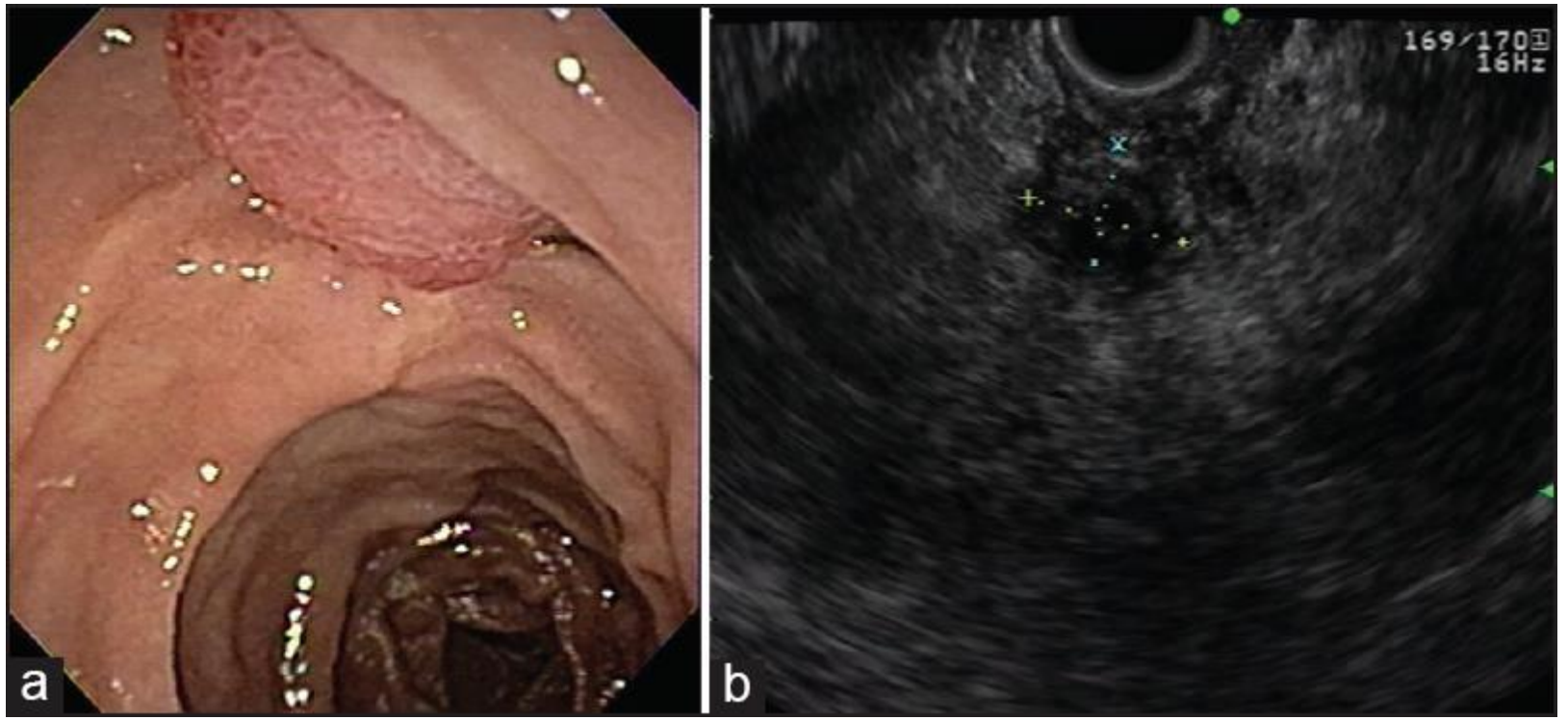
Ampullary Carcinoma



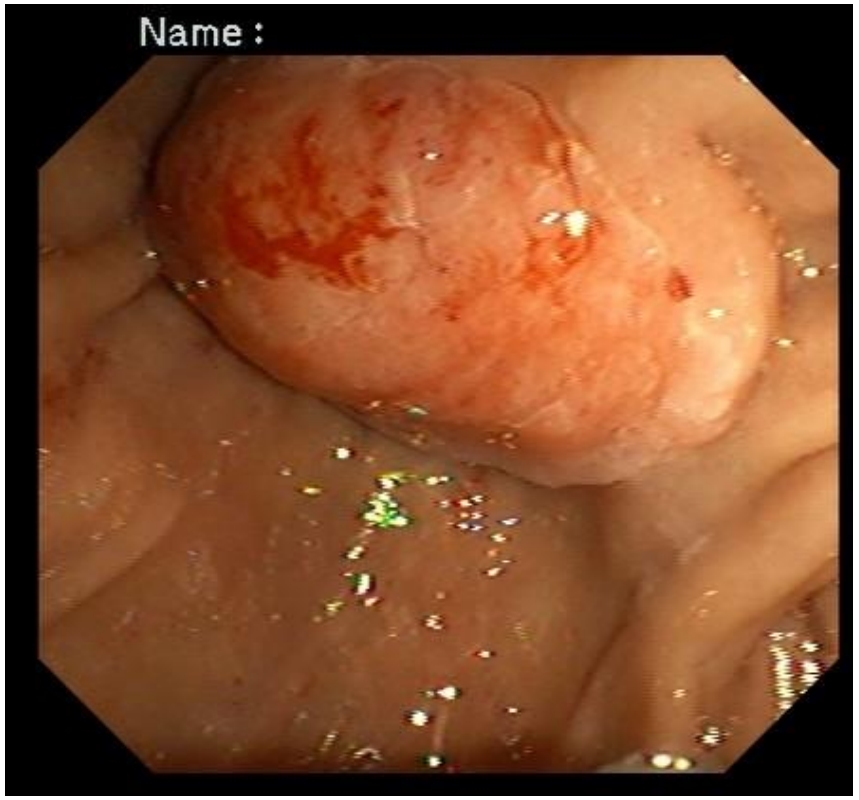
Ampullary Carcinoma

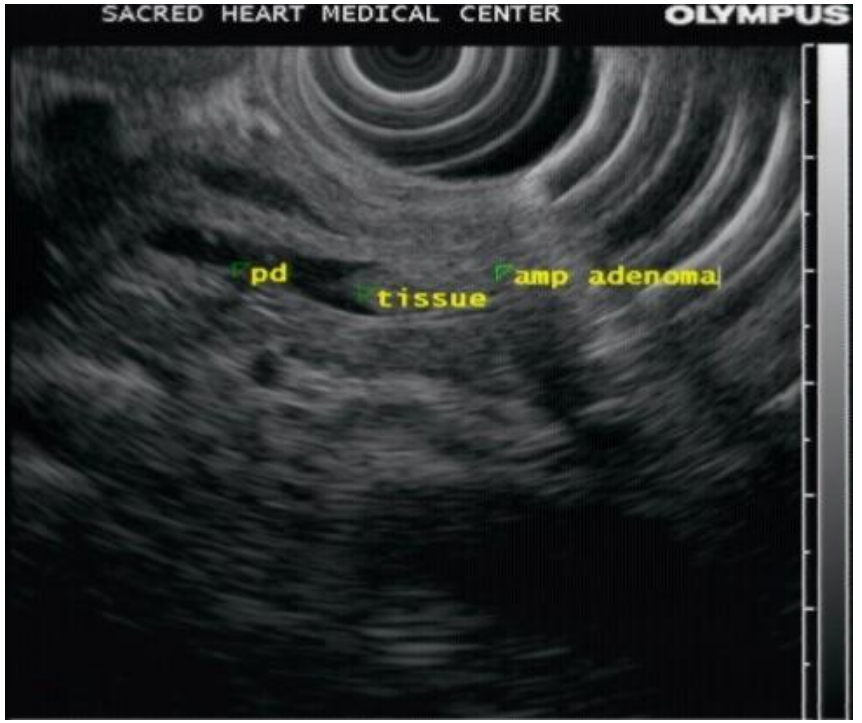


Ampullary Adenoma Confined to Mucosa

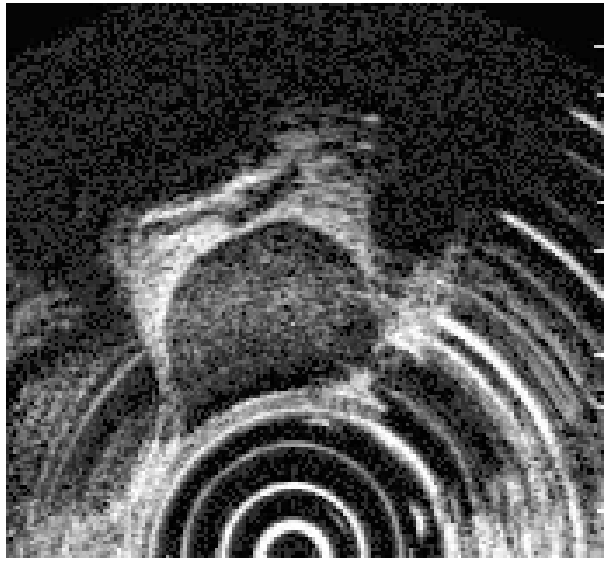


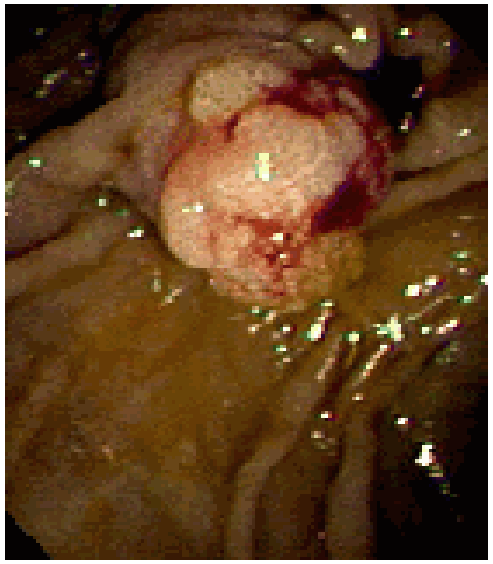
Ampullary Adenoma In FAP



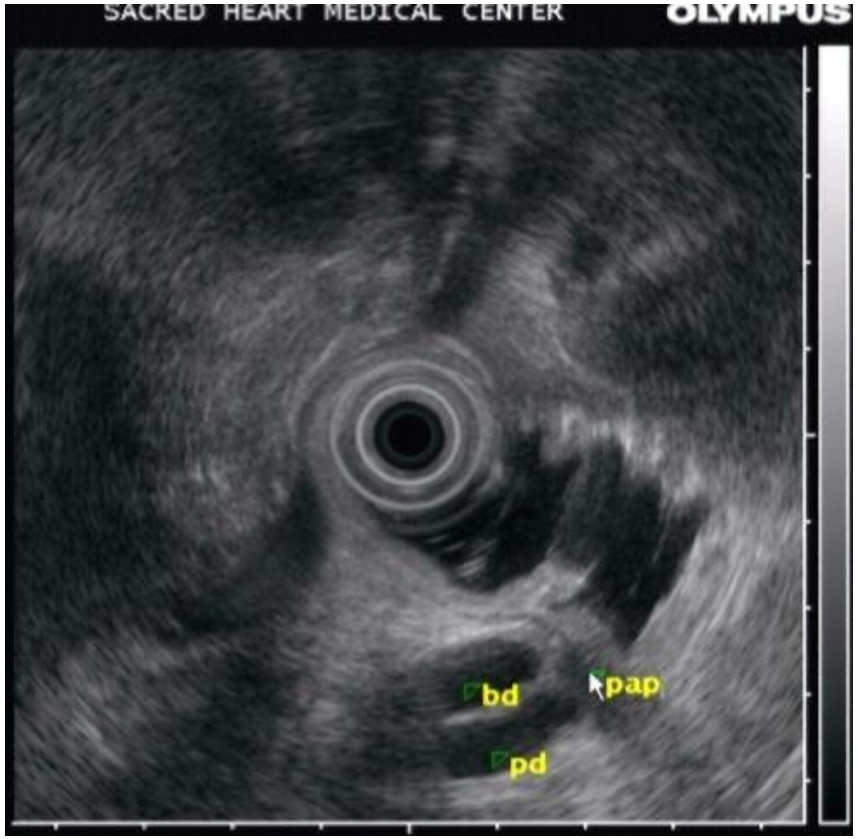


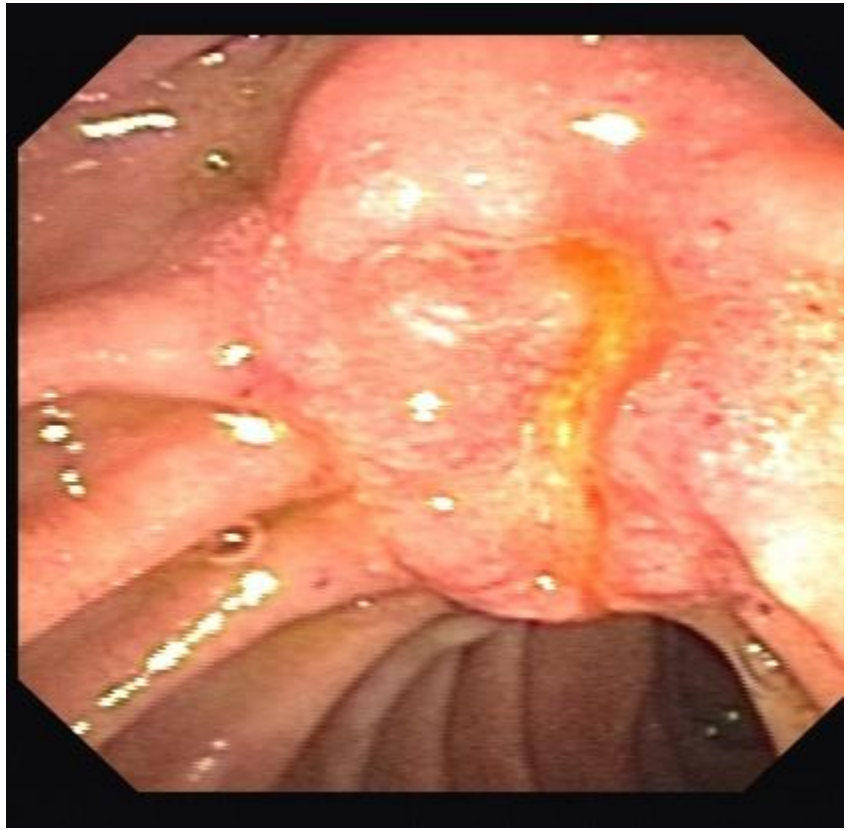
Ampullary Adenoma In FAP



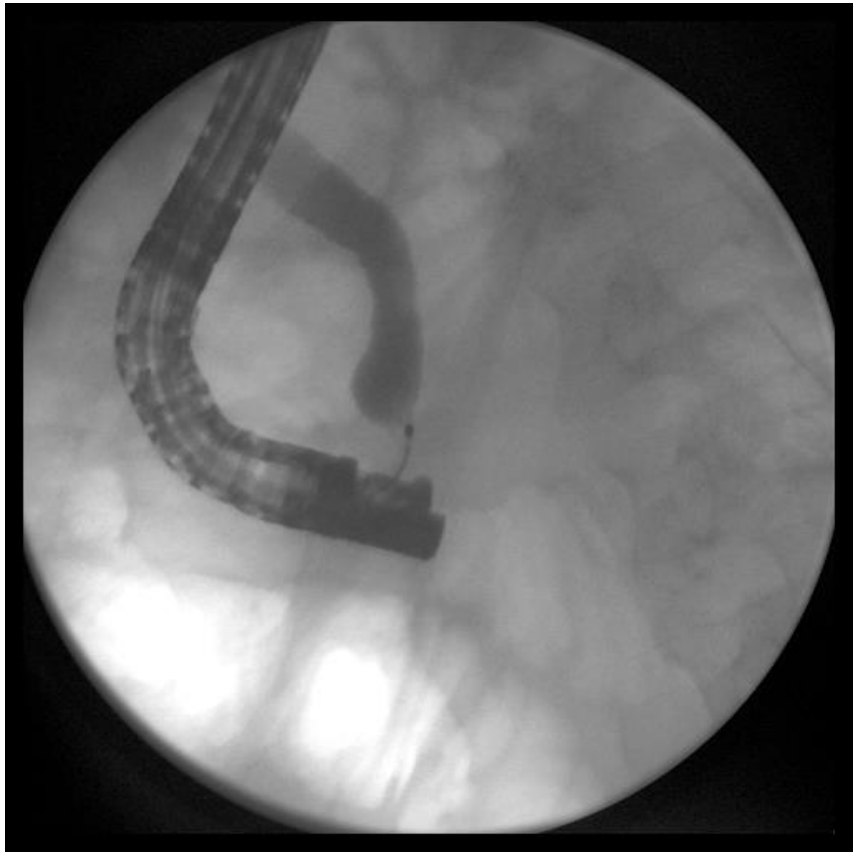


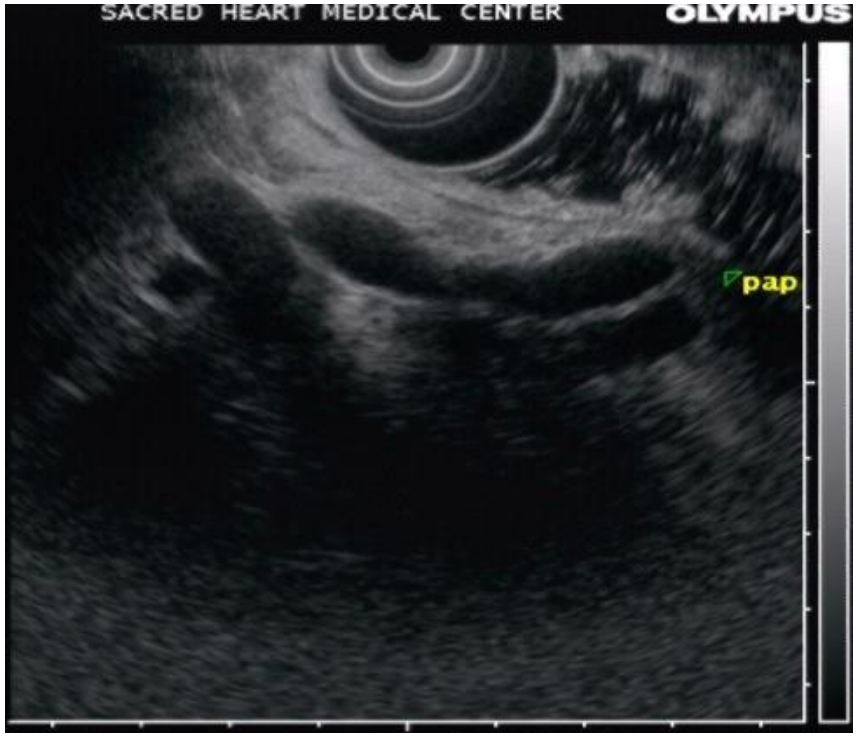
Ampullary Carcinoma

