Chapter 25
Biopsy & Cytology
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1. Describe the techniques for biopsy including indications, contraindications, potential complications, patient care and patient education.
2. Discuss the methods used in gastroenterology for collection of specimens for cell collection for cytology.
• Biopsy and Cytology allow direct sampling of GI tissue for diagnostic purposes.

• BIOPSY—excision of pieces of living tissue with subsequent histopathological analysis
  ◦ Can be done with biopsy forceps, suction method (small bowel or rectal suction bx) or a needle passed percutaneously (percutaneous liver bx or pancreatic FNA)
Basic Principles

• CYTOLOGY—specimens for cell culture or cytological analysis can be obtained:
  ◦ Using brushes
  ◦ Using Washings and/or Aspirations
Endoscopic biopsy is indicated when there is a suspicion of abnormal mucosal tissue, to assess tissue response to therapy, or for confirmation of normal tissue in any portion of the GI tract.

- Biopsy is contraindicated with Severe Coagulopathy or active bleeding.
- Be cautious with recent ingestion of anticoagulants, NSAIDs, or ASA.
A.S.G.E. has guidelines for care of patients on anticoagulation who are to have endoscopic procedures. Guidelines are based on the relative risks of the procedure and the underlying condition necessitating the procedure.

- Decision must be individualized for each patient
Endoscopic Biopsy

- Wide variety of biopsy forceps
  - Simple cupped forceps
  - Elongated
  - Fenestrated
  - Central spike
  - Jumbo
  - Hot biopsy forceps use electrocoagulation for patients at increased risk of bleeding
Endoscopic Biopsy

- FROZEN SECTION – a tissue biopsy sent to lab IMMEDIATELY for microscopic examination by a pathologist for immediate denial or confirmation of malignancy.
- NO FIXATIVE of any kind!
- Specimen placed on special mounting material, labeled and immediately taken to the laboratory
**INDICATIONS:**
- Radiologically demonstrated stricture
- Suspected carcinoma
- Evidence of Barrett’s esophagus in patients with esophageal reflux
- To verify esophagitis
- Chronic or acute esophagitis
- Chronic esophageal reflux
- Esophageal ulcer
- Herpes simplex (HSV)
**METHODS:**
- Biopsy forceps
- Cytology brushes
- Fine-needle aspiration
- Endoscopic mucosal resection

**POINTS TO NOTE:**
- Structured lesions suspicious of malignancy may need dilated
- Biopsy clearly abnormal tissue, but not necrotic tissue
ENDOSCOPIC MUCOSAL RESECTION

- Alternative to surgical resection.
- Established technique for **curative** treatment of mucosal cancers in the esophagus, stomach and colon.
- Also for local management of Barrett’s High Grade Dyplasia.
**TECHNIQUES for EMR:**

1. Simple Suction Method (stiff snare)
2. Strip-off biopsy or Polypectomy technique (injection diluted epi)
3. Lift-and-cut technique (needs dual channel scope)
4. Suck-and-ligate technique (banding kit)
5. Endoscopic mucosal resection cap (EMRC)—read the book description

All techniques have risks of bleeding, stricture or perforation.
**INDICATIONS:** (for Diagnosis of)
- gastric mucosal abnormalities assoc. with active and chronic gastritis
- gastric polyps
- carcinoma
- gastric ulcers
- Helicobacter pylori (H. pylori) infections
All polyps of the stomach should be biopsied. Technique varies depending on size, type and risk of removal. Adenomatous polyps, large hyperplastic polyps and any polyp with a stalk should be removed using a snare technique. Visualization is not sufficient.

Most neoplasms of the stomach are adenocarcinomas.
Gastric Ulcers:
Biopsies of the ulcer edges are necessary to be certain whether or not the lesion is malignant. 6-10 bx specimens should be obtained in a circumferential pattern from the ulcer margin. Exfoliative brush cytology may also be performed.

H. PYLORI – obtain specimen from the dependent portion of the antrum, along the greater curvature. Variety of test methods.
**Post procedure:**
Observe patient for s/sx of complications such as: bleeding and perforation, abdominal pain, tenderness, distention, nausea, vomiting, chills, hypotension or temperature elevation.
**INDICATIONS: (for differential dx)**

- Malabsorption
- Other entities responsible for diarrhea or weight loss
- Celiac sprue
- Intestinal lymphangiectasia
- Agammaglobulinemia
- Whipple’s disease
- Giardia
Endoscopic small bowel biopsy

Requirements for SBB to be of maximum diagnostic value:

- Precise localization of the biopsy site
- Proper orientation and prompt fixation of biopsy specimens
- Careful study of serial sections of the central half or two thirds of each biopsy specimen
- Obtaining the specimen from the region of the duodenal-jejunal junction, in the area of the ligament of Treitz.
Specimens can be larger, easier to orient and less traumatizing. For best specimens, avoid the more proximal duodenum for better histological interpretation.
See page 334.
INDICATIONS:

- Suspected collagenous or microscopic colitis
- Suspected neoplastic lesions of the rectum and colon
- Suspected Crohn’s disease
- Suspected Ulcerative Colitis
- Diagnosis of suspected neural lipidoses and pts with unexplained signs of a degenerative nervous system disorder.
- Schistosomiasis (parasite)
- Amebiasis
- Assessment of progress in pts undergoing therapy
Suction bx more consistently penetrates into the submucosa.

