The Effect of Modified Pancreaticojejunostomy for Reducing the Pancreatic Fistula After Pancreaticoduodenectomy

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Introduction

- Pancreatic fistula (PF)
- Unresolved problem
- Distress to surgeons
- No specific technique has been identified that clearly leads to fewer pancreatic leaks
Introduction

- **External drainage**\(^1\) of pancreatic duct with stent has been reduced PF after pancreaticoduodenectomy in many study.

- Recently, **Blumgart an** (transpancreatic U-sutu leakage rates has beer
Purpose

- We compound with described two methods for pancreaticojejunostomy during pancreaticoduodenectomy.
- We investigated the effectiveness of this modified PJ technique to prevent a PF.
Patients

- **2002.3 ~ 2013.3**
- **91** consecutive patients who underwent a pancreaticoduodenectomy

- **Group 1**: 2002.3 – 2011.8 (n=70)
- **Group 2**: 2011.9 – 2013.3 (n=20 / modified PJ)
  (Total 21, exclude 1 patient with PG-stomy in this period)

- Reviewed the medical records retrospectively
- Compared patients characteristics and short term surgical outcome
- SPSS (Ver 15.0 for windows; SPSS Inc)
- Independent sample T-test, pearson $\chi^2$ test, p<0.05
Methods –perioperative management-

- Amount of peripancreatic/ p-duct drain were measured daily
- **Serum and drain amylase** levels were measured on postoperative all days till drain removal
- A computed tomography scan was performed on postoperative day 7
- **PF** was defined according to the International Study Group of Pancreatic Fistula (ISGPF)
- PF were graded according to the clinical impact on the patient’s hospital course (grades A, B, C)
- **Delayed gastric emptying and hemorrhage** was defined according to ISGPS
Modified pancreaticojejunostomy
(External pancreatic drain with Blumgart anastomosis)
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(External pancreatic drain with Blumgart anastomosis)
## Results - pre/intraoperative factors -

<table>
<thead>
<tr>
<th></th>
<th>Group 1 (n=70)</th>
<th>Group 2 (n=20)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>60.2±11.3</td>
<td>63.5±9.7</td>
<td>NS</td>
</tr>
<tr>
<td>Gender (male/female)</td>
<td>50/40</td>
<td>17/3</td>
<td>0.021</td>
</tr>
<tr>
<td>ASA classification (I / II / III)</td>
<td>18/59/13</td>
<td>3/14/3</td>
<td>NS</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>24.1±3.5</td>
<td>24.8±3.2</td>
<td>NS</td>
</tr>
<tr>
<td>Operation type, n</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Whipple / PPPD</td>
<td>2/88</td>
<td>10/10</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Pancreatoco-enterostomy, n</td>
<td>12/78</td>
<td>20/0</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Pathologic diagnosis, n</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PDAC/CBDca/AVOca/duod ca/other ca/benign</td>
<td>25/27/24/0/2/12</td>
<td>2/11/5/1/1</td>
<td>NS</td>
</tr>
</tbody>
</table>

ASA : American Association of Anesthiologist  
BMI : Body mass index  
PPPD : pylorus preserving pancreatricoduodenectomy  
PDAC : pancreatic ductal adenocarcinoma  
CBD : common bile duct  
AOV : ampulla of vater  
NS: not significant
## Results – intra/postoperative factors –

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<th>Group 2 (n=20)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation time (min,mean)</td>
<td>410 ± 105</td>
<td>432 ± 92</td>
<td>NS</td>
</tr>
<tr>
<td>Intraoperative transfusion, n(%)</td>
<td>32 (45.7)</td>
<td>5 (25.0)</td>
<td>NS</td>
</tr>
<tr>
<td>Complication, n(%) (except PF/bleeding)</td>
<td>20 (28.6)</td>
<td>4 (20.0)</td>
<td>NS</td>
</tr>
<tr>
<td><strong>Pancreatic fistula, n (A/B/C)</strong></td>
<td>38 (21/10/7)</td>
<td>2 (2/0/0)</td>
<td><strong>0.016</strong></td>
</tr>
<tr>
<td>Post operative bleeding,n(%)</td>
<td>12 (17.1)</td>
<td>2 (10.0)</td>
<td>NS</td>
</tr>
<tr>
<td>Reoperation,n(%)</td>
<td>6 (8.6)</td>
<td>1 (5.0)</td>
<td>NS</td>
</tr>
<tr>
<td>Reoperation for PF,n(%)</td>
<td>4 (5.8)</td>
<td>0 (0)</td>
<td>NS</td>
</tr>
<tr>
<td>Mortality,n(%)</td>
<td>7 (10.0)</td>
<td>0 (0)</td>
<td>NS</td>
</tr>
<tr>
<td>Hospital day (days)</td>
<td>21.1 ± 11.7</td>
<td>21.5 ± 7.0</td>
<td>NS</td>
</tr>
</tbody>
</table>
Results – Group 2 -

- **2 Patients with grade A pancreatic fistula**
  - POD # 5 day: normalized JP amylase level
  - POD # 14 day: JP drain removal

- Pancreas texture
  - soft / firm / hard 3 / 15 / 2

- Pancreatic duct size
  - mean 2.6 ± 1.5 mm (1.8 – 4.2 mm)

- Other complication
  - **Bleeding 2**: Omentum bleeding – reoperation
  - GJ site intra-luminal bleeding – endoscopic control

- **Delayed gastric emptying 3**
- Wound complication 1
Summary and Conclusion

- External drainage with Blumgart method of pancreaticojejunostomy showed reducing PF after pancreaticoduodenectomy.
- We suggest very cautiously that modified PJ-stomy have possibility of reducing high grade PF after pancreaticoduodenectomy on the basis of our clinical results.
- However, further clinical evaluation is mandatory.