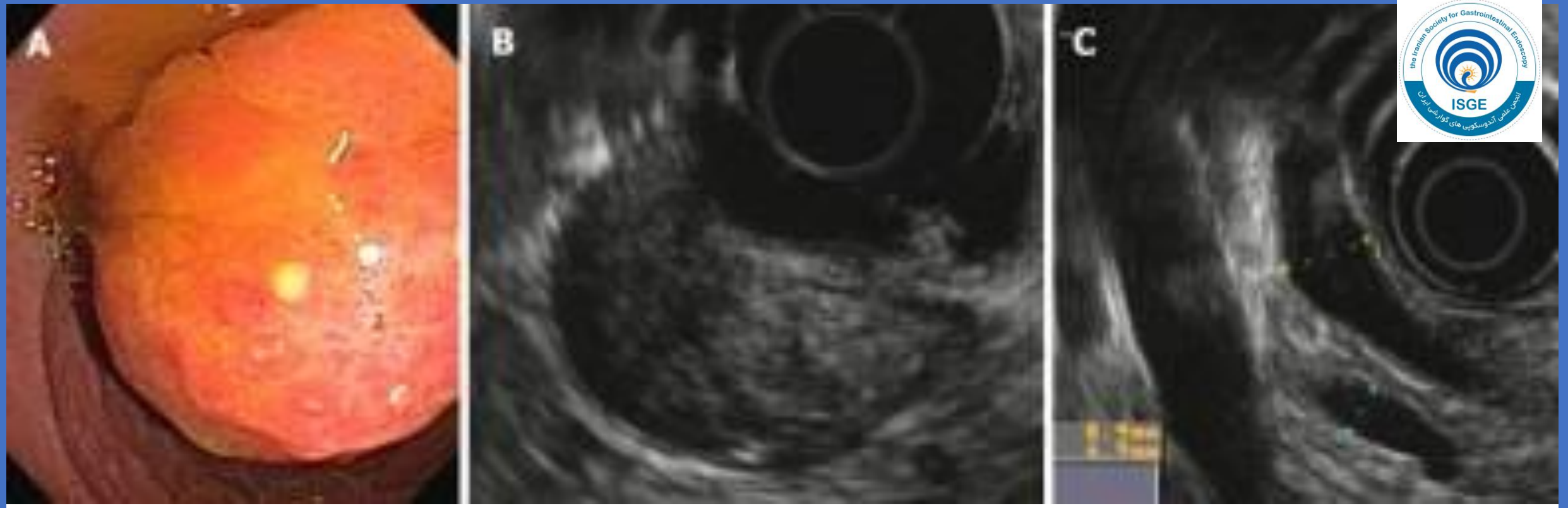




Ampullary Carcinoma







1 .Surgery
2.Ampullectomy

TNM staging for ampullary carcinom

Primary tumor (T)

- TX Primary tumor cannot be assessed
- T0 No evidence of primary tumor
- Tis Carcinoma in situ
- T1 Tumor limited to the ampulla of Vater or sphincter of Oddi
- T2 Tumor invades duodenal wall
- T3 Tumor invades pancreas
- T4 Tumor invades peripancreatic soft tissues or other adjacent organs or structures other than pancreas

Regional lymph nodes (N)

- NX Regional lymph nodes cannot be assessed