2 disorders: Hirschsprung’s disease and systemic amyloidosis

Diagnosis is obtained by use of a rigid sigmoidoscope and large cup bx forcep, or by rectal suction biopsy.

See page 335.
Insert cotton swab into rectum and rotate completely then remove and place in culture media.
The main pathogens that are isolated are: bacterial or parasitic enterocolitis, gonorrhea infection, and vancomycin-resistant Enterococcus.
Fine-needle Aspiration of the Pancreas

May be US, MRI or CT guided or by EUS. 80-90% diagnostic accuracy rate. Indicated for pts with large pancreatic masses. Cytological exam of bx specimens can provide tissue diagnosis and differentiation of lymphoma or endocrine tumors. Especially valuable in elderly and to aid in treatment decisions.
**FNA Complications:** (infrequent but include)

- Pancreatitis
- Abdominal pain
- Bleeding
- One report of seeding of malignant cells along the needle tract.

*Accuracy depends greatly on the skill of the operator and experience of the cytologist*
After endoscopy and EUS, the needle is passed into the targeted lesion. The stylet is removed and suction is applies with a 10ml syringe. With suction maintained, the needle is moved back and forth within the lesion. Suction is released while the needle is removed to reduce risk of aspirating surrounding tissue. Then the entire needle assembly to removed and the cell material is smeared on a glass slide for diagnosis.

**Endoscopic Ultrasound-Guided Fine Needle Aspiration**
- Also indicated for staging of lymph node involvement of GI, pancreatic and pulmonary cancers.
- Complications are similar to those of any endoscopic procedure.
**INDICATIONS:**

- Acute and chronic cholestatic jaundice
- Acute viral hepatitis
- Alcoholic hepatitis
- Documentation of cirrhosis and provision of information about the etiological agent.
- Alpha-antitrypsin deficiency
- Unexplained hepatomegaly or liver abnormalities
- Space-occupying lesions or infiltrative neoplastic disease
More Indications:

- Assessment of a pt’s response to therapy
- Lipid or glycogen storage diseases
- Drug-related liver disease
- Wilson’s disease
- Hemochromatosis
- Screening of relatives of pt’s with familial liver dx.
- Staging of malignant lymphoma
Contraindications:

- Significant coagulopathy
- Severe anemia
- Extrahepatic obstructive jaundice with palpable enlargement of the GB
- Inadequate movement of the right diaphragm secondary to right pleural effusion, right lower lung pneumonia, or fibrosis
- Moderate to large amounts of ascites
- Severe uremia, unless BT is normal
- Excessive obesity
More Contraindications:

- Local skin infections involving the planned biopsy site
- Peritonitis
- Suspected hemangioma or hepatoma
- Suspected hepatic vein thrombosis
- Amyloidosis
NPO for at least 6 hours.
Preliminary lab work, BRP.
IV access. Pre-meds optional.
Lie supine near right edge of the bed with pillow under right side. Right arm is placed under their head and the head turned to the left.

Post-procedure—lying on right side for 1-2 hours. At home BR for 8-12 hours.
Post-procedure notify the physician immediately for:
- Increase in pulse along with a decrease in systolic BP
- Prolonged pain radiating to back, abdomen and shoulder
- Abdominal distention or obvious bleeding from the insertion site
- Increase in pt’s temp
- Change in pt’s respiratory rate or effort
**INDICATIONS:**

- Suspected malignancy
- Suspected candidiasis
- Examination of duodenal aspirate for Giardia, secretory immunoglobulins, bile acid patterns, pancreatic amylase and trypsin levels
- Pancreatic and bile ductal lesions

**Brush Cytology** - slides in fixative

Brush in sterile saline

**Obtaining specimens by Washing** – 20-30 ml of non bacteriostatic saline

Cell Culture and Cytology
1. Endoscopic biopsy is contraindicated in patients with:
   a. Carcinoma
   b. Severe Coagulopathy
   c. Inflammatory Bowel Disease
   d. GI polyps
2. The most likely complication of endoscopic biopsy is:
   a. Excessive bleeding
   b. Infection
   c. Tumor Seeding
   d. Nausea and vomiting
3. Suspect esophageal tissue is most often sampled using what technique?
   a. Endoscopic mucosal resection
   b. Needle Aspiration
   c. Endoscopic biopsy
   d. Polypectomy
4. Specimens for the upper portion of the small bowel biopsy are usually taken from what general area?

a. The duodenum  
b. The jejenum  
c. The ileum  
d. The ligament of Treitz
5. During EUS/FNA, aspiration of tissue is accomplished using suction applied with?

a. A 5-ml syringe
b. A 10-ml syringe
c. A 20-ml syringe
d. A 60-ml syringe
6. The length of time a patient should remain on his or her right side following a liver biopsy is?
   a. 6-8 hours
   b. 1-2 hours
   c. 4-6 hours
   d. 8-10 hours
7. If disposable cytology brushes are sent intact to the laboratory, they should be moistened with?
   a. Non-bacteriostatic saline  
   b. Glutaraldehyde  
   c. Isopentane  
   d. Cellular fixative