The role of endoscopy in HPB cancers: from diagnosis to palliation
Disclosures

Consultant Boston Scientific, Erbe
Research grant Olympus
Diagnosis

EUS pancreatic cancer
FNB
EUS biliary cancer
ERCP and Cholangioscopy

Treatment

Drainage
RFA
EUS pancreatic cancer

ESMO guidelines 2015

- Staging of the patient is initially done by CT scan
- EUS provides some complementary information and allows biopsy of the tumour [II, A]
- MRI should be discussed, especially in cystic lesions [IV, C]

ASGE

- Although EUS is more operator dependent compared with CT and MRI, it is the most sensitive test in expert hands to detect pancreatic mass lesions or pancreatic adenocarcinoma, particularly when lesions are equivocal by CT or <2 centimeters in size.
- In a systematic review of 9 studies and 678 patients, EUS was more sensitive than CT for the detection of pancreatic adenocarcinoma (91%-100% vs 53%-91%)

People with obstructive jaundice

1.1.1 For people with obstructive jaundice and suspected pancreatic cancer, offer a pancreatic protocol CT scan before draining the bile duct.

1.1.2 If the diagnosis is still unclear, offer fluorodeoxyglucose-positron emission tomography/CT (FDG-PET/CT) and/or endoscopic ultrasound (EUS) with EUS-guided tissue sampling.

1.1.3 Take a biliary brushing for cytology if:

- endoscopic retrograde cholangiopancreatography (ERCP) is being used to relieve the biliary obstruction and
- there is no tissue diagnosis.

People without jaundice who have pancreatic abnormalities on imaging

1.1.4 Offer a pancreatic protocol CT scan to people with pancreatic abnormalities but no jaundice.

1.1.5 If the diagnosis is still unclear, offer FDG-PET/CT and/or EUS with EUS-guided tissue sampling.

1.1.6 If cytological or histological samples are needed, offer EUS with EUS-guided tissue sampling.
Role of EUS ancillary techniques (CH-EUS, Elastography)

- Accuracy of CH-EUS (92.4%) was significantly higher than that for conventional tissue harmonic EUS (69.2%) ($P < 0.05$) for diagnosis and T staging.

- N-staging: defect of enhancement that diagnosed malignant LN with a 100% sens and a 82% spec.


Case to illustrate

- Jaundice
- CT: no lesion, dilated bile duct and pancreatic duct with atrophy
- ECRP: stricture, biopsy and brushing neg
- MRI no lesion
- PET-CT: hypermetabolic lesion 16 mm (SUV 5.6)
Diagnosis
EUS pancreatic cancer
FNB
EUS biliary cancer
ERCP and Cholangioscopy

Treatment
Drainage
RFA
Indications, results, and clinical impact of endoscopic ultrasound (EUS)-guided sampling in gastroenterology: European Society of Gastrointestinal Endoscopy (ESGE) Clinical Guideline – Updated January 2017

Authors
Jean-Marc Dumonceau¹, Pierre H. Deprez², Christian Jenssen³, Julio Iglesias-Garcia⁴, Alberto Larghi⁵, Geoffroy Vanbiervliet⁶, Guruprasad P. Aithal⁷, Paolo G. Arcidiacono⁸, Pedro Bastos⁹, Silvia Carrara¹⁰, László Czakó¹¹, Gloria Fernández-Esparrach¹², Paul Fockens¹³, Àngels Ginès¹², Roald F. Havre¹⁴, Cesare Hassan¹⁵, Peter Vilmann¹⁵

Dumonceau Jean-Marc et al. Endoscopy 2017; 49: 695–714
Pancreatic solid lesions

**RECOMMENDATION**
For pancreatic solid lesions, ESGE recommends performing EUS-guided sampling as first-line procedure when a pathological diagnosis is required. Alternatively, percutaneous sampling may be considered in metastatic disease. Strong recommendation, moderate quality evidence.

Dumonceau Jean-Marc et al. Endoscopy 2017; 49: 695–714
Pancreatic solid lesions

RECOMMENDATION

For pancreatic solid lesions, ESGE recommends performing EUS-guided sampling as first-line procedure when a pathological diagnosis is required. Alternatively, percutaneous sampling may be considered in metastatic disease. Strong recommendation, moderate quality evidence.

