Three-decade experience of periampullary cancer resections at a single institution

Epidemiologic trend and survival results
Periampullary adenocarcinomas are biologically distinct neoplasm that arise in the epithelia of the pancreatic duct, distal bile duct, ampulla or duodenum.

Pancreaticoduodenectomy offers chance for cure.
• Similar histological appearance
• Close proximity of tissue of origin

The long term survival following resection varies among the different sites of origin

• Recent report from Johns Hopkins Medical Institute (HBP, 2013)
  – “2,564 resected periampullary adenocarcinomas at a single institution: trends over three decades”
  – Incidence & Prognosis

<table>
<thead>
<tr>
<th>Incidence (%)</th>
<th>Median survival (months)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1  Pancreas (66%)</td>
<td>Duodenum (54 months)</td>
</tr>
<tr>
<td>2  Ampulla (16%)</td>
<td>Ampulla (47 months)</td>
</tr>
<tr>
<td>3  CBD (12%)</td>
<td>CBD (23 months)</td>
</tr>
<tr>
<td>4  Duodenum (6%)</td>
<td>Pancreas (19 months)</td>
</tr>
</tbody>
</table>
Objectives

• To investigate;

  – the **epidemiologic incidence** and trend of resected periampullary cancers in SNUH

  – the **survival outcome** of resected periampullary cancer
Materials & Methods

• A retrospective analysis of all patients undergoing curative intent surgery for periampullary adenocarcinomas from 1984 to 2011

• Based on a single-center database

• Definition
  – All adenocarcinoma variants included
  – IPMN associated invasive cancers excluded
  – Non curative operations were excluded
• Subjects
  – 1,412 patients operated with curative intent
  – Divided into 4 groups of 7-year periods for trend investigation

• Data
  – Location of tumor
  – Demographics
  – Operation
  – Pathologic features
  – Survival

• Analysis using IBM SPSS Statistics v19
  – Comparative analyses
  – Survival analysis
RESULTS
Demographics

• Total number of periampullary cancer cases
  – 1,867 operated cases
  – 1,412 curative intent operations (75.6%)

• Mean age
  – 61.1 ± 0.3 years

• Sex
  – M : F = 864 : 548 (61.2% : 38.8%)

• Operations

<table>
<thead>
<tr>
<th>Operation</th>
<th>Count (Percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whipple’s op</td>
<td>588 (41.6%)</td>
</tr>
<tr>
<td>PPPD</td>
<td>785 (55.6%)</td>
</tr>
<tr>
<td>Total pancreatectomy</td>
<td>25 (1.8%)</td>
</tr>
<tr>
<td>HPD</td>
<td>6 (0.4%)</td>
</tr>
<tr>
<td>PHPSD*</td>
<td>4 (0.3%)</td>
</tr>
<tr>
<td>Ampullectomy</td>
<td>4 (0.3%)</td>
</tr>
</tbody>
</table>

*Pancreas head preserving segmental duodenectomy
Periampullary cancer

- Pancreas: 459 (32.5%)
- CBD: 433 (30.7%)
- AoV: 454 (32.2%)
- Duodenum: 66 (4.7%)
## Periodic incidence

<table>
<thead>
<tr>
<th></th>
<th>84~90</th>
<th>91~97</th>
<th>98~04</th>
<th>05~11</th>
<th>P-value*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pancreas</strong></td>
<td>52</td>
<td>42</td>
<td>126</td>
<td>239</td>
<td>37.6%</td>
</tr>
<tr>
<td></td>
<td>35.4%</td>
<td>17.2%</td>
<td>32.6%</td>
<td>37.6%</td>
<td></td>
</tr>
<tr>
<td><strong>CBD</strong></td>
<td>42</td>
<td>95</td>
<td>117</td>
<td>181</td>
<td>28.5%</td>
</tr>
<tr>
<td></td>
<td>27.2%</td>
<td>38.9%</td>
<td>30.3%</td>
<td>28.5%</td>
<td></td>
</tr>
<tr>
<td><strong>AoV</strong></td>
<td>51</td>
<td>94</td>
<td>114</td>
<td>195</td>
<td>30.7%</td>
</tr>
<tr>
<td></td>
<td>34.7%</td>
<td>38.5%</td>
<td>29.5%</td>
<td>30.7%</td>
<td></td>
</tr>
<tr>
<td><strong>Duodenum</strong></td>
<td>4</td>
<td>13</td>
<td>29</td>
<td>20</td>
<td>3.1%</td>
</tr>
<tr>
<td></td>
<td>2.7%</td>
<td>5.3%</td>
<td>7.5%</td>
<td>3.1%</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>147</td>
<td>244</td>
<td>386</td>
<td>635</td>
<td></td>
</tr>
</tbody>
</table>

