Infected Pancreatic Necrosis

Translumbar Approach and Management With Retroperitoneoscopy

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Hypothesis: The extraperitoneal translumbar approach and retroperitoneoscopy are useful in the treatment and follow-up of patients with infected pancreatic necrosis.

Design: Descriptive study.

Setting: University hospital.

Patients: Fifteen consecutive patients with infected and drained pancreatic necrosis.

Interventions: Extraperitoneal translumbar approach to drain and retroperitoneoscopy as a method to propose evolutive control.

Main Outcome Measures: Morbidity and mortality.

Results: Four (27%) of 15 patients died, and 3 (20%) of 15 patients experienced complications during hospital admission.

Conclusions: The retroperitoneal access to infected pancreatic necrosis has low rates of mortality and morbidity and a low percentage of repeated surgeries, and retroperitoneoscopy facilitates evolutive control of treated infected pancreatic necrosis.

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RELEVANT FACT in the natural history of acute pancreatitis, owing to its poor prognosis, is the development of infected pancreatic necrosis (IPN), which occurs in less than 10% of patients.1 When the data are compatible with a syndrome of systemic inflammatory response and the clinical suggestion of IPN, the diagnosis of necrosis must be confirmed by dynamic computed tomography (CT) with contrast and the infection by fine-needle aspiration and culture of the material obtained.2 Because of the aggressiveness of the process, IPNs require surgical treatment with adequate debridement, antibiotic administration, and intensive support measures. However, there is still controversy over certain aspects of the treatment of these patients, such as antibiotic therapy, appropriate time for drainage, surgical approach, and follow-up of the IPN after drainage.3-10

In this article we present our experience with drainage and debridement of IPNs via the extraperitoneal translumbar approach and follow-up using retroperitoneoscopic techniques.

PATIENTS AND METHODS

During the past 10 years, the Department of General Surgery, “Virgen de la Arrixaca” University Hospital, has admitted 318 patients with acute pancreatitis diagnosed via clinical, analytical, and imaging techniques. Fifteen of these patients (4.7%) evolved to IPN and comprise the study group. The general clinical, analytical, and diagnostic features of each patient are given in Table 1. The mean patient age was 51.4 years (range, 29-69 years), and the male-female ratio was 2:1. Follow-up averaged 8 years (range, 2-14 years).

See Invited Critique at end of article

The cause of IPN was biliary lithiasis in 11 patients, alcohol in 3, and surgical sphincterotomy in 1. All patients had more than 3 Ranson signs of poor prognosis (mean, 5.2 signs) during the first 48 hours of hospital admission, and the APACHE II score was 6 to 28 points (mean, 12.8 points) during the first 24 hours’ intensive care unit stay.

The diagnosis of necrosis was made by dynamic CT with contrast (Figure 1), and infection was confirmed in all patients by fine-needle aspiration. The CT was Balthasar...
stage D in 5 patients and stage E in 10, with a high severity index of 8 points. Surgery was indicated in the first 24 to 48 hours of admission in 4 patients, between 2 and 7 days in another 5, and later (25-92 days) in the remaining 6.

Retroperitoneal drainage was performed under general anesthesia, and a left or right translumbar incision was made (approximately 15 cm long). By pushing aside the posterior parietal peritoneum and the colon toward the midline, we accessed the retroperitoneal space. A manual necrosectomy was performed, and an 18 Charrier tube (Kendall Proclinics, Montmelo, Barcelona, Spain) was fitted for 24-hour continuous lavage with 2L of physiological serum and 20% diluted iodated povidone, together with a 32 Charrier tube for drainage. The translumbar incision was left open but packed in the first 5 patients and was closed in the rest.