In the case of negative or inconclusive results and a high degree of suspicion of malignant disease, ESGE suggests re-evaluating the pathology slides, repeating EUS-guided sampling, or surgery. Weak recommendation, low quality evidence.
## Randomized Trial of FNA vs. FNB (Acquire)

<table>
<thead>
<tr>
<th></th>
<th>FNB (n=46)</th>
<th>FNA (n=46)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median Tissue Volume (mm²)</td>
<td>6.1</td>
<td>0.28</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Median Tumor Area (%)</td>
<td>0.68</td>
<td>0.099</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Median Area of Desmoplastic Fibrosis</td>
<td>3.9</td>
<td>0</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Diagnostic Cell Block (%)</td>
<td>97.8%</td>
<td>82.6%</td>
<td>0.03</td>
</tr>
</tbody>
</table>

Bang JY et al. GUT 2017
More tissue is the issue

More accurate diagnosis by combining cyto and histology
FNB provides more material than FNA: tissue and stroma
Better material to enable cell isolation

Diagnosis of malignancy

More accurate diagnosis

Targeted treatment (Theranostic biomarkers
MGMT, HA, MSI, Rb)

Courtesy Ivan Borbath and Jerome Cros
Conventional cytology (smear, cytospin)

Monolayer Cytology (thinprep)

Histo-bloc « microhistology »

Courtesy Ivan Borbath and Jerome Cros
Advantages of FNB

<table>
<thead>
<tr>
<th>Tumoral Proteins</th>
<th>Cytology</th>
<th>Poor FNA/FNB</th>
<th>Rich FNA</th>
</tr>
</thead>
<tbody>
<tr>
<td>OK</td>
<td>OK</td>
<td>OK</td>
<td></td>
</tr>
<tr>
<td>+/- OK</td>
<td>+/- OK</td>
<td>OK</td>
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<tr>
<td>+/- OK</td>
<td>+/- OK</td>
<td>OK</td>
<td>Risk of contamination</td>
</tr>
<tr>
<td>+/- OK</td>
<td>+/- OK</td>
<td>OK</td>
<td>Risk of contamination</td>
</tr>
<tr>
<td>NO</td>
<td>NO</td>
<td>OK</td>
<td></td>
</tr>
</tbody>
</table>

Cros J., Napoléon B. Hepato-Gastro 2017

Courtesy Ivan Borbath and Jerome Cros
Sample / Culture 

Organoid culture (D14) 

Routine Diagnosis 

Panel NGS 

RNA Signatures 

Tumour Subtypes 

Sensitivity profiling 

BRCAness Profile search 

«Chemogram » 

RNA sensitivity signatures 

Courtesy Ivan Borbath and Jerome Cros
hENT1 as a predictive marker of gemcitabine response

Maréchal R. et al, Gastroenterology 2012

Courtesy Ivan Borbath
Genomic analyses identify molecular subtypes of pancreatic cancer
Precision medicine for advanced PDAC: the IMPaCT Trial
Individualized Molecular Pancreatic Cancer Therapy

Registration
Males or females with confirmed *de novo* metastatic or recurrent adenocarcinoma of the pancreas

Prescreening/Screening
Enroll in Australian Pancreatic Genome Initiative for sequence analysis

Eligibility
Males or females enrolled in APGI with confirmed adenocarcinoma of the pancreas
Molecular analysis confirms eligible target in one of three subgroups
No prior chemotherapy or 1 cycle only of gemcitabine for metastatic disease

1:1 Randomization
Stratified by mutation subgroup

Standard treatment
- Gemcitabine

Personalized treatment
- HER2-positive subgroup
gemcitabine + trastuzumab
- DNA damage repair defects subgroup
5-fluorouracil + mitomycin C
- KRAS wild-type subgroup
gemcitabine + erlotinib

Progression
per RECIST 1.1 criteria

Courtesy Ivan Borbath
MSI

Le et al, Science 2017

Pictures Dr Pamela Baldin, Courtesy Prof Ivan Borbath
Diagnosis
EUS pancreatic cancer
FNB
**EUS biliary cancer**
ERCP and Cholangioscopy

Treatment
Stents
RFA
Biliary tract cancer: ESMO guidelines

- Distinguish the subtype (iCCA, pCCA, dCCA or GBC) with its own specific characteristics, requiring individual workup (IDH-1, FGFR,...)
- Best diagnostic tool is MRI + MRCP and diffusion weighted imaging
- 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)
- For malignancy diagnosis
  - ESMO advises ERCP + biopsies as first tool + drainage
  - EUS to be considered if ERCP-guided brush cytology or biopsies are negative or inconclusive
EUS and biliary cancer

