Handling and Grossing of Large Breast Specimens

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Introduction

- Multidisciplinary team approach
  - Pathologist
  - Pathologist assistant/resident/fellow
  - Surgeon
  - Radiologist
  - Oncologist
Type of Surgical Procedure

- Partial mastectomy specimen
  - Lumpectomy
    - With/without wire-guided localization
  - Quadrantectomy
  - Shave margins

- Mastectomy
  - Simple
  - Modified radical

- Axillary nodes
  - Sentinel lymph node(s)
  - Complete axillary dissection
Preoperative Diagnosis

- **Benign lesion**
  - Lumpectomy for fibroadenoma
  - Prophylactic mastectomy

- **Atypical lesion**
  - ADH
  - ALH/LCIS
  - FEA
  - Papillary lesions
  - Radial Scar

- **Malignant lesion**
  - DCIS
  - PLCIS
  - Invasive Cancer
  - Phyllodes Tumor

All treated in a similar manner
Appropriate Handling of Large Breast Specimens

- Time of removal from patient recorded on specimen requisition.
- Specimen + requisition form transported fresh to the pathology dept.
- Opened, orientated, inked and sliced at 5mm intervals
- Placed in adequate volume of neutral buffered formalin for a minimum of 6 hours
- Time placed in formalin recorded on the requisition form
Patient ID: 12SH 5604

Clinical Information:
- Diagnosis and Surgical Findings:
  - Axillary Left Breast
  - Seen Breast Cancer, R/o Recurrence, previous Radiation

Specimen Orientation:
- Specimens:
  1. Left breast tissue, short superior wing lateral, medical margin clip on final margin (left breast)
  2. 
  3. 
  4. 
  5. 
  6. 
  7.

Cold Ischemic Time:
- Cold Ischemic Time: 0915
- Time Tissue Removed: 120622
- Lab Use: 0947
- Tissue Removed: 2014-11-12 0915

(Additional markings and notes are present on the form, including a barcode and various form fields.)
Specimen Orientation

- Right breast lumpectomy
- Received fresh
- Suture identification (long lateral and short superior) and specimen orientation
Specimen Painting

Margins identified and painted:
- Anterior yellow
- Superior blue
- Posterior black
- Inferior red
Specimen Slicing

- Specimen A serially sectioned
- Lesion identified
- Margin proximity evident
Formalin Fixation

- Specimen prepared for formalin fixation
Grossing of Large Breast Specimens

- Specimen requisition form
- Previous biopsy report
- Relevant radiology
- Relevant clinical information
- Specimen diagram
Lumpectomy Specimen with wire-guided localization

- Usually the result of screening mammography
  - Non palpable mass or area of architectural distortion
    - Preoperative core biopsy diagnosis of
      - Invasive carcinoma
      - Radial scar
      - Papillary lesion
  - Suspicious Calcification
    - Preoperative core biopsy diagnosis
      - DCIS
      - Suspicious lesion
        - ADH
        - FEA
        - LN
        - Fails to demonstrate microcalcifications despite ancillary studies (levels etc) and additional biopsy attempts
Lumpectomy Specimen with wire-guided localization

Case 1
- 65 year old female with **suspicious micro-calciﬁcations** detected in the right UOQ on screening mammography.
- Needle core biopsy diagnosis “atypical ductal hyperplasia cannot exclude low-grade DCIS”.
- Recommendation “complete excision of the area of suspicious micro-calciﬁcation”.
Lumpectomy Specimen with wire-guided localization

- Specimen radiograph following excision from patient to ensure area of interest has been removed.
Lumpectomy Specimen with wire-guided localization

- Margins identified and painted:
  - Anterior yellow
  - Superior blue
  - Posterior black
  - Inferior red
- ‘Hypodermic needle site marked in red’
Lumpectomy Specimen with wire-guided localization

- Specimen serially sectioned
- No gross lesion identified
Specimen sections are laid out in order from medial to lateral with the specimen slices clearly identified.
Lumpectomy Specimen with wire-guided localization
Lumpectomy Specimen with wire-guided localization
Lumpectomy Specimen with wire-guided localization