In the last 2 patients, the evacuative control and lavage aspiration of the pancreatic area was performed by retroperitoneoscopy from the patient’s own bed, without insufflation, with removal of the drainage tube and insertion through the same orifice of an endoscope (CV-100 GIF-100HL or GIF-PX20 flex-

**Table 1. Clinical Features and Follow-up of 15 Patients With Infected Pancreatic Necrosis**

<table>
<thead>
<tr>
<th>Patient No./Sex/Age, y</th>
<th>Origin</th>
<th>Ranson Signs</th>
<th>APACHE II Score</th>
<th>CT</th>
<th>Germ</th>
<th>Approach</th>
<th>Morbidity</th>
<th>Retroperitoneoscopy</th>
<th>Follow-up (y)</th>
</tr>
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<tbody>
<tr>
<td>1/F/56</td>
<td>L 4/9</td>
<td>E</td>
<td>EC + PA</td>
<td>B(o)</td>
<td>Fistula pancreas</td>
<td>...</td>
<td>Asymptomatic (14)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2/M/58</td>
<td>L 4/9</td>
<td>E</td>
<td>EC + PA</td>
<td>R(o)</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/M/33</td>
<td>A 4/9</td>
<td>D</td>
<td>COLI</td>
<td>L(o)</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4/F/43</td>
<td>L 4/6</td>
<td>E</td>
<td>FFWPS</td>
<td>L(o)</td>
<td>...</td>
<td>...</td>
<td>Asymptomatic (11)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5/M/59</td>
<td>L 4/9</td>
<td>E</td>
<td>EC + COLI</td>
<td>L(o)</td>
<td>...</td>
<td>...</td>
<td>Asymptomatic (10)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6/F/69</td>
<td>L 7/28</td>
<td>E</td>
<td>EC + PA</td>
<td>B</td>
<td>Fistula duodenum</td>
<td>...</td>
<td>MOF death</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7/M/47</td>
<td>L 12/13</td>
<td>E</td>
<td>COLI + PA</td>
<td>L</td>
<td>...</td>
<td>...</td>
<td>Asymptomatic (8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8/F/60</td>
<td>SS 5/13</td>
<td>E</td>
<td>COLI + EC + PA</td>
<td>R</td>
<td>Fistula colon</td>
<td>...</td>
<td>Asymptomatic (8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9/M/66</td>
<td>L 8/19</td>
<td>E</td>
<td>COLI + EC + PA</td>
<td>R</td>
<td>...</td>
<td>...</td>
<td>MOF death</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10/M/54</td>
<td>L 11/8</td>
<td>D</td>
<td>COLI + EC + PA</td>
<td>L</td>
<td>...</td>
<td>...</td>
<td>Asymptomatic (6)</td>
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<tr>
<td>11/M/29</td>
<td>A 7/19</td>
<td>E</td>
<td>COLI</td>
<td>L</td>
<td>...</td>
<td>...</td>
<td>MOF death</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/M/59</td>
<td>L 11/8</td>
<td>E</td>
<td>COLI + EC + PA</td>
<td>L</td>
<td>...</td>
<td>...</td>
<td>Asymptomatic (5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13/M/40</td>
<td>L 3/9</td>
<td>D</td>
<td>EC + PA</td>
<td>L</td>
<td>...</td>
<td>...</td>
<td>Asymptomatic (4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14/M/35</td>
<td>A 6/19</td>
<td>D</td>
<td>FFWPS</td>
<td>L</td>
<td>...</td>
<td>...</td>
<td>Asymptomatic (3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15/F/63</td>
<td>L 4/19</td>
<td>D</td>
<td>COLI</td>
<td>L</td>
<td>...</td>
<td>...</td>
<td>MOF death</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*L indicates lithiasis; A, alcohol; SS, surgical sphincterotomy; CT, computed tomography (Balthasar stage); EC, Enterobacter cloacae; PA, Pseudomonas aeruginosa; COLI, Escherichia coli; FFWPS, polymicrobial flora without predominance of species; B, bilateral; R, right; L, left; o, open; and MOF, multiple organ failure.

†Exocrine pancreatic insufficiency.
tion, there is general agreement for early debridement in the first week,\textsuperscript{1,15} but some physicians believe it should be delayed until the third week so that the necrosis can be distinguished from the healthy tissue.\textsuperscript{20} However, others find no significant differences regarding mortality comparing early surgery (48-72 hours after admission) with late surgery (12 days).\textsuperscript{17}

The transperitoneal approach enables physicians to perform necrosectomy, place tubes for lavage drainage, and access the gallbladder and bile duct if the cause is lithiasis, but it involves major morbidity and mortality and a high rate of repeated surgery for abdominal sepsis.\textsuperscript{1,3,15,16-21} Various possibilities have been suggested: necrosectomy plus lavage, with lower morbidity and mortality rates but more repeated surgeries for sepsis, and necrosectomy associated with periodic debridements, with similar mortality and greater local morbidity rates.\textsuperscript{3} After transperitoneal access and in the presence of clinical signs of sepsis but without collections in the CT scan, recent studies\textsuperscript{11,22} have suggested dilation of the drainage orifice to insert a flexible endoscope for lavage and aspiration of the infected necrosis, which carries morbidity of 25% and no mortality.