- EUS-FNA sensitivity 66%-80%, specificity 97-100%
- Compared with ERCP-guided sampling, the diagnostic yield of EUS-FNA higher with a pancreatic mass (sensitivity 100% vs. 38 %) and similar with a biliary mass (79% sensitivity for both) or an indeterminate biliary stricture (sensitivity 80% vs. 67%)
- EUS-guided sampling of LNs and other extrahepatic sites remains a very important tool for the staging of perihilar cholangiocarcinoma

Weilert F, et al. EUS-FNA is superior to ERCP based tissue sampling in suspected malignant biliary obstruction GIE 2014; 80: 97 – 104
EUS and biliary cancer

3.2 Biliary strictures including cholangiocarcinoma

RECOMMENDATION
ESGE suggests EUS-guided sampling for the diagnosis of indeterminate biliary strictures, either as an alternative to or in combination with endoluminal biliary sampling. Weak recommendation, moderate quality evidence.

- EUS-guided biliary sampling appears to be safe, with a pooled rate of adverse events of 1% in the most recent meta-analyses.

- The main concern is potential tumor seeding that has led some authors to discourage EUS-guided sampling of a hilar mass, if liver transplantation is considered (but not sampling of distal lesions as the puncture tract is resected during surgery).

**Diagnosis**

EUS pancreatic cancer
FNB
EUS biliary cancer
**ERCP and cholangioscopy**

**Treatment**

Drainage
RFA
**ERCP sampling**

- **Salvage Cytology**
  - Bile juice cytology: 38% sensitivity

- **Brush Cytology**
  - Sensitivity: approximately 50% (range 20-75%)
  - Higher for cholangiocarcinoma compared to pancreatic cancer and metastatic disease

- **Endoluminal Biopsy**
  - Successful biopsy rate of 57 - 95%
  - Sensitivity varied from 43 - 88% with a 100% specificity
  - Risk of seeding << percutaneous
  - Safety: 1 case of bile duct perforation described


SpyGlass™ Direct Visualisation System

SpyScope™ 10Fr Access & Delivery Catheter

SpyGlass™ Fiber Optic Probe

SpyBite™ Biopsy Forceps

Monitor
Camera
Light Source
Pump
Cart
3-joint Arm
Isolation Transformer
Irrigation Pump
Cholangioscopy

The efficacy of peroral cholangioscopy for difficult bile duct stones and indeterminate strictures: a systematic review and meta-analysis

- 49 studies were included.
- The accuracy of POC was 89% for making a visual diagnosis and 79% for making a histological diagnosis.
- Overall adverse event rate was 7% (95% CI 6%–9%)

Korrapati Praneet et al. Peroral cholangioscopy for difficult bile duct stones and indeterminate strictures. EIO 2016
Cholangioscopy: ESGE technology review

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Sensitivity</th>
<th>Specificity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brushing cytology</td>
<td>45%</td>
<td>99%</td>
</tr>
<tr>
<td>Intraductal biopsy</td>
<td>48%</td>
<td>99%</td>
</tr>
<tr>
<td>Brushing + Biopsy</td>
<td>59%</td>
<td>100%</td>
</tr>
<tr>
<td>p-CLE</td>
<td>83%</td>
<td>67-77%</td>
</tr>
<tr>
<td>pCLE + CPE</td>
<td>89%</td>
<td>67-77%</td>
</tr>
<tr>
<td>Cholangioscopy (direct visualization+biopsy)</td>
<td>84-96%</td>
<td>86-100%</td>
</tr>
</tbody>
</table>

RESULTS

78 patients

Cholangioscopy 71

<table>
<thead>
<tr>
<th>Indication</th>
<th>N  (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indeterminate strictures</td>
<td>35 (49.3%)</td>
</tr>
<tr>
<td>Difficult stones</td>
<td>24 (33.8%)</td>
</tr>
<tr>
<td>Indeterminate filling defects</td>
<td>7 (9.8%)</td>
</tr>
<tr>
<td>Selective cannulation of the right intrahepatic duct</td>
<td>1 (1.4%)</td>
</tr>
<tr>
<td>Suspicion of papillomatosis</td>
<td>1 (1.4%)</td>
</tr>
<tr>
<td>Extension of papillomatosis before surgery</td>
<td>2 (2.8%)</td>
</tr>
<tr>
<td>Intrahepatic migrated stent</td>
<td>1 (1.4%)</td>
</tr>
<tr>
<td>Dilated intrahepatic ducts with no obvious cause</td>
<td>1 (1.4%)</td>
</tr>
</tbody>
</table>