- N0 No regional lymph node metastasis
- N1 Regional lymph node metastasis

Distant metastasis (M)

- M0 No distant metastasis
- M1 Distant metastasis

Causes of CBD dilatation

- Intra ductal :stone
- Ductal : stricture (malignant , benign)
- Extrinsic

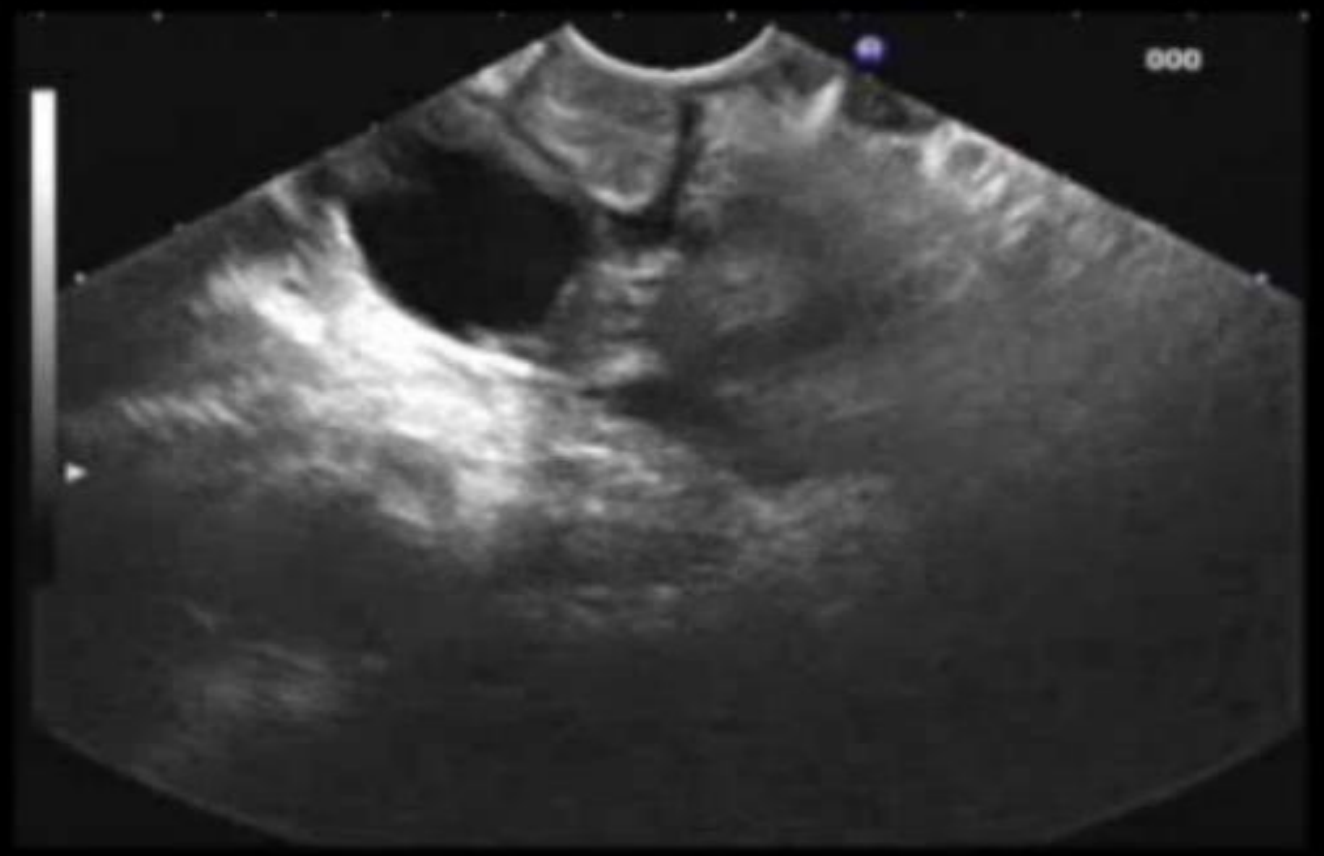
Malignant vs Benign Sx of BD

- Dilatation of CBD best assessed in Duodenum
- If proximal obstruction gastric view may be used
- If GB intact , CBD ≥7 mm is considered abnormal
- Back and forth from hilum to ampulla

