Early Experience With Optical Coherence Tomography (OCT), A Novel 3D Imaging Modality in Pathology

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Objectives

• Brief explanation of OCT and its significance

• Discuss early “practical” OCT imaging experience
SIGNIFICANCE OF OCT
Glass Microscopy (Slow)

Turn-around Time = 8-16 hours

1-2 DAYS
Specimen OCT (Quick)

Turn-around Time
Hours?

Direct Diagnosis from Tissue
in vivo OCT (Quickest)

Turn-around Time
Minutes?

in vivo diagnosis
OCT might bypass glass histology

Beforehand (OR; etc.)
Grossing & Frozen Desk
Histology
Diagnosis

3D digital microscopy

in vivo diagnosis
WHAT IS OCT?
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- Interferometry of reflected light
- Sees “inside” tissue
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OCT EXPERIENCES
Complete Cross Sections of Almost-Always Benign Tissue

Sentinel lymph node
Invasive Lobular Carcinoma (Breast)
Metastatic Breast Carcinoma (axillary lymph node)
Metastatic Breast Carcinoma
(axillary lymph node)
Mucinous Cystic Neoplasm (ovary)
Mucinous Cystic Neoplasm (ovary)
Endometrioid Adenocarcinoma (uterus)
Endometrioid Adenocarcinoma (uterus)
Uterine Papillary Serous Carcinoma
Uterine Papillary Serous Carcinoma (3D)
Where’s the 3D?

- Data Size Limits
- Time Limits

Surface Area

Number of z-stack slices
Vulvar Paget’s Disease (video)
(en face, superficial to deep)
Vulvar Paget’s Disease
Coverslip

(Uncompressed tissue)
Practical Experience

- Sample preparation

- Scan parameters
  - Depth (0 vs 50 vs 100 microns into tissue)
  - Area vs Z-stack slices

- Image Manipulation and documentation
Example – Endometrial Section

• Wide-area scan
  – 10 – 20 minutes

• Depth
  – Varies but 25-50 microns depth (slice)

• Viewing
  – Invert display, use auto “windows”
Summary

• Learning about imaging parameters
  – What are we trying to see?
• Learning about sample preparation
• Image viewing and manipulation

• Understanding the image
  – Traditional Pathologist diagnostic skills
  – Seeing better/more with experience
  – Lumens/Glands/Tubes are easiest to see for now