Pancreatoscoppy 7

<table>
<thead>
<tr>
<th>Indication</th>
<th>N  (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suspicion of IPMN</td>
<td>5 (71.4%)</td>
</tr>
<tr>
<td>Migrated intraductal stent</td>
<td>2 (28.6%)</td>
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</table>
## RESULTS

<table>
<thead>
<tr>
<th>Spy Diagnosis</th>
<th>N 35</th>
<th>Histopath confirmation</th>
</tr>
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<tbody>
<tr>
<td>Malignant stricture</td>
<td>13</td>
<td>10</td>
</tr>
<tr>
<td>Benign stricture</td>
<td>20</td>
<td>19</td>
</tr>
<tr>
<td>Malignant nodular lesion</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Malignant IPMN</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Technical failure (tight stenosis)</td>
<td>2</td>
<td></td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Spybite biopsy</th>
<th>43</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conclusive histological result</td>
<td>42 (97.67%)</td>
</tr>
</tbody>
</table>
Cost Benefit

In the model for stricture diagnosis, the use of IDC determined a decrease in the number of procedures (-31% relative reduction) and costs (-€13 000; -5% relative variation) when compared with ERCP.

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Diagnosis
EUS pancreatic cancer
FNB
EUS biliary cancer
ERCP and cholangioscopy

Treatment
Drainage
RFA
Palliative drainage ESGE guidelines 2018

3.1.2. Palliative biliary drainage

3.1.2.1 Route for primary biliary drainage

**RECOMMENDATION**

ESGE recommends that decompression of malignant extrahepatic biliary obstruction be performed via endoscopic retrograde cholangiopancreatography (ERCP) rather than by surgery or percutaneously. Strong recommendation, moderate quality evidence.

ESGE recommends restricting the use of EUS-guided biliary drainage to cases where biliary drainage using standard ERCP techniques has failed. Strong recommendation, low quality evidence.

- **ERCP vs. PTBD**
  - Reported in the analysis of a national database (9135 pts) and in two RCTs
  - Both hilar / extrahepatic malignant biliary obstruction
    - Lower adverse event rate (8.6% vs. 12.3%)
    - Shorter hospitalization
    - Lower total costs
Palliative drainage ESGE guidelines 2018

3.1.2.2 Type of stent

RECOMMENDATION
ESGE recommends SEMS insertion for palliative drainage of malignant extrahepatic biliary obstruction.
Strong recommendation, high quality evidence.

- Compared with plastic stents, SEMSs are associated with a longer patient survival, a lower risk of stent dysfunction/cholangitis, and fewer reinterventions.
- Covered and uncovered similar results
  - Covered SEMSs were associated with a lower risk of tumor ingrowth but a higher risk of stent migration.

Meta-analysis (13 studies, 59437 ERCPs) showed that ERCP success is more frequent

- By high volume vs. low volume endoscopists (OR 1.6)
- In high volume vs. low volume hospitals (OR 2.0)

AE less frequent when ERCP is performed by high volume endoscopists

Palliative drainage ESGE guidelines 2018

6.1.3. Palliative drainage of malignant hilar strictures

**RECOMMENDATION**
ESGE suggests palliative drainage of malignant hilar strictures by means of ERCP for Bismuth types I and II, and PTBD or a combination of PTBD and ERCP for Bismuth types III and IV, to be modulated according to local expertise.
Weak recommendation, low quality evidence.

**RECOMMENDATION**
ESGE recommends uncovered SEMSs for palliative drainage of malignant hilar obstruction.
Strong recommendation, moderate quality evidence.

**RECOMMENDATION**
ESGE suggests, for palliative endoscopic drainage of Bismuth types II–IV strictures, drainage of ≥50% of the liver volume and avoidance of the opacification of biliary ducts that will not be drained.
Weak recommendation, low quality evidence.

