Advances in pancreatic and biliary surgery and post-surgical ICU management

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Outline

• Diagnosis
• Resectability
  • Anatomy
  • Classification
• Operative details
  • Steps
    • Right sided resection (whipple)
    • Left sided resection (distal pancreatectomy/splenectomy)
• Quality open and laparoscopic
• How are we doing
• ICU—risk for complications and timing of need
Differential Diagnosis of Solid Pancreatic Mass

Tissue Diagnosis = EUS

Adenocarcinoma
Neuroendocrine tumor
Metastatic (renal cell)
Lymphoma
Inflammatory mass – autoimmune pancreatitis

Principles of Diagnosis, Imaging and Staging

- Multidisciplinary tumor board at high volume hospital
- High quality pancreas protocol CT (thinnest possible < 3mm, prefer 1mm)
  Within 4 weeks of surgery, prior to stenting; Chest CT for staging
- MRI only as problem solving tool (indeterminate liver lesions), no PET
- Consider genetic testing if positive family history
- EUS-FNA preferred diagnostic tool
- CA 19-9 important (repeat after resolution of biliary obstruction)
- +/- diagnostic laparoscopy

NCCN Guidelines 2017
Anatomy

Criteria for Resection: Pancreatic Head/Uncinate

- **Borderline Resectable:** Arterial
  - Contact with CHA (common hepatic a.)
  - Solid tumor contact with SMA ≤ 180
  - Contact with variant arterial anatomy
  - No extension to celiac axis
  - No extension to hepatic artery bifurcation

Al-Hawary MM et al Radiology 2014
Criteria for Resection: Pancreatic Head/Uncinate

- **Borderline Resectable: Venous**
  - Contact with SMV or PV > 180
  - Contact of ≤ 180 with contour irregularity of vein or thrombosis
  - Suitable vessel for reconstruction

Pancreas Resectability

Resectable
- no contact mesenteric vessels.

Al-Hawary MM et al Radiology 2014
Resectability

2. Borderline
- contact mesenteric vessels, < 180 deg artery
- distortion, clot OK
- reconstructable

Criteria for Resection: Pancreatic Head/Uncinate

Locally Advanced = Unresectable, but non metastatic

- Locally Advanced: Arterial
  Contact with SMA > 180
  Contact with CA (celiac axis) > 180
  Contact with 1st jejunal SMA branch

- Locally Advanced: Venous
  Unreconstructable SMV/PV
  Contact with most proximal draining jejunal branch into SMV
Locally Advanced

**Criteria for Resection: Pancreatic Body/Tail**

- **Borderline Resectable: Arterial**
  
  Contact with celiac axis ≤ 180

- **Borderline Resectable: Venous**
  
  Same as for pancreatic head
Criteria for Resection: Pancreatic Body/Tail

- Locally Advanced: Arterial
  - Contact > 180 with SMA or celiac axis
  - Contact with celiac axis and aortic involvement
- Locally Advanced: Venous
  - Same as pancreatic head

MD Anderson Criteria Borderline Resectable

A: Anatomic (arterial and venous anatomy)
B: Biologic
  - CA 19-9 > 1,000
  - Biopsy proven + regional LN
  - Suspicious non regional LN on imaging
C: Functional
  - Patient co-morbidites
  - Need for physical therapy or nutritional rehab
Surgery after Neoadjuvant Chemotherapy

- If no metastatic disease while on chemotherapy → Surgery
- 30-40% of locally advanced patients will become resectable

Diagnostic laparoscopy
Exploratory laparotomy
Medial visceral rotation
Exposure of SMA

Whipple versus Distal Pancreatectomy
Whipple versus Distal Pancreatectomy

Pancreatectomy

- Mobilize colon down, duodenum right (Kocher)
- Remove gallbladder, divide common duct, gastroduodenal artery
- Divide stomach, jejunum
Pancreaticoduodenectomy Technique

- Divide pancreas
- Divide uncinate
- Remove specimen

Portal Vein Reconstruction
Reconstruction

- 3 Anastomoses total
  - PJ, HJ, GJ/DJ

Reconstruction

- Surgeon preference
- Classic Whipple
  - Antecolic
- Whipple with Roux-en-Y
  - Less bile reflux
  - Make shorter limb (15-30 cm)
Reconstruction

A: Classic Whipple

B: Pylorus Preserving Whipple

Distal Pancreatectomy with Splenectomy

*May need to remove adrenal gland

*RAMPS = Radical Antegrade Modular Pancreatosplenectomy
Hospital Volume and Surgical Outcomes

Significantly improved outcomes at high-volume centers
Leapfrog Group reported hospital volume standards for select high-risk operations
Pancreaticoduodenectomy (PD) ≥ 11 / year


Hospital Volume in Pancreas Surgery

More than operation
Patient rescue
Multidisciplinary care
Oncologic outcomes

Hollenbeck et al. J Clin Oncol 2007

Number of lives saved for every 100 procedures regionalized
90-day Mortality Trend by Hospital Volume

Mortality (%)

 Very Low volume:<5  Low Volume: 5-10
High Volume:11-19  Very high volume:>=20

p < 0.0001

Jutric et al. In review. 2017

Hospital Volume

Slow trend toward centralization over past 15 years

In 2012, 85% of hospitals are low-volume

41% of cases done at low-volume hospitals

Strongest predictor of mortality is volume
Laparoscopic whipple NCDB

Technique laparoscopic pancreas surgery
RTOG 97-04 Overall Survival

Regine, W. JAMA 2008;299:1019

CONCO (Germany)

Oettle, J. JAMA 2007;297:267
MGH retrospective data more adv disease

CRT = chemotherapy → SBRT
CRT+S = chemotherapy → SBRT → surgery

A. Overall survival by treatment.

B. Survival by resectability status on initial imaging.


Postoperative Complications

Pancreatic Fistula
Peripancreatic abscess
Delayed gastric emptying
Pseudo aneurysm bleed
Biliary stricture
Marginal ulcer
Pancreatic insufficiency
Stratification of complication risk

- ASA, POSSUM, APACHE II
- NSQIP risk calculator
- Fistula Score

### NSQIP Entry

**Procedure:** 45153 - Pancreaticoduodenectomy, proximal subtotal with near-total duodenectomy, cholecystectomy and duodenaljejunostomy (pylorus-sparing, Whipple-type procedure), with pancreatectomy

**Risk Factors:**
- 75-84 years
- Partially dependent functional status
- Mild systemic disease
- Diabetes (Oza, NTH)

#### Outcomes

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<tr>
<th>Outcome</th>
<th>Your Risk</th>
<th>Average Risk</th>
<th>Chance of Outcome</th>
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<tbody>
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<td>Serious Complication</td>
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<td>Any Complication</td>
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<td>Pneumonia</td>
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<td>Cardiac Complication</td>
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<td>Renal Failure</td>
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<td>Return to OR</td>
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<td>Death</td>
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<td>Discharge to Nursing or Rehab Facility</td>
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**Note:** Your Risk has been rounded to one decimal point.

**Predicted Length of Hospital Stay:** 12 days

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*Appropriate Potential Non-operative Treatment Options Are Available and Should Be Discussed*
Thank you

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