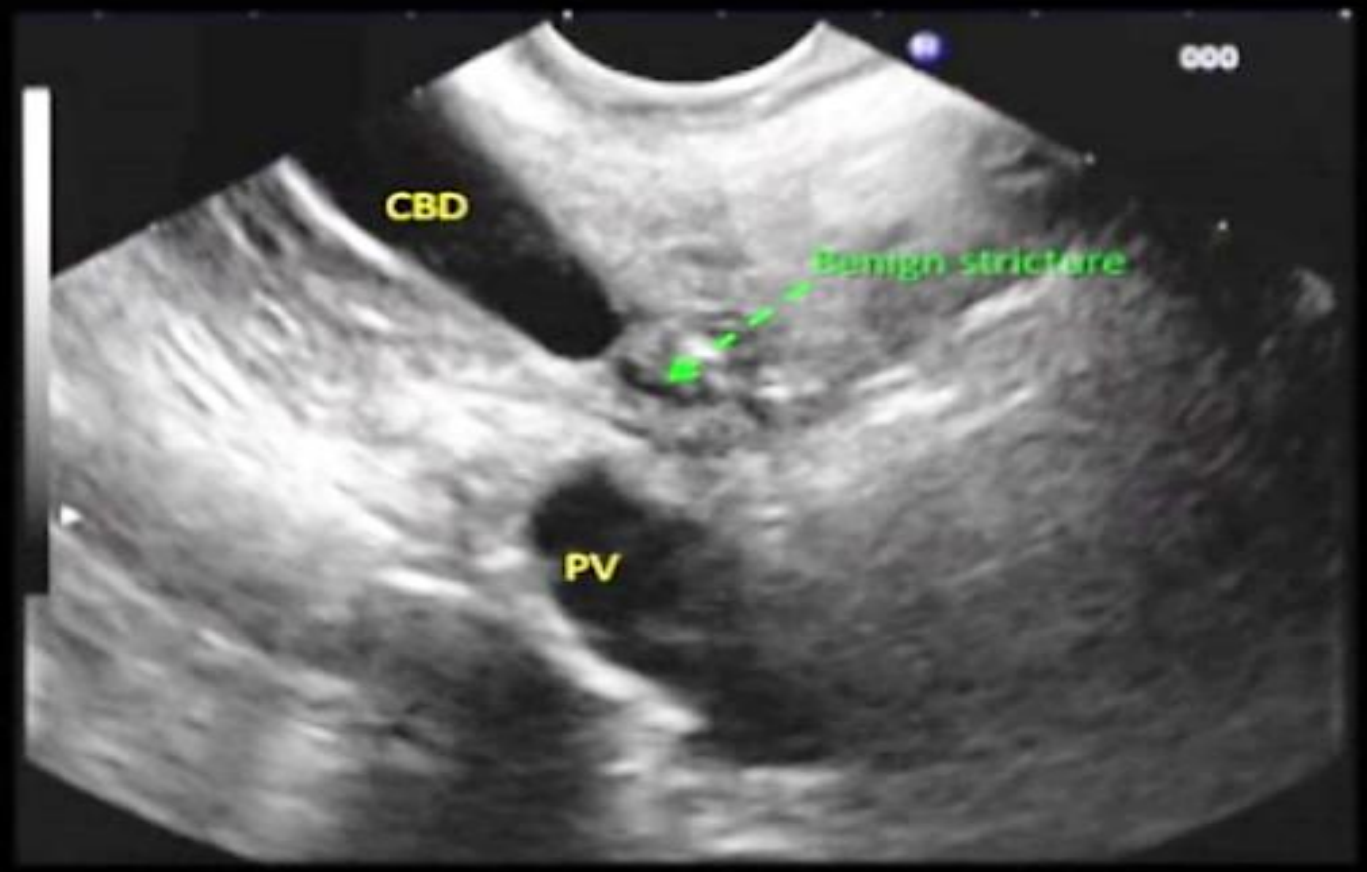
Malignant Strictures

- Irregular margins
- Abrupt transition
- Hypoechoic thickening of duct wall
- Associated polypoid / intraluminal tumor
- Associated mass
- Associated LN ?