Role for EUS BD (HGS, left lobe) in combination with ERCP (right liver)

EUS-BD vs PTBD

- A meta-analysis that compared PTBD vs. EUS-BD (3 RCTs and 3 retros studies; 312 pts)
- Similar clinical success
- Fewer AE (and severe) in the EUS-BD group
- Reintervention rates and costs also lower

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).

EUS-BD/PD: ACCESS ROUTES

- Transluminal techniques
  - CDS: Choledocoduodenostomy
  - HGS: Hepaticogastrostomy

- Transpapillary techniques
  - « Rendez-vous »
  - Retrograde stent placement
  - Anterograde
    - Transpapillary or transanastomotic anterograde stent placement

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

ERCP failure

Accessible Papilla
- Proximal Obstruction
  - RV HGS (Antegrade)
- Distal Obstruction
  - (RV) CDS (HGS)

Inaccessible Papilla
- Proximal Obstruction
  - HGS (Antegrade)
- Distal Obstruction + Duod obstruction
  - HGS (CDS) (Antegrade) (Combi)
- Distal Obstruction Anatomy variant
  - HGS (Antegrade) (Combi)

+ internalization PTBD, benign conditions with repeat treatments

**Diagnosis**

- EUS pancreatic cancer
- FNB
- EUS biliary cancer
- ERCP and cholangioscopy

**Treatment**

- Drainage
- RFA
EUS guided RFA: Equipment

Habib EUS RFA probe
*Emcison, UK*

EUS RA, Starmed

Hybrid Therm, ERBE
Endoscopic treatment

RFA in pancreatic cancer
- EUS-guided RFA is a feasible and safe minimally invasive procedure for patients with unresectable PDAC.
- Further studies are warranted to demonstrate the impact of EUS-guided RFA on disease progression and overall survival

RFA in biliary tract cancer
- Meta-analysis (9 studies, 505 pts) stenting w/ w/out RFA
  - significantly longer stent patency (50 vs 37 ds, P < 0.002)
  - and survival (285 vs 248 days, P < 0.001)
- Still uncertain role of RFA in patients with occluded SEMS

Song et al. Initial experience of EUS-guided RFA of unresectable pancreatic cancer. GIE 2016; 83:440-8
### World Experience. EUS RFA of pancreatic tumor, N=42

(Panc Ca. 28, PNET 7, Mucinous cyst 4, IPMN 2, Micro-cystic adenoma 1)

<table>
<thead>
<tr>
<th>Reference</th>
<th>N</th>
<th>Indication</th>
<th>Mean size, mm (range)</th>
<th>RF device</th>
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<tbody>
<tr>
<td>Arcidiacono et al. (2012)</td>
<td>22</td>
<td>Locally advanced PC</td>
<td>36 (23–54)</td>
<td>CTP(cryotherm probe)</td>
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<tr>
<td>Rossi et al. (2014)</td>
<td>1</td>
<td>PNET</td>
<td>9</td>
<td>Habib EUS RFA</td>
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<tr>
<td>Weigt et al. (2014)</td>
<td>1</td>
<td>IPMN (recurrent Bleeding)</td>
<td>10</td>
<td>HabibTM EndoHPB</td>
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<tr>
<td>Armellini et al. (2015)</td>
<td>1</td>
<td>PNET</td>
<td>20</td>
<td>18 G needle electrode (STARmed)</td>
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<tr>
<td>Pai et al. (2015)</td>
<td>8</td>
<td>Pancreatic cysts</td>
<td>41 (24–70)</td>
<td>Habib EUS RFA</td>
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<tr>
<td>Lakhtakia et al. (2016)</td>
<td>3</td>
<td>Insulinoma</td>
<td>19 (14–22)</td>
<td>19 G needle electrode (STARmed)</td>
</tr>
<tr>
<td>Song et al. (2016)</td>
<td>6</td>
<td>Locally advanced PC (4), metastatic PC (2)</td>
<td>38 (30–90)</td>
<td>18 G needle electrode (STARmed)</td>
</tr>
</tbody>
</table>
RFA

Induced immunomodulation

Local triggered immunostimulation via NF-kb pathway

Systemic immunostimulation
CD4+ CD8+ cells activation
immunosuppressive T reg cells stable
10 patients with locally advanced pancreatic cancer

Difference with surgery: immunostimulation / No immunosuppression

Nakagawa H Cancer Immunol Immunother 2014;63:347-56; Giardino A Pancreatology 2017;17:962-6