- Two potential approaches
  - Serial sequential sampling
  - Non-sequential sampling
Lumpectomy Specimen with wire-guided localization

Serial Sequential Sampling

Department of Anatomical Pathology
Surgical Pathology - Gross Description/Dissection Schematic Diagram -Rev
Lumpectomy Specimen with wire-guided localization

Serial Sequential Sampling

Department of Anatomical Pathology
Surgical Pathology - Gross Description/Dissection Schematic Diagram -Rev
Lumpectomy Specimen with wire-guided localization

Non-Sequential Sampling

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Surgical Pathology - Gross Description/Dissection Schematic Diagram -Rev
Shave Excisions

- Accompany a primary lumpectomy specimen
- Represent a ‘re-excision’ for a close or positive resection margin
Shave Excisions

- Suture indicating ‘external’ margin
- Measure the specimen in 3 dimensions
- Paint the external margin
- Serially section and embed
Mastectomy Specimen

- Patient choice
- Large tumor
- Multifocal tumor
- Recurrence or new primary in a patient previously treated with breast conserving therapy (BCT)
- Neoadjuvant therapy
- Prophylactic
Mastectomy Specimen

- Patient choice
- Large tumor
- Multifocal tumor
- Recurrence or new primary in a patient previously treated with breast conserving therapy (BCT)
- Neoadjuvant therapy
- Prophylactic
Neoadjuvant Therapy (NAT)

- Administration of systemic therapy (chemotherapy or anti-hormonal therapy) prior to definitive surgical resection
  - Inflammatory breast cancer
  - Inoperable locally advanced disease
  - Render breast conserving surgery possible
  - Primary management of ‘aggressive’ subtypes of disease
Grossing of Mastectomy Specimen post NAT

- Specimen requisition
- Patient identification
  - Specimen identification
  - Number, type etc.
  - Type and location of lesion(s)
  - Time removed from patient
  - Time placed in formalin
  - Other
- Previous biopsy report
- Relevant radiology
- Relevant clinical information
<table>
<thead>
<tr>
<th>Specimen Requisition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Patient ID</strong></td>
</tr>
<tr>
<td><strong>Clinical Information</strong></td>
</tr>
<tr>
<td><strong>Specimen Orientation</strong></td>
</tr>
<tr>
<td><strong>Cold Ischemic Time</strong></td>
</tr>
</tbody>
</table>

**HAMILTON HEALTH SCIENCES**

**DEPARTMENT OF LABORATORIES**

**SURGICAL PATHOLOGY REQUISITION**

- **Patient ID:**
  - [Redacted]

**Clinical Information**

- **Left Medial Breast**
- **Radical Mastectomy**

**Specimen Orientation**

1. **Left Breast Tissue**
   - (long lateral short superior)
2. **Deep Axillary Tissue Left**

**Cold Ischemic Time**

- **Date:** June 14
- **Time tissue removed:** 0845 9:25
- **Time into formalin:** 10:20
Grossing of Mastectomy Specimen post NAT

- Specimen requisition
- Patient identification
  - Specimen identification
  - Number, type etc.
  - Type and location of lesion(s)
  - Time removed from patient
  - Time placed in formalin
  - Other
- Previous biopsy report
- Relevant radiology
- Relevant clinical information
Grossing of Mastectomy Specimen post NAT

- Modified radical mastectomy post NAT
- Received fresh
- Suture marking axillary tail
Grossing of Mastectomy Specimen post NAT

Posterior Aspect
Painting of Mastectomy Specimen post NAT

- Margins identified and painted:
  - Anterior yellow
  - Superior blue
  - Inferior red
Painting of Mastectomy Specimen post NAT

- Margins identified and painted:
  - Posterior, black
Slicing of Mastectomy Specimen post NAT
Slicing of Mastectomy Specimen post NAT
Dissection of the nipple-areola complex
Mastectomy Specimen post NAT
### Department of Anatomical Pathology
### Surgical Pathology - Gross Description/Dissection Schematic Diagram - Rev