*Disregarding 91~97 Cases

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**Notes:**

- Pancreas: The incidence of pancreatic cancer has increased over the years, with a peak in 2005-2011.
- CBD: The incidence of choledochal cysts has also increased, with a peak in 2000-2006.
- AoV: The incidence of abdominal aortic aneurysm has remained relatively stable.
- Duodenum: The incidence of duodenal ulcer has decreased over the years.

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**Graphs:**

- **Left Graph:** Periodic incidence over time for each organ.
- **Right Graph:** Bar chart showing the percentage distribution of cases for each organ over the years.

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**Seoul National University Hospital**
Resectability of surgery candidates

- Overall resectability: 75.6% (1412/1753)
- Resectability
  - Pancreas head cancer: 61.6%
  - Distal CBD cancer: 81.7%
  - Ampullary cancer: 97.0%
  - Duodenum cancer: 53.2%

- Trend of resectability
Overall survival

- Median survival – 37 ± 3 months
- 5 year survival rate – 41.1%
Overall survival by location

<table>
<thead>
<tr>
<th>Location</th>
<th>Median survival (m)</th>
<th>5 YSR (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pancreas</td>
<td>18 ± 1</td>
<td>12.0</td>
</tr>
<tr>
<td>CBD</td>
<td>56 ± 8</td>
<td>48.3</td>
</tr>
<tr>
<td>AoV</td>
<td>108 ± 19</td>
<td>60.3</td>
</tr>
<tr>
<td>Duod</td>
<td>47 ± 21</td>
<td>47.6</td>
</tr>
</tbody>
</table>

$P < 0.05$
Overall survival by period

<table>
<thead>
<tr>
<th>Period</th>
<th>Median survival (m)</th>
<th>5 YSR (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>84~90</td>
<td>34 ± 5</td>
<td>36.1%</td>
</tr>
<tr>
<td>91~97</td>
<td>29 ± 4</td>
<td>37.0%</td>
</tr>
<tr>
<td>98~04</td>
<td>32 ± 4</td>
<td>37.4%</td>
</tr>
<tr>
<td>05~11</td>
<td>52 ± 8</td>
<td>47.0%</td>
</tr>
</tbody>
</table>
Pancreas

Ampulla

Distal CBD

Duodenum

$P < 0.05$

$P < 0.05$

$P < 0.05^*$

*Except for 84~90 & 05~11 ($P=0.11$)
Stage Shifts

- No definite shifting trend to earlier stages

**Pancreas**

![Pancreas Stage Shifts Diagram](image1)

**Distal CBD**

![Distal CBD Stage Shifts Diagram](image2)

**Ampulla**

![Ampulla Stage Shifts Diagram](image3)

**Duodenum**

![Duodenum Stage Shifts Diagram](image4)
Summary & Discussion

• Incidence
  – Pancreas ≈ AoV ≈ CBD ≫ Duodenum

• Increasing trend of periampullary cancer
  – Increasing periampullary cancer patients
    • Better detection modalities
    • Easier access to medical care
  – Better selection of operation candidates
    • Increasing resectability and less palliative operations
Summary & Discussion

• Prognosis
  – AoV ≫ CBD ≈ Duodenum ≫ Pancreas

• Improved survival duration in recent years
  – Due to more early stage patients?
    • No change in stage distribution in general
  – Improved surgical techniques?
    • More or less the same
  – More active adjuvant treatment?

The actual survival results need to be obtained
Further suggestions

- Different incidences from literatures
- Different survival results from literatures
- Improving survival outcomes in recent years
- No shift in common stages

Are these just a institutional phenomena or a local (even global) one?

Inter-institutional comparison locally or internationally should be interesting