What Should Pathologists’ Assistants Know About Gastrointestinal Histopathology?
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References

- Mills SE. Histology for Pathologists. 2012
- College of American Pathologists: Cancer Protocols and Checklists
- Odze RD & Goldblum JR: Surgical Pathology of the GI Tract, Liver, Biliary Tract, and Pancreas. 2009 → 2014 (out in September)

GI Biopsies

- Esophagus: upper, mid, lower
- Stomach: cardia, fundus, body, antrum, pyloric channel
- Duodenum: bulb, 2nd portion, 3rd portion
- Ileum: at time of colonoscopy
- Colon: cecum, ascending, transverse, descending, sigmoid, rectum
- Anus: anal canal, peri-anal region

ISSUES
- Specimen Sequencing
- Accessioning as one case (simultaneous upper-and-lower)
- Discontinuous case accession numbers
Biopsy fragments

- Routine "pinch" biopsies: 4-8 mm in length: mucosa, muscularis mucosa
- "Jumbo" biopsy forceps: 8-9 mm in length: no deeper than routine forceps
- Forceps without a "spike": retrieval from endoscope with each biopsy
- Forceps with a "spike": multiple biopsies before retrieval

Indications for Biopsy

- Esophagus: driven by symptomatology (pain, reflux, difficulty swallowing)
- Stomach: driven by symptomatology (pain, acid reflux, early satiety)
- Duodenum: diarrhea, pain, weight loss, jaundice
- Jejunum: evaluation of diarrhea, pain, history of inflammatory bowel disease
- Colon: diarrhea, pain, blood per rectum (occult or overt), obstruction
- Anus: pain, bleeding, mass

SURVEILLANCE FOR PRE-MALIGNANT CONDITIONS

- Esophagus: Barrett’s esophagus
- Stomach: history of inflammatory or dysplastic adenomatous polyps
- Duodenum: history of dysplastic/adenomatous polyps
- Colon: routine screening colonoscopy; history of IBD (esp. dysplasia) *including: history of Familial Adenomatous Polyposis (FAP)
"Hot" biopsies: Largely discontinued owing to cautery artefact

Biopsy of normal mucosa: to provide information about the "background" mucosa, when there is a mass lesion
  - Example: is there IBD as "background" to a colonic polyp?

Perforation following biopsy:
  - Rare (humans): < one in 50,000 procedures
  - If so, usually after snare polypectomy in a viscus with a free serosal surface (e.g., cecum)
  - (in dogs): with colonic insufflation within 1 week after deep bx

Hemorrhage following biopsy:
  - Rare with pinch biopsies
  - After snare polypectomies: reported 0.4% risk
  - Electrocautery is required to ensure hemostasis
  - Increased risk of hemorrhage:
    - Pedunculated polyps >1.7 cm dia, or stalk >0.5 cm dia
    - Sessile polyps (with artificially created "stalk")
  - Malignant lesions

Small: routine or "jumbo" biopsy forceps

Pedunculated: "snare" polypectomy ("hot" or "cold")

Sessile:
  - suction followed by snare polypectomy, OR
  - piecemeal with jumbo forceps

In case you were wondering..
“Big” Specimens

- ANATOMY:
  - Transitions between anatomic segments
    - Mucosa
    - Serosa – Adventitia
    - Muscularis Propria
      - Especially: tiniae coli
  - Transitions between “normal” and “abnormal”
- MARGINS (always)
  - Don’t rub the mucosa (if you can avoid it): denudes the epithelium

“Big” Specimens

- DEPTH OF SECTIONS
  - “Fixed Specimen” = tissue layers are fixed one-to-another
    - Mucosa / M.mucosa / Submucosa / M.propria / Serosa-Adventitia
- ORIENTATION OF SECTIONS
  - Margins: ? Perpendicular vs. En face?
    - Argument for Perpendicular: precise distance from tumor
    - Argument for En face: samples entire margin
  - Tumors: Along long axis of specimen; must include deep margin
    - Ulcers: Along long axis of specimen
- HOW LARGE A BLOCK?
  - 1.0 – 2.0 mm thick
  - Not the entire tissue cassette

NORMAL

- Mucosa
- Mucosa-Associated Lymphoid Tissue (MALT)
- Muscularis Mucosae
- Submucosa
- Muscularis Propria
- Subserosal tissue / Adventitia (fat, vasculature, LN)
- Serosa / Soft tissue margins
- Mesenteric root
- Lymph Nodes
ABNORMAL: Non-Neoplastic

- Inflammation
  - “Active” (= acute)
  - Chronic
- Mucosal damage
  - Inflammation with retention of mucosal architecture
  - Chronic architectural changes (e.g., IBD)
  - Erosion vs. Ulceration
  - Non-neoplastic polyps (e.g., “inflammatory”)
- Submucosa
  - Fibrosis, inflammation, ulceration
- Muscularis Propria
  - Attenuation vs. thickening
  - Inflammation, necrosis
  - Neural changes

ABNORMAL: Neoplastic

- Dysplasia
  - Called “dysplasia” in: Barrett’s Esophagus, IBD
  - Called “adenomatous…” in most other conditions
- Intramucosal Carcinoma (controversial term)
- Adenocarcinoma
  - Without saying “invasive” if you don’t know anatomy
  - Can say “invasive” if anatomy is clear
    - i.e., “invasive” (into submucosa…)
- Intravascular invasion
- Lymphatic invasion
- Perineural invasion
- Lymph node metastasis

PA Scope of Practice

- Under the direction and supervision of a pathologist
- Accurate and timely processing of specimens
- PAs are key in helping make a pathologic diagnosis
  - It is the sole province of the pathologist to render a diagnosis
- Responsible for gross examination and dissection
- Responsible for performance of post-mortem examination
- Prepare tissue for: FS, Flow Cytometry, ImmunoHx
- Photograph gross and microscopic specimens
- Help prepare educational conferences
- Provide training to pathology personnel, including residents
- PAs may fill administrative, instructional & supervisory roles
  - Including working as liaison to other departments and administration

AAPA website; Article III, Section B of AAPA Bylaws
PA Contribution to GI Path Diagnosis

- Accurate entry of all specimens into diagnostic workflow
- Accurate assembly of pertinent information
- Verification of specimen integrity and labeling
- Experienced review of all pertinent gross findings
- Accurate enumeration and measurement of specimens
- Creation of accurate gross record
- Photography as appropriate
- Identification of key anatomic findings
  - Accurate sampling of key anatomic landmarks / features
  - Competent “Cutting in” of sections for histology
- Good judgement for when to consult Pathologist

Teamwork!