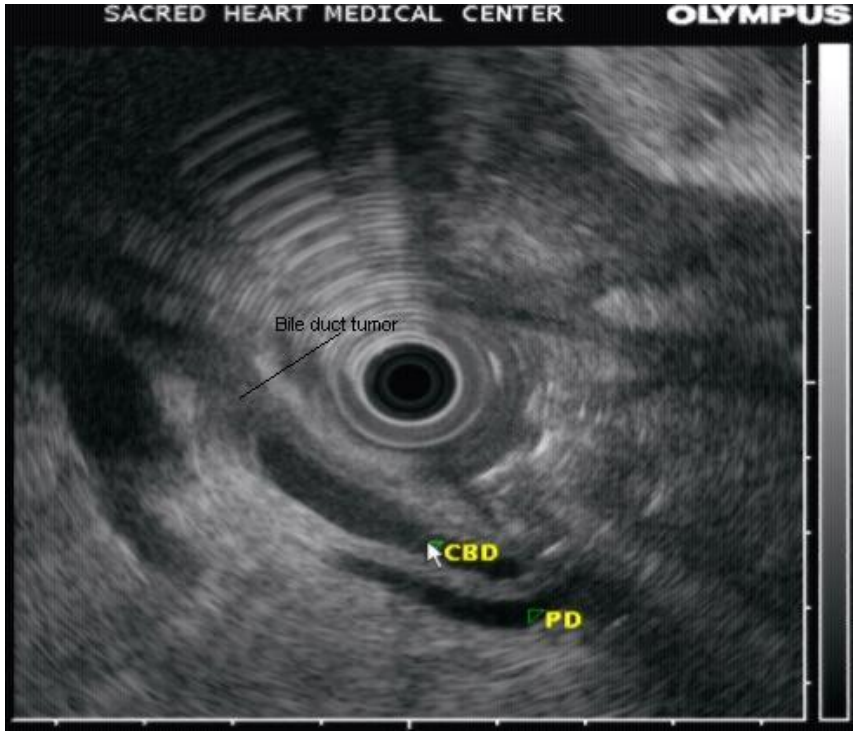
Malignant Stricture

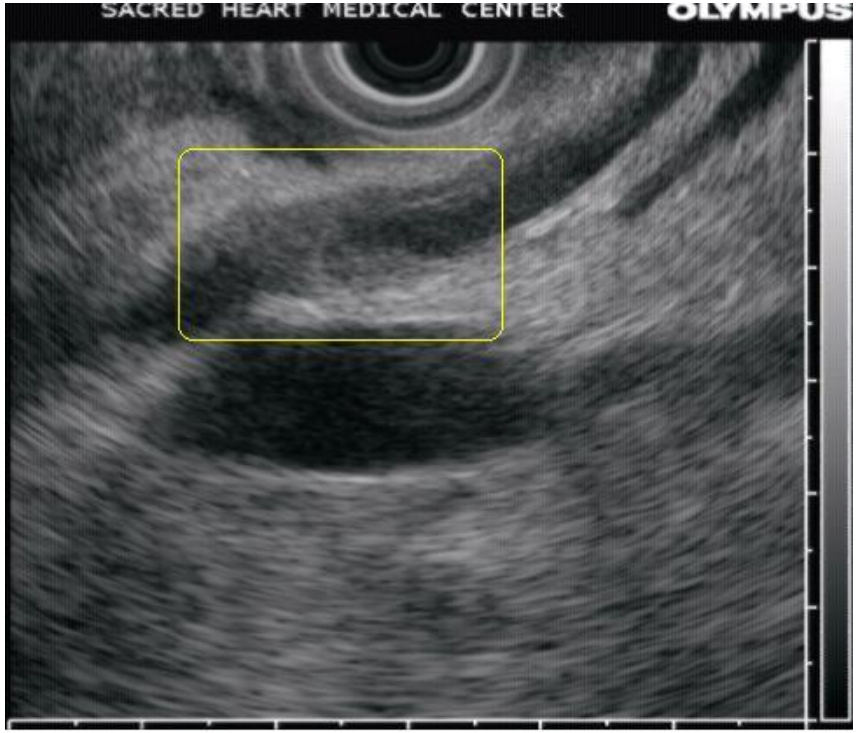


Benign Stricture

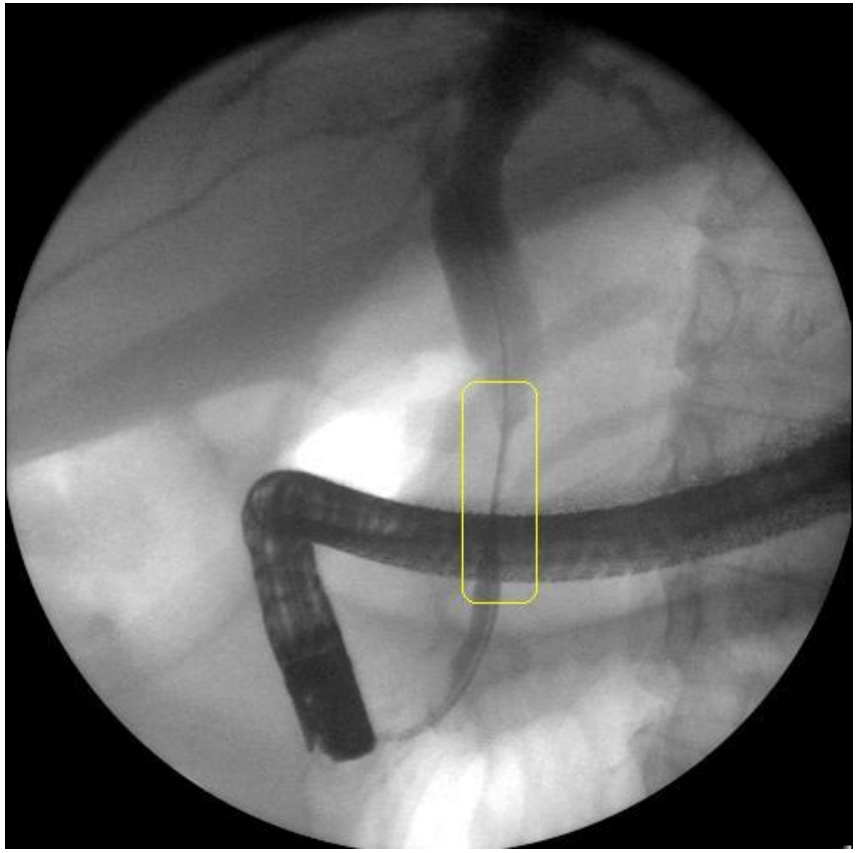


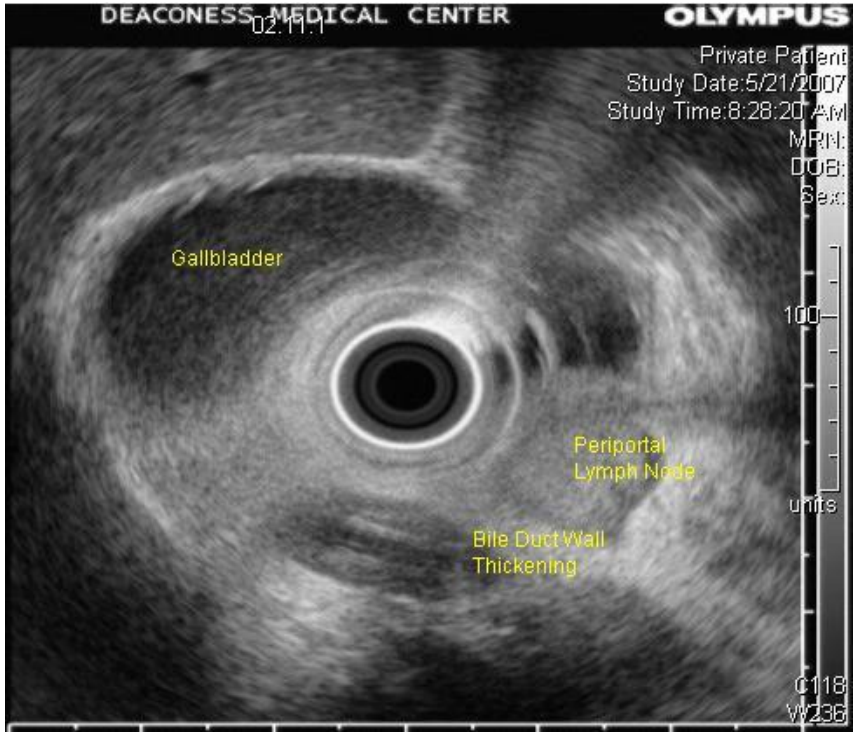
Cholangiocarcinoma



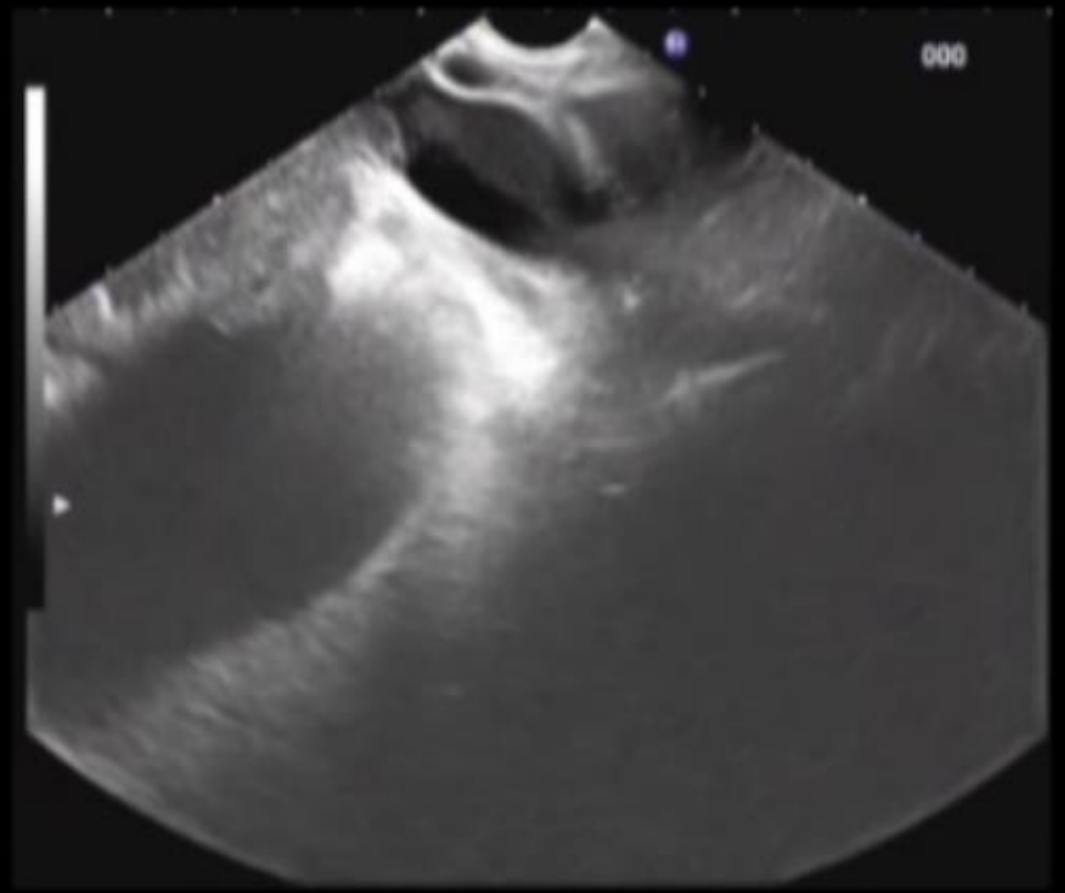


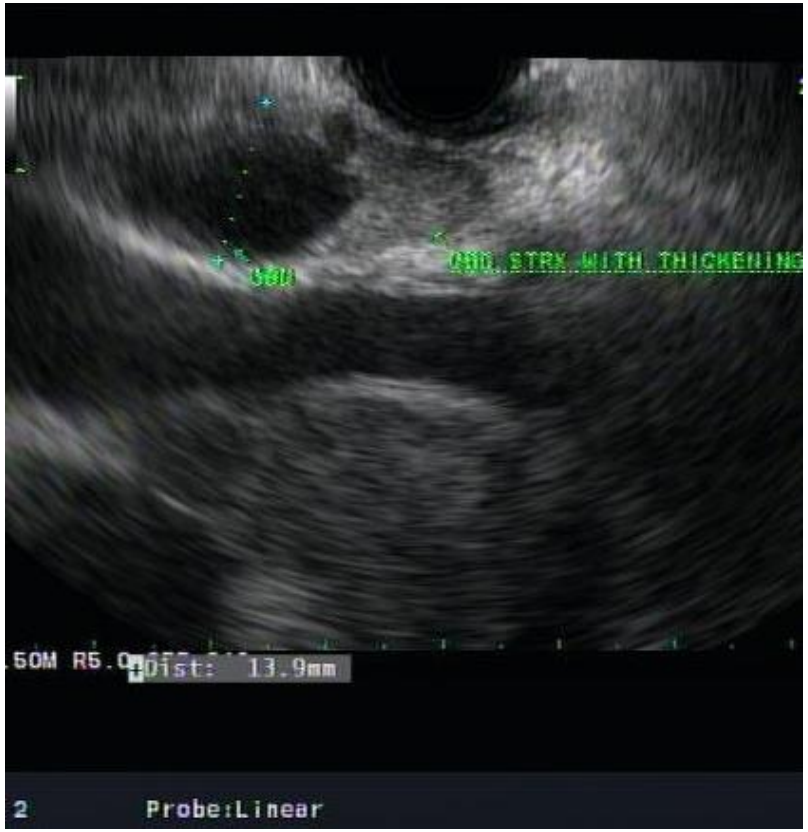
Cholangiocarcinoma





Common Hepatic Duct Stricture

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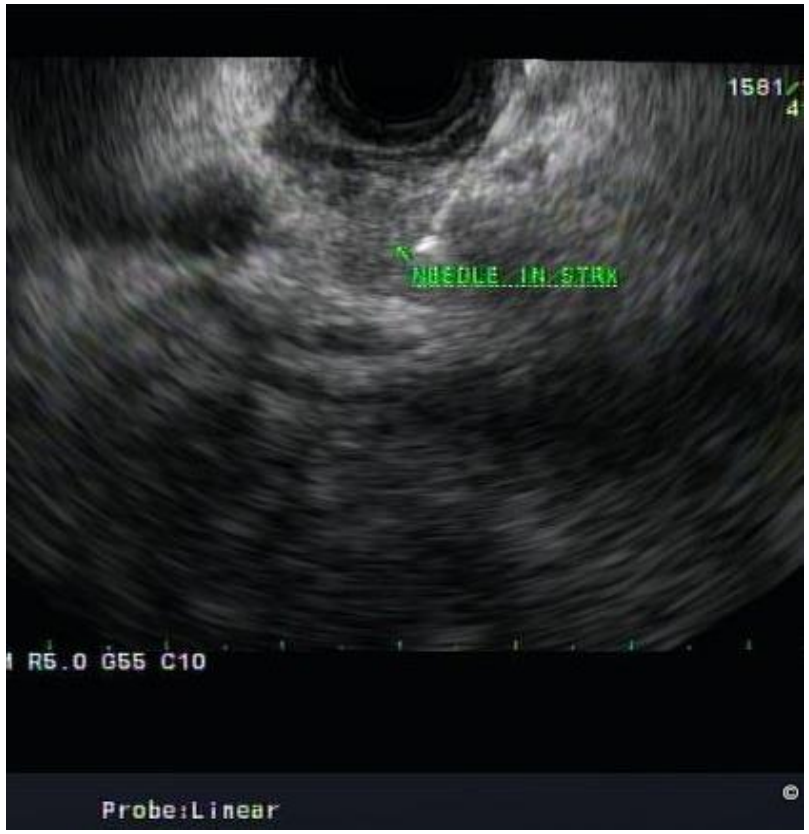
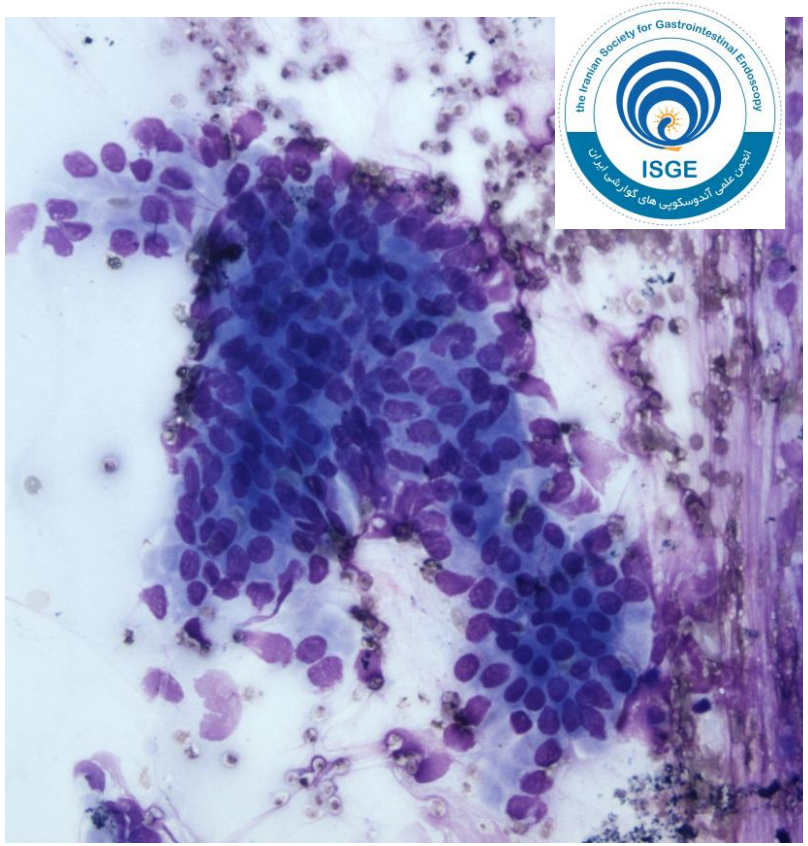
Probe:Linear


1581
4
NEEDLE IN STRX
R5.0 G55 C10
Probe:Linear



Accuracy of EUS-FNA in diagnosing cholangiocarci

	Study design	Cohort size	Sensitivity	Specificity	NPV	PPV	Negative ERCP cytology?	Sensitivity of mass detection by CT/MRI/US
Fritscher-Ravens	Prospective	44	89%	100%	67%	100%	Yes	------
Eloubeidi	Prospective	28	86%	100%	57%	100%	Yes	33%
Mohamdnejad	Prospective	81	53%	97%	-----	------	No	30/42%
Ohshima	Retrospective	22	100%	100%	100%	100%	Yes	36%
DeWitt	Retrospective	24	77%	100%	29%	100%	Yes	33/50%/33%

EUS-FNA: endoscopic ultrasound-guided fine needle aspiration; CT: computed tomography; MRI: magnetic resonance imaging; US: ultrasonography; ERCP: endoscopic retrograde cholangiopancreatography; NPV: negative predictive value; PPV: positive predictive value.

Endosc Ultrasound. 2013 Apr-Jun; 2(2): 71-76.