<table>
<thead>
<tr>
<th>Specimen #</th>
<th>Gross:</th>
<th>Patient Surname</th>
<th>Size</th>
<th>Date</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anat. Site</td>
<td>Left breast</td>
<td>Spec. Type</td>
<td>Modified radical mastectomy (post neoadjuvant), left breast</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ink Anterior</td>
<td>Yellow</td>
<td>Ink Posterior</td>
<td>Black</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Viewed from</td>
<td>Posterior</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comments</td>
<td>Oriented with long suture lateral, short suture superior. Superior edge inked blue, inferior edge inked red. Sliced specimen has been radiographed; images and report available in PACS.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

##### Spec. dim. (cm):
- M-L: 22.5
- S-I: 21.0
- A-P: 3.9

<table>
<thead>
<tr>
<th>Spec. Wt.: 998g</th>
<th>Lesion/Tumour dimensions (cm):</th>
<th>Distance from margins (cm):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skin: 17.2 x 9.0</td>
<td>M-L: 2.4</td>
<td>Sup: 4.0</td>
</tr>
<tr>
<td>Areola: 4.0</td>
<td>S-I: 2.0</td>
<td>Inf: 0.5</td>
</tr>
<tr>
<td>Nipple: 1.4 x 0.6</td>
<td>A-P: 2.1</td>
<td>Med: 8.0</td>
</tr>
</tbody>
</table>

**Appearance:** Speculated

![Schematic Diagram](image_url)
Lymph Node Dissection post NAT

- Axillary dissection
  - Identify all nodes and count
  - Identify gross metastases if present and measure and submit one representative section
  - Uninvolved nodes should be sectioned at 2mm along their long axis and all embedded
  - Nodes ~5mm can be bisected and embedded
  - Nodes 2-3mm can be embedded whole
  - No more than one sectioned LN in each cassette
Lymph Node Dissection post NAT

1
2
3
4

2mm
Reporting of Mastectomy Specimens post NAT

- Objective is to identify and quantify the extent of residual disease
- Optimal response is to achieve pCR
  - No invasive carcinoma in the breast or LNs
  - DCIS is permitted
  - 15-28%
  - Prognostic
<table>
<thead>
<tr>
<th>Grade</th>
<th>Miller &amp; Payne</th>
<th>UICC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 1</td>
<td>No change or some alteration to individual malignant cells but no reduction in overall cellularity</td>
<td>No response</td>
</tr>
<tr>
<td>Grade 2</td>
<td>A minor loss of tumor cells, up to 30% loss</td>
<td>Pathological partial response (pPR)</td>
</tr>
<tr>
<td>Grade 3</td>
<td>30-90% reduction in tumor cells</td>
<td></td>
</tr>
<tr>
<td>Grade 4</td>
<td>More than 90% loss of tumor cells</td>
<td></td>
</tr>
<tr>
<td>Grade 5</td>
<td>No malignant cells, only vascular fibroelastotic stroma</td>
<td>Pathological complete response (pCR)</td>
</tr>
<tr>
<td></td>
<td>But, DCIS may be present</td>
<td></td>
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Reporting of post NAT Specimens
Tumour Cellularity
<table>
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<tr>
<th>Grade</th>
<th>Miller &amp; Payne</th>
<th>UICC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>No change or some alteration to individual malignant cells but no reduction in overall cellularity</td>
<td>No response</td>
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<td>2</td>
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<td>5</td>
<td>No malignant cells, only vascular fibroelastotic stroma But, DCIS may be present</td>
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Lymph Node Changes post NAT
Reporting of Mastectomy Specimens post NAT

- ‘y’pT ‘y’pN (AJCC)
- Size of tumor
  - Large single mass
  - Multiple discrete foci (ypT(m))
  - Single dispersed cells over a large area
  - No residual invasive disease (pCR)
- Grading of tumor response
  - A number of systems are available
  - Non are recommended/endorsed by the CAP
  - Prudent to comment on the residual tumor cellularity
- Lymph nodes
  - Number of nodes identified
  - Number involved by macro and micrometastases
  - Therapy effect
- Hormone receptor and HER2
  - Should be repeated
Proper handling and grossing is the foundation of a good pathology report

Multidisciplinary effort

Specimen diagrams are highly recommended