Histopathology of Endoscopic Resection Specimens from Barrett's Esophagus
Norman Rupert Barrett
(1903-1979)

Br J Surg 38 oct. 1950
Definition of Barrett's esophagus

- A change in the esophageal epithelium of any length that can be recognized at endoscopy and is confirmed to have columnar epithelium / intestinal metaplasia by biopsy.

Endoscopy

- Gastroesophageal junction:
  - Western world: Proximal border of gastric folds.
  - Japan: Pallisading longitudinal vessels.
Pathology

• Squamo-columnar junction:
  – USA: specialized intestinal metaplasia.
  – UK/Japan: all columnar metaplasia.
  – Europe: specialized intestinal metaplasia.
Gross anatomy of a BE resection specimen

Squamocolumnar junction

Z-Line

Columnar-Lined Esophagus

Squamous mucosa

Barrett's
Define Barrett's in Biopsy

Definition:
A change in the esophageal epithelium of any length recognized at endoscopy and confirmed to have columnar epithelium / IM by biopsy.

Challenge for pathologist:
- Define origin of the biopsy.
- Identify intestinal metaplasia.
Biopsy distal esophagus: Barrett?
Biopsy distal esophagus: Barrett?

- Gastric type mucosa.
- Intestinal metaplasia?
- Differential includes hiatus hernia.
Biopsy distal esophagus: Barrett?
Multilayered Epithelium with Pseudogoblet
Intestinal Metaplasia vs Pseudogoblet cells
Definition of Barrett's: Mucin Histochemistry
Definition of Barrett's: CDX2 Expression
Diagnostic of Barrett's: Esophageal Duct
Diagnostic of Barrett's: Squamous Patches
Distal Esophagus: Barrett's? Dysplasia?
Revised Vienna Classification of Gastrointestinal Epithelial Neoplasia

1. Negative for dysplasia
2. Indefinite for dysplasia
3. Low grade dysplasia
4. Mucosal high-grade neoplasia (HGD)
   - High grade adenoma / dysplasia
   - Non invasive carcinoma (CIS)
   - Intramucosal carcinoma
5. Submucosal invasion by carcinoma

Schlemper RJ et al. J Gastroenterol 2001;36:445-456
Based on the Revised Vienna Classification

- No dysplasia
- Indefinite for dysplasia
- Low grade dysplasia
- High grade dysplasia
- Intramucosal carcinoma
- Invasive adenocarcinoma
Biopsy Report

- Intestinal metaplasia.
- When dysplasia is present, grade.
- HGD / EAC does not automatically implicate esophagectomy anymore.
- Local resection (mucosectomy) as staging modality.
Multiband Mucosectomy (MBM)  
*ligate-and-cut*
ER-Cap Technique

*lift-suck-and-cut*
Endoscopist should loosely pin down specimen on paraffin block or cork to prevent from curling up (creates artefact).

Deliver up-side-down (specimen down) in formalin and fixate overnight.
Usually non-marked specimen, photograph, ink,
Slices, each 2 to 3 mm
2 to 3 slices per cassette
2 to 3 sections per slice
Conclusion ER Specimen

- Dysplasia / carcinoma / type
- Differentiation grade
- Depth of invasion
- Submucosal invasion
- Vaso-invasion
- Vertical margin (mm) / radicality
- Lateral margin (not in piecemeal resection)
- Intestinal metaplasia
Risk Factors

Essential in sign out, relative risk factors for esophagectomy:

1. Invasion in submucosa.
2. Poor differentiation grade (solid tumor, signet cell carcinoma).
Risk Factor:
Submucosal Mucosal vs Submucosal Disease

- M1 high grade dysplasia.
- M2 intramucosal carcinoma confined to lamina propria.
- M3 intramucosal carcinoma invasion in musc. mucosa.

- SM-1: - 500mm of the submucosa.
- SM-2: 500mm-1000mm.
- SM-3: > 1000mm.
Risk Factor: Submucosal
Invasion in Muscularis Mucosae?
p53 IHC

Esophageal duct

Tumor

Tumor

Esophageal duct
Extensive Esophageal Gland Involvement
Submucosal Invasion?
Risk Factor: Poor Differentiation
Risk Factor: Vaso-invasive Growth
Vaso-invasive Growth
Vaso-invasive Growth
Vaso-invasive Growth
Extension in Esophageal Duct

CD31 IHC
Patient 29 years old
Surgical Resection Specimen
microscopic tumor focus
2 of 16 Lymph Nodes Show Metastasis
Summary ER

- Prevent non-interpretable slide.
- Train endoscopist for pinning down.
- Gross: train resident (staff).
- Parallel slices at regular interval (2-3 mm).
- Not too many slices per block.
- Train lab technician in cutting slides.
• Analyze for risk factors:
  – radicality
  – poor differentiation
  – submucosal invasion
  – vaso-invasive growth

• Lateral margin not important in piecemeal resection.
Summary ER

- Use full stains: desmin and p53.
- Don’t overestimate depth of invasion at the edge of specimen (desmin stain).
- Don’t overestimate non-radical excision needle artefact.
Questions?