Gastroenterology Report 3 (2015) 209–215, doi:10.1093/gastro/gou057
Advance access publication 27 August 2014

Meta-Analysis

Endoscopic ultrasound in the diagnosis of cholangiocarcinoma as the etiology of biliary strictures: a systematic review and meta-analysis

Udayakumar Navaneethan[1], Basile Njei[2], Preethi GK Venkatesh[1], Vennisvasanth Lourdusamy[1] and Madhusudhan R Sanaka[1]

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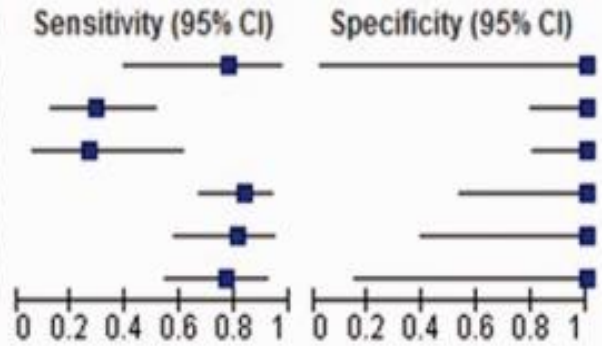
Submitted 11 July 2014; Revised 24 July 2014; Accepted 26 July 2014

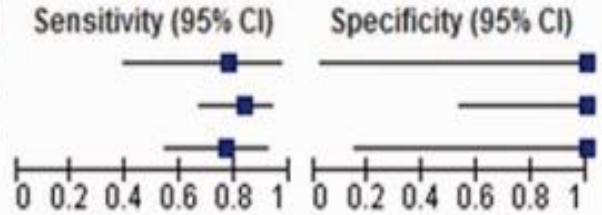
EUS-CCA-Overall

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Fritscher-Ravens 2000	7	0	2	1	0.78 [0.40, 0.97]	1.00 [0.03, 1.00]
Lee 2004	7	0	17	16	0.29 [0.13, 0.51]	1.00 [0.79, 1.00]
Rosch 2004	3	0	8	17	0.27 [0.06, 0.61]	1.00 [0.80, 1.00]
Fritscher-Ravens 2004	30	0	6	6	0.83 [0.67, 0.94]	1.00 [0.54, 1.00]
Eloubeidi 2004	17	0	4	4	0.81 [0.58, 0.95]	1.00 [0.40, 1.00]
Dewitt 2006	17	0	5	2	0.77 [0.55, 0.92]	1.00 [0.16, 1.00]



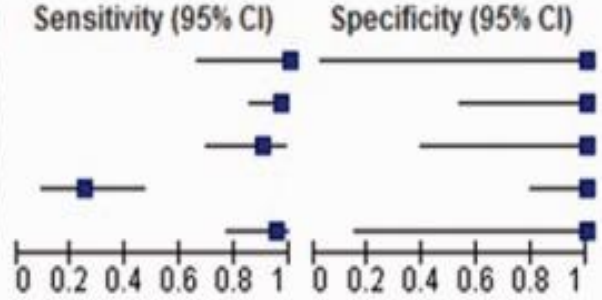
EUS-CCA-Proximal Biliary Strictures

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Fritscher-Ravens 2000	7	0	2	1	0.78 [0.40, 0.97]	1.00 [0.03, 1.00]
Fritscher-Ravens 2004	30	0	6	6	0.83 [0.67, 0.94]	1.00 [0.54, 1.00]
Dewitt 2006	17	0	5	2	0.77 [0.55, 0.92]	1.00 [0.16, 1.00]



