Endoscopic ultrasound-guided fine-needle aspiration of the pancreas

Shyam Prasad
Summary

- What is EUS
- Utility of EUS FNA in pancreas
- Technical considerations
- Clinical considerations
  - Local figures
What is EUS?

Combination of
- Endoscopy

and
- Ultrasound
Anatomical sites

- Mediastinal (+/- EBUS)
- Oesophago-gastric
- Ano-rectal
- Hepatico-biliary
- Pancreatic
EUS

**Radial**
- Cross-sectional
- Cannot visualise instruments
- Only diagnostic

**Linear Array**
- Planar
- Instruments in field
- Allow **biopsy**
- Therapeutic
Pancreatic uses

Diagnostic
- Ultrasonography
- FNA
- Trucut

Therapeutic
- Transgastric drainage of pseudocysts
- Coeliac plexus blocks
- Transgastric biliary drainage
Role of EUS FNA in pancreas

Reasons for developing role:
- Technical
- Clinical
Technical considerations
Anatomy
Anatomy
EUS-guided vs CT-guided

**EUS**
- Smaller lesions
- Minimal risk of seeding
- Risks of bleeding, pancreatitis, perforation
- Sedation / invasive
- Less available

**CT**
- Larger sample?
- Risk of seeding track
- Risk of bleeding, pancreatitis, perforation
- Less invasive
- Widely available
EUS FNA – method

- Sedation or GA
- Localise lesion in field
- Puncture with 19, 22, 25 Fr needle
- Suction if necessary
- Process sample
- Assess sample
- Repeat 3-6 times
Processing of sample

Cytology

- In room cytotechnician; trained and experienced pancreatic cytologist
- Rapid air-dried & wet-prep smears
- Stain with Diff-Quik for immediate assessment of cellularity & adequacy
- Needle wash & clot for IHC
- Sample for Flow Cytometry if indicated

Biochemistry

- Cystic lesions: CEA, amylase, mucin; assess viscosity
Cases so far

- 55 cases undergone pancreatic FNA
- Sedation in 52, GA in 3
- Duration 30-90 mins
- Prophylactic antibiotics in cystic
- One complication – pancreatitis
  - Systematic review: 1-2% risk, mostly pancreatitis\(^1\)

\(^1\)Wang et al, Gastrointest Endosc. 2011 Feb;73(2):283-9
Clinical considerations
Solid Lesions
Background – pancreatic cancer

- 4th commonest cause of cancer death
- 95% exocrine origin, 5% endocrine
- 85% are ductal adenocarcinomas
- Mostly presents late and irresectable
- 15-20% resectable, of these <20% 5yr survival
Advanced / inoperable disease
Aim: confirm pathological diagnosis

Advanced disease

- Biopsy
  - CT/US-guided
  - EUS-guided
  - Chemotherapy?
- No biopsy

Chemotherapy?
Example: irresectable mass
Advanced disease – local figures

- Inoperable mass
  - Adenocarcinoma
    - Considered for chemo / trial
Potentially operable disease

- Clearly malignant and operable
  - Surgery
- Malignant but borderline operable
  - Follow-up imaging
    - Risk of tumour advancement
- Diagnosis unclear
  - CT-guided biopsy
    - Difficult & risk of tumour seeding
Potentially operable disease

- Clearly malignant and operable: Surgery
- Malignant but borderline operable: EUS + FNA
- Diagnosis unclear: Further staging, Confirm diagnosis
Example: operable mass
Potentially operable disease – local figures
Performance in solid lesions

Using surgical pathology or clinical behaviour as gold standard:

- Sensitivity 97%
- Specificity 100%
- PPV 100%
- NPV 50%
- Accuracy 97%
Cystic Lesions
Cystic lesions

Non-neoplastic
- Pseudocysts

Cystic Neoplasms
- Others
Pancreatic cystic neoplasms

**Non-mucinous**

- Serous cystic neoplasms
  - Benign
  - (Serous cyst-adenocarcinoma)

**Mucinous**

- Mucinous cystic neoplasms

- Intraductal papillary mucinous neoplasms

- Benign (LGD)
- Borderline (Mod dyspl)
- Non-invasive carcinoma (HGD)
- Invasive carcinoma
Aims of EUS +/- FNA in cystic lesions

- Detect malignancy
  - EUS: Invasion, lymphadenopathy
  - FNA: Malignant cytology
- Detect risk factors for malignancy
  - EUS: Size, growth, solid component, mural nodules, appearances of IPMN
  - FNA: Dysplastic cells
- Detect mucinous (pre-malignant)
  - EUS: Poor discriminator
  - FNA: CEA, CA19-9, mucin
Cystic lesions – local figures

Cystic 22

Mucinous tumour (Mucin and / or high CEA) 9
- Adenocarcinoma on cytology
- Vascular invasion at EUS 1
- Declined or not offered surgery 4
- Close observation 4

Non-mucinous or non-neoplastic (Normal cells, no mucin, low CEA) 13
- Discharged 2
- Surgery: Pseudocyst 1
- Observation 10
Example: cystic lesion

CEA < 1ng/ml
No mucin
Amylase < 10
↓
Discharged
Conclusion

EUS FNA of the pancreas is:

- Feasible
- Safe
- Sensitive
- Useful
- Confirm diagnosis
- Upstage; reduce unnecessary surgery
- Demonstrate mucinous (pre-malignant) aetiology