Courtesy of Prof Marc Barthet
### Biliary RFA

#### Endoscopic radiofrequency biliary ablation treatment: A comprehensive review

Alberto Larghi,1 Mihai Rimbaș,3 Andrea Tringali,2 Ivo Boškoski,1 Gianenrico Rizzatti1 and Guido Costamagna2,4

<table>
<thead>
<tr>
<th>Author (yr)</th>
<th>No. of patients</th>
<th>Study design</th>
<th>Diagnosis</th>
<th>RFA administration</th>
<th>Outcome measurements</th>
<th>Adverse events</th>
<th>Results/Survival</th>
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</thead>
<tbody>
<tr>
<td>Schmidt (2016)1,21</td>
<td>34</td>
<td>RS</td>
<td>Klatskin 26, CCA 6, Others 2</td>
<td>RFA (14 pts) vs PDT (20 pts) followed by PS or SEMS</td>
<td>Safety and effectiveness</td>
<td>Cholangitis 2, Liver abscess 2</td>
<td>Significantly lower stent replacement rate in the RFA group</td>
</tr>
<tr>
<td>Laleman (2017)1,8,22</td>
<td>18</td>
<td>Pros</td>
<td>Klatskin 9, Distal CCA 2, PDAC 7</td>
<td>RFA followed by PS or SEMS</td>
<td>Feasibility, safety, and stent patency</td>
<td>Cholangitis 4, Pancreatitis 2</td>
<td>RFA successful in all patients</td>
</tr>
<tr>
<td>Yang (2018)1,23</td>
<td>65</td>
<td>RCT</td>
<td>Klatskin Type I, II 19, CCA 46</td>
<td>RFA + PS (32) vs PS alone (33)</td>
<td>Stent patency, AE, overall survival</td>
<td>Cholangitis 2</td>
<td>Similar AE stent patency (RFA 6.8 mos vs stent alone 3.4 months, ( P = 0.02 )) Overall mean survival (RFA 13.2 vs 8.3 months stent alone, ( P &lt; 0.001 ))</td>
</tr>
</tbody>
</table>
Take home messages

- EUS plays a major role in advanced HPB cancers
  - Diagnosis + FNB
  - Targeted therapies
  - Drainage when ERCP fails (better than PTBD)

- ESGE guidelines for biliary drainage

- Improved tools for ERCP diagnosis
  - Cholangioscopy with targeted sampling

- Role for RFA promising but still to determine
ORGANIZING STAFF
The teaching staff includes academic, non-academic and international experts. The organizing team is represented by:
- Pierre Henri Deprez (UCLouvain), Academic adviser
- Abdenor Badouai (UCLouvain), Scientific and educational adviser
- Wim Lallemant (KULeuven)
- Pierre Esmenrau (ULB)
- Perrette Bost (ULg)
- Pieter Hyndricks (UZ Gent)
- Board members of the Belgian Group for Digestive Endosonography (BGDE)
- French and Belgian experts from Club Francophone d’Echo-endoscopie (CFE)

PRACTICAL INFORMATION
LOCATION AND SCHEDULE
The course is organized from February 2020 to June 2020 and will consist of more than 30 hours of training. Lectures will be given at UCLouvain university hospitals : CHU UCL Namur in Godinne and Cliniques universitaires Saint-Luc in Brussels.

REGISTRATION FEES
Registration costs are 1,800 euros.
These fees include tuition, course materials, practical exercises, student card, catering, and access to the site and facilities.

CONDITIONS FOR ADMISSION
- Medical Doctor in gastroenterology
- Trainee in gastroenterology

THE UNIVERSITY CERTIFICATE
Participants attending the programme and passing the evaluation will be awarded a "University Certificate in Digestive endosonography" and 12 ECTS credits. On top of the personal development value of the certificate for the attendees' training plan, these credits can be used to pursue other academic programmes in Europe, pending the approval by the committee in charge of the programme for which the participant wishes to apply at a later date.

REGISTRATION
Applicants must fill in the online registration form, which can be found on the website of the certificate. They are requested to describe their:
- Educational background
- Experience
- Motivations for taking the certificate
- Motivation letter
Applications will be reviewed by the programme jury in their order of submission.

FIND OUT MORE
- www.digestive-endosonography.be
- +32 (0)2 764 34 58
- digestive-endosonography@uclouvain.be

UCLouvain
Faculté de médecine
et de médecine dentaire