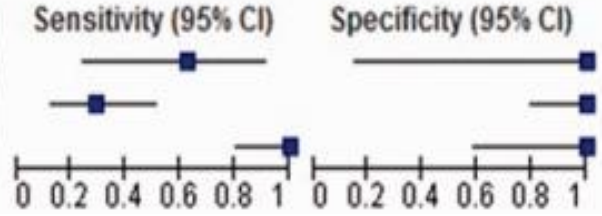
EUS-CCA-Mass lesions detected in EUS

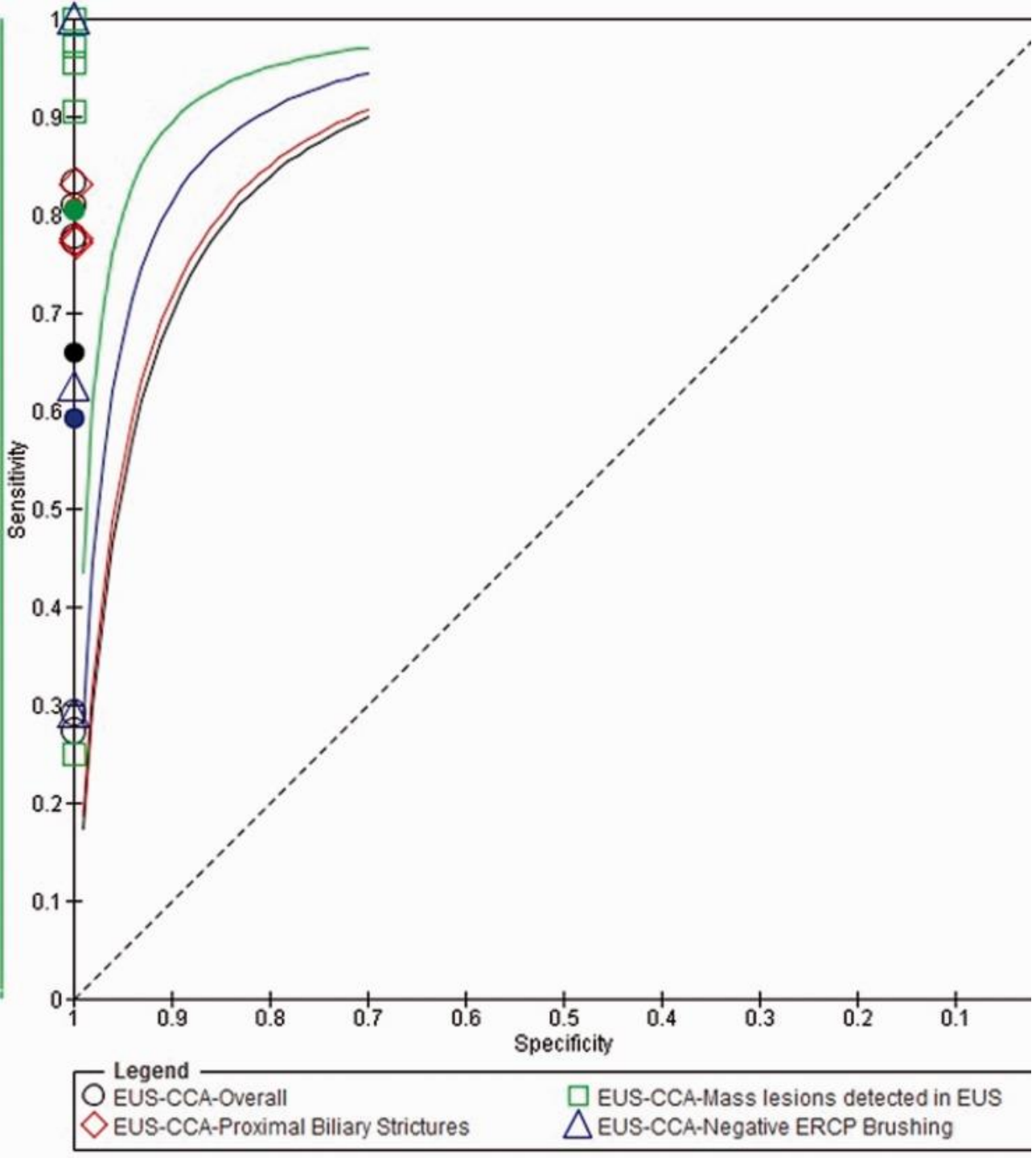
Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Fritscher-Ravens 2000	9	0	0	1	1.00 [0.66, 1.00]	1.00 [0.03, 1.00]
Fritscher-Ravens 2004	35	0	1	6	0.97 [0.85, 1.00]	1.00 [0.54, 1.00]
Eloubeidi 2004	19	0	2	4	0.90 [0.70, 0.99]	1.00 [0.40, 1.00]
Lee 2004	6	0	18	16	0.25 [0.10, 0.47]	1.00 [0.79, 1.00]
Dewitt 2006	21	0	1	2	0.95 [0.77, 1.00]	1.00 [0.16, 1.00]



EUS-CCA-Negative ERCP Brushing

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Fritscher-Ravens 2000	5	0	3	2	0.63 [0.24, 0.91]	1.00 [0.16, 1.00]
Lee 2004	7	0	17	16	0.29 [0.13, 0.51]	1.00 [0.79, 1.00]
Dewitt 2006	17	0	0	7	1.00 [0.80, 1.00]	1.00 [0.59, 1.00]





Summary receiver operating curve (SROC) for EUS-FNA to diagnose cholangiocarcinoma

Gastroenterol Rep (Oxf). 2015 Aug; 3(3): 209–215.

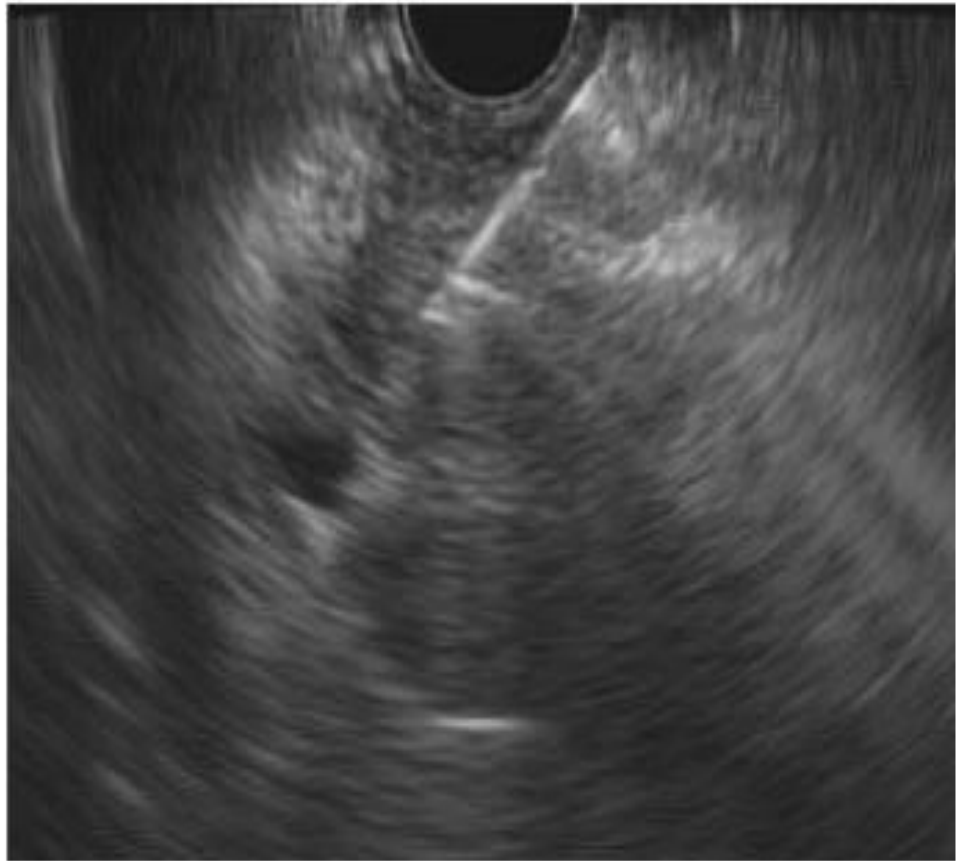
EUS for Malignant Stricture

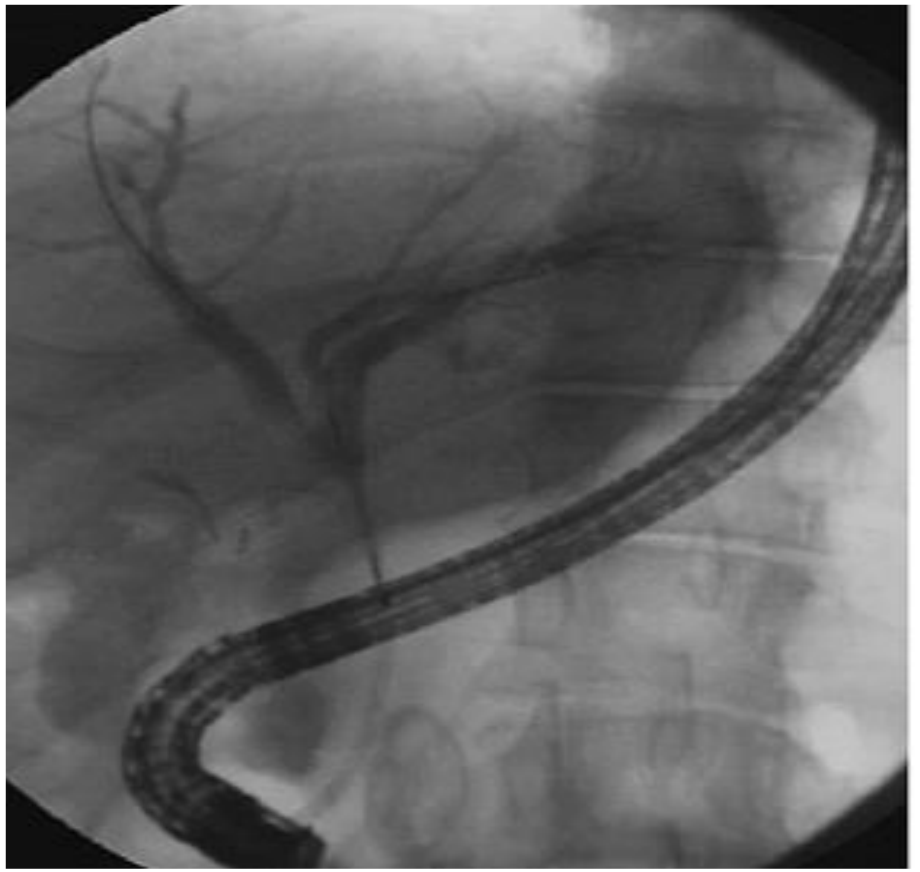
- Meta-analysis of 20 studies on EUS-FNA for diagnosis of malignant BS : pooled sensitivity 80% and specificity 97%,
- Diagnostic sensitivity was higher in distal (83%) than proximal (76%) BS.
- The negative likelihood ratio was 0.26.
- Adverse events were rare (approximately 1%) and generally mild in nature— including self-controlled bleeding.
- EUS-FNA is sensitive and highly specific for diagnosing malignancy in BS, but cannot be relied on to exclude malignancy.
- ***Sadeghi et al.Gastrointest Endosc 2016;83:290–8.e1***

Tumor Seeding with EUS

- Tumour seeding of the needle track in potential surgical candidates is in debate
- Mayo Clinic : during the tumour staging procedure, 83% of patients with a history of a positive FNA were found to have peritoneal metastasis along the needle tract. Heimbach et al. HPB (Oxford) 2011;13:356–60.
- 150 patients with CCA: preoperative EUS-FNA did not adversely affect either overall or progression-free survival; however, the follow-up period in this study was relatively short. El Chafic et al. Endoscopy 2013;45:883–9.
- The risk of tumour seeding should be borne in mind when considering EUS-FNA in operable patients.

