Critical issues in the gross examination of the pancreas

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Clinically important features in your pathology report about pancreatic adenocarcinoma

- Status of surgical margins
  - What should be sampled
- Status of lymph nodes
  - Where to look and how many must be found
- Site of origin
- Special situations
  - Arising from IPMN or MCN

Positive surgical margin is associated with very poor prognosis

- 30-80% of patients resected for cure have positive margins
- Median survival rate of patients with positive margin is the same or worse than that of patients with unresectable tumors
- Margin status is critical because those with close/positive retroperitoneal margin or bulky tumor (at least pT2) may be offered adjuvant chemoradiotherapy

Ann Surg 2001;234(6):758-68
**Lymph node status**

- One of the most important independent prognostic factors of survival is accurate staging of lymph nodes
- Predictive value of lymph node status is directly proportional to number of lymph nodes (up to 15 LNs) identified
  - Guidelines by the American College of Surgeons will recommend examination of at least 12 lymph nodes for accurate staging of pN0

**Pancreaticoduodenectomy**

- Orient the specimen
- Remove surgical margins
- Dissect the lymph nodes
- Bivalve the pancreas

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![Image of Pancreaticoduodenectomy specimen](http://pathology.jhu.edu/pancreas/whipplePop.html)

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[Arch Surg 2007;142:767-773](#)
[Personal communication](#)
To orient the specimen

- Superior/proximal
  - Stomach, if present
- Inferior/distal
  - Duodenum/jejunum
- Anterior pancreatic surface bulges
- Posterior pancreatic surface is flat

Anterior view
Pancreas bulges

Posterior view - Pancreas is flat

Superior mesenteric vein to portal vein

- Liver
- Portal vein
- Splenic vein
- Head of pancreas
- Duodenum
- Superior mesenteric vein
Common bile duct

Posterior view

Pancreatic pathologists agree these are surgical margins

• Common bile duct
• Pancreatic resection
  – CAP: Distal margin
  – AJCC: Pancreatic neck
• Retroperitoneal/uncinate
  – CAP: Uncinate
  – AJCC: Retroperitoneal
• Stomach and duodenum

How to gross a pancreaticoduodenectomy specimen

• Orient the specimen
• Remove surgical margins
  – Residual tumor
    • R0 no residual tumor
    • R1 microscopic residual tumor
    • R2 macroscopic residual tumor
• Dissect the lymph nodes
• Bivalve the pancreas

Retroperitoneal/uncinate margin

Posterior view
Pancreatic pathologists agree the following are not surgical margins

- Anterior pancreatic surface covered by peritoneum
  - Anterior to the pancreas is the omental bursa/lesser sac
- Indentation of superior mesenteric vessels
  - Also known as vascular bed or vascular groove
  - Tumor involvement at this site is considered unresectable

Pancreatic pathologists do not agree if the posterior surface is a surgical margin

- Peeled off the anterior surface of inferior vena cava
- Some consider this to be part of the retroperitoneal margin
- Palpate, if mass is near the posterior surface, ink and take perpendicular section

How to gross a pancreaticoduodenectomy specimen

- Orient the specimen
- Take surgical margins
- Dissect the lymph nodes
- Bivalve the pancreas

Dissect the lymph nodes

- Where are all these lymph nodes?
- American College of Surgeon will advocate identification of 12 lymph nodes
These are not true lymph node designations, but if you take soft tissue from these sites you will not miss any

- Anterior pancreatoduodenal surface
- Anterior pancreatic surface
- Peri-common bile duct
- Superior aspect of the pancreatic head
- Posterior pancreatoduodenal surface
- Posterior pancreatic surface
- Retroperitoneal/uncinate margin
- Inferior aspect of the pancreatic

High yield areas for lymph nodes

- 66% of the lymph nodes were located
  - Retroperitoneal/uncinate margin
    - Range 0-15
  - Peri-common bile duct
    - Range 0-3
  - Anterior pancreatoduodenal
    - Range 0-6

Most likely site for positive lymph nodes

- **Retroperitoneal/uncinate margin** (26% of cases)
- **Posterior pancreatoduodenal** (26% of cases)
- **Posterior pancreatic** (18% of cases)
- **Anterior pancreatic** (18% of cases)
- Superior pancreatic (15% of cases)
- Inferior pancreatic (15% of cases)
- Anterior pancreatoduodenal (11% of cases)
- Peri-common bile duct (11% of cases)

How to gross a pancreaticoduodenectomy specimen

- Orient the specimen
- Take surgical margins
- Dissect the lymph nodes
- Bivalve the pancreas
Bivalved pancreas

Ampullary adenocarcinoma

Section demonstrates relationship of tumor to ampulla and ducts

Pancreatic adenocarcinoma
Clinically important features in your pathology report about pancreatic adenocarcinoma

- Status of surgical margins
  - Specifically take the retroperitoneal/uncinate margin
- Status of lymph nodes
  - Submit all peripancreatic soft tissue for lymph nodes
- Site of origin
  - If possible, bivalve the pancreas to examine the relationship of tumor to ampulla, pancreatic duct, and common bile duct

Special situations

- Adenocarcinomas arising from cystic neoplasms
  - Intraductal papillary mucinous neoplasm (IPMN)
  - Mucinous cystic neoplasm (MCN)

### Clinical distinguishing features

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<thead>
<tr>
<th></th>
<th>IPMN</th>
<th>MCN</th>
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<tbody>
<tr>
<td>Age (yrs)</td>
<td>50-75</td>
<td>40-50</td>
</tr>
<tr>
<td>Gender</td>
<td>M&gt;F</td>
<td>F</td>
</tr>
<tr>
<td>Location</td>
<td>Head&gt;Tail</td>
<td>Tail &gt;&gt;&gt;&gt;Head</td>
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Mucin extrusion from **ampulla of Vater** is virtually diagnostic of intraductal papillary mucinous neoplasm

**Clue to the diagnosis**

**Anatomic classification**

Two types of IPMN

- **Main duct**
  - Dilation of main duct > 1 cm

- **Branch duct**
  - Cysts communication to main duct without dilation

*Tanaka M et al. Pancreatology 2006;6:17-32*
Dilated pancreatic duct filled with papillary growth

IPMN branch duct type
Common bile duct
Grape like cysts
Pancreatic duct

IPMN branch duct type
Grape like cysts
Pancreatic duct

IPMN multifocal
Pancreatic duct
Grape like cysts
Your pathology report with IPMN should contain the following

- If invasive carcinoma is present
  - X type invasive carcinoma, # cm, arising in association with IPMN (# cm)
- If no invasive carcinoma
  - IPMN (# cm) with highest grade of dysplasia
    - Main or branch duct type (correlate with radiology)
    - Epithelial subtype (intestinal, gastric/null, pancreatobiliary, oncocytic)
Your pathology report with MCN should contain the following

- If invasive carcinoma is present
  - X type invasive carcinoma, # cm, arising in association with MCN (# cm)
- If no invasive carcinoma
  - MCN (# cm) with highest grade of dysplasia

Clinically important features in your pathology report about pancreatic adenocarcinoma

- Status of surgical margins
- Status of lymph nodes
- Site of origin
- Special situations
  - Arising from IPMN or MCN
    - Relationship of pancreatic duct to cystic mass is useful
    - Evaluate solid areas for invasive carcinoma, if necessary submit entire mass