EUS vs ERCP





ORIGINAL ARTICLE: Clinical Endoscopy

EUS-FNA is superior to ERCP-based tissue sampling in suspected malignant biliary obstruction: results of a prospective, single-blind, comparative study

CME

Frank Weilert, MD, Yasser M. Bhat, MD, Kenneth F. Binmoeller, MD, Steve Kane, BS, Ian M. Jaffee, MD, Richard E. Shaw, PhD, Rees Cameron, MD, Yusuke Hashimoto, MD, Janak N. Shah, MD

San Francisco, California, USA

Background: Both EUS and ERCP sampling techniques may provide tissue diagnoses in suspected malignant biliary obstruction. However, there are scant data comparing these 2 methods.

Objective: To compare EUS-guided FNA (EUS-FNA) and ERCP tissue sampling for the diagnosis of malignant biliary obstruction.

TABLE 2. Results of EUS-FNA and ERCP-based tissue sampling in 51 patients with malignant (n = 48) and benign (n = 3) disease

	EUS-FNA, no. (%)	ERCP sampling, no. (%)
Malignant*	41 (80)	15 (29)
Atypical, suspect malignant	4 (8)	9 (18)
Atypical, favor benign	3 (6)	8 (16)
Benign	3 (6)	12 (23)
Nondiagnostic, insufficient	0 (0)	7 (14)

EUS-FNA, EUS-guided FNA.
*EUS-FNA provided a significantly higher proportion of definite malignant samples compared with ERCP-based methods ($P < .0001$).

TABLE 3. Overall performance characteristics of EUS-FNA and ERCP-based tissue sampling in 51 patients with final diagnoses of malignant (n = 48) and benign (n = 3) disease

	EUS-FNA, %	ERCP brush and biopsy, %	*P* value
Sensitivity	94	50	<.0001
Specificity	100	100	NS
Positive predictive value	100	100	NS
Negative predictive value	50	11	<.0001
Accuracy	94	53	<.0001

EUS-FNA, EUS-guided FNA; NS, not significant.

Results

- EUS-guided FNA is superior to ERCP tissue sampling in evaluating suspected malignant biliary obstruction, particularly for pancreatic masses, but also appears to be comparable for biliary masses/strictures.
- Single-session EUS-FNA and ERCP may maximize diagnostic and therapeutic benefits.

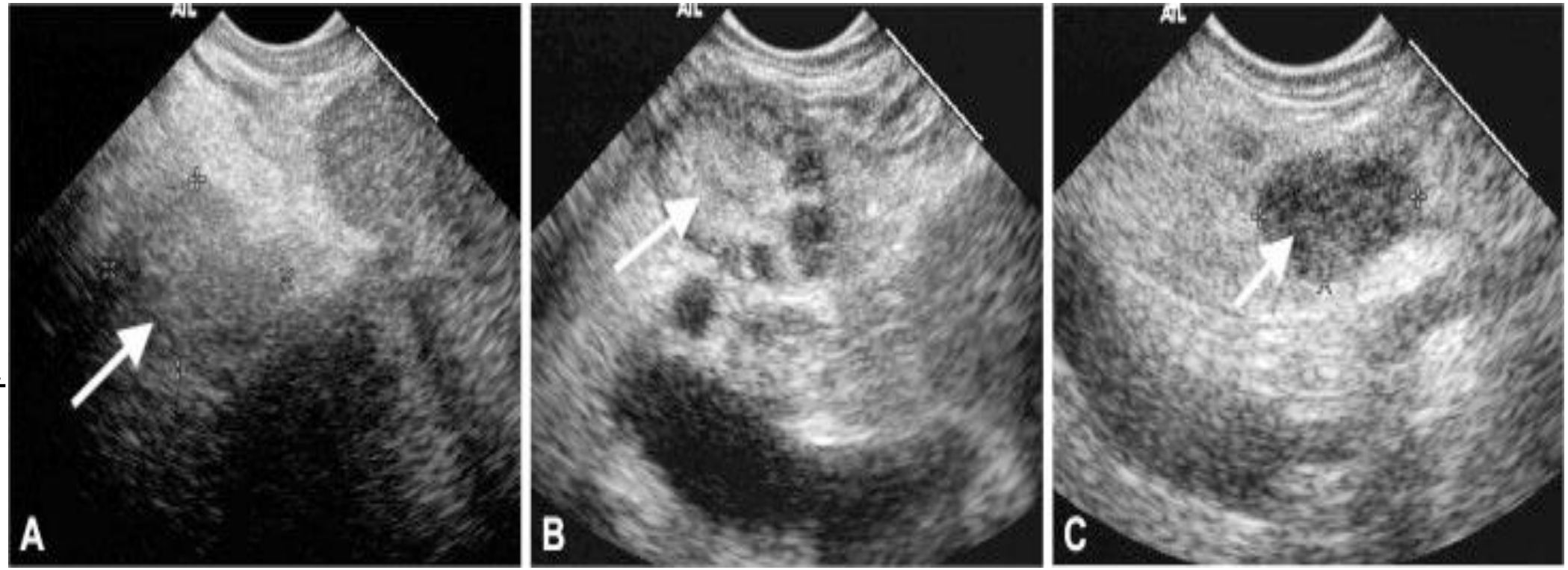
Weilert. Et al. Gastrointest Endosc 2014;80:97-104

Nodal Staging

- Nodal malignancy cannot be determined by lymph node appearance in patients with cholangiocarcinoma
- Oval or geographic in appearance
- Hypoechoic rim-features
- FNA thus plays an important role in nodal staging, especially if liver transplantation is being considered.

Clin Endosc. 2012 Sep; 45(3): 328–330.

Clin Endosc. 2012 Sep; 45(3): 328–330.



Bismuth-Corlette classification

of perihilar cholangiocarcinomas

1 2 3A 3B 4

M. Skalski

Radiopaedia.org

ESMO Guideline for Diagnosis of Biliary Cancer 2016

Ann Oncol (2016) 27 (suppl 5): v28-v37

- Abdominal ultrasound may be useful for the initial examination (identification of biliary obstruction)
- MRI and MRCP should be carried out before any biliary intervention; CT is less useful
- ERCP allows relief of bile duct obstruction (by stenting); brush cytology and biopsies should be carried out
- For patients deemed suitable for surgery with radical intent, a biopsy is not obligatory (brush cytology may be available). A biopsy should be restricted to selected cases (e.g. equivocal lesion) and only after discussion at a specialist hepatobiliary MDT; if so, EUS-guided biopsy is preferred and percutaneous sampling should be avoided
- For patients with advanced/inoperable disease, histological/cytological confirmation is essential; it may be obtained at EUS or metastatic lesions can be biopsied percutaneously (ultrasound or CT guided)
- FDG-PET imaging has no established role in the diagnosis of BTC
- Baseline CA19-9 should be interpreted with caution and is best used to guide treatment and follow-up; it may have a prognostic value in the absence of biliary obstruction

ESMO Guideline for Staging of Biliary Cancers 2016

Ann Oncol (2016) 27 (suppl 5): v28-v37

- The established staging system for biliary tract cancer is the one developed by the TNM committee of the AJCC/UICC (currently 7th Edition) with subclassifications for GBC and iCCA, pCCA and dCCA
- CT (including thorax and pelvis) allows evaluation of distant metastases and vessel involvement
- MRI plus MRCP is useful for T-staging
- EUS helps to clarify N-stage (± nodal biopsy) and adds information regarding vessel involvement
- FDG-PET scan is not routinely recommended for the staging of BTC
- Staging laparoscopy may be considered on an individual basis to exclude the presence of peritoneal metastases if it will influence the decision to proceed with major resection (e.g. locally advanced GBC)
- Pathology examination and reporting of surgically-resected specimens should follow standardised reporting tools (minimum dataset)

Practical Points

- Compression with big wheel up may result un missing CBD dilatation
- Once we are able to see the papilla through endoscopy, withdraw the endoscope 1 to 2 cm in order to position the papilla in front of the ultrasound transducer.
- Making small up-and-down movements with the large wheel and small lateral movements with the shoulders for better view
- It is better to have a distance from papilla to not to lose the detail of ampulla
- Use of water immersion
- If CBD stone is found , look in distal part of CBD to find possible cause of stasis

EUS Guided Biliary Drainage

- EUS as a guide to obtain access to the bile duct from the duodenum, or to the intrahepatic bile duct from the stomach
- When access failed or was not possible through ERCP
- 89.5% clinical success rate and 10.5% adverse events including one death,
- RCT versus percutaneous biliary drainage is required before this technique is advocated for routine use.

Khashab et al : Endosc Int open 2016;4:E487–96.

Take Home Messages

- Ampullary lesions need precise evaluation before endoscopic resection which may include EUS
- EUS can help to differentiate benign and malignant Sx of BD
- Routine EUS is not recommended for diagnosis of cholangiocarcinoma but may help in staging specially before LTx
- Nodes needs to be biopsied before concluding on their nature in perihilar and peri duodenal region