The translumbar extraperitoneal access facilitates any necessary debridements without contaminating the peritoneal cavity or hampering the subsequent abdominal approach.\textsuperscript{7,8} The only inconvenience is not being able to work on the gallbladder, although cholecystectomy can be performed in a second intervention, and if the bile duct must be drained because of impaction of stones in the papilla, an endoscopic retrograde cholangiography with papillotomy can be performed. Computed tomography and, especially, periodic postoperative retroperitoneoscopy, as performed in our last 2 patients, facilitate evolutive control of the IPN; the latter can be performed from the patient's bed with sedation and without multiple surgeries, which reduces the number of CT scans and patient transfers to the radiology department and the operating room.

The transperitoneal approaches, whether open or closed, have mortality of 15% to 42%, a high morbidity rate (31%-84%), and a high percentage of repeated surgeries (17%-50%).\textsuperscript{1,3,15,16,21} With purely retroperitoneal access, mortality ranges from 0% to 33%, morbidity is lower (20%-62%), and the number of repeated surgeries per patient averages 0 to 3.6 (Table 2).\textsuperscript{5,9,12}

### RESULTS

The overall mean hospital stay was 84 days (range, 5-204 days), and the mean intensive care unit stay was 34 days (range, 2-150 days). Mortality (multiple organ failure in all cases) reached 27% (4/15). Complications during hospital admission occurred in 20% (3/15) of the patients: 1 pancreatic fistula, 1 of the third duodenal portion, and 1 of the transverse colon, all cured with conservative treatment (retroperitoneoscopy had not been performed in any of these patients). Late complications appeared in another 3 patients (20%): 2 pseudocysts in the body of the pancreas and 1 eversion of the lumbotomy. After the acute phase, 10 open cholecystectomies, 2 pseudocyst bypasses to the stomach, and 1 lumbar enterorrhaphy were performed. The 11 patients (73%) who survived are currently asymptomatic; only 1 has an exocrine insufficiency, treated with pancreatic enzymes and insulin owing to diabetes mellitus.

### COMMENT

The general patient characteristics studied are in line with those of most published IPN series.\textsuperscript{1,11,12} Our incidence of IPN was 4.7%, with morbidity of 40% and mortality of 27%, similar to those reported elsewhere (Table 2).\textsuperscript{5-9,12}

The prophylactic use of antibiotics in uninfected IPNs, which penetrate and maintain good levels in the pancreatic tissue, can reduce the risk of infection and improve prognosis. Imipenem given intravenously in doses of 1.5 g/d for 2 weeks decreases the incidence of infection but does not significantly reduce the mortality rate.\textsuperscript{13} A complementary measure is selective decontamination of the digestive tract, which decreases the morbidity and mortality rates by reducing the colonization of gram negatives and, therefore, pancreatic infection.\textsuperscript{14} We used imipenem in the postoperative period and other antibiotics depending on the results of the cultures, and in 2 cases—with good results—we used selective decontamination of the digestive tract until coprocultures were obtained without gram-negative bacteria.

Surgery is indicated in IPNs if there are clinical criteria of sepsis without response to intensive treatment. The aim is to eliminate the necrotized pancreatic tissue and ascites to prevent toxic vasoactive substances from passing into the blood flow.\textsuperscript{1} As for the time of opera-

### Table 2. Retroperitoneal Approach to Infected Pancreatic Necrosis: Literature Review

<table>
<thead>
<tr>
<th>Source</th>
<th>Mortality, %</th>
<th>Morbidity, %</th>
<th>Repeated Surgeries, Mean/Patient, No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fagniez et al,\textsuperscript{1} 1989 (N = 40)</td>
<td>33</td>
<td>50</td>
<td>3.6</td>
</tr>
<tr>
<td>Villazón et al,\textsuperscript{1} 1991 (N = 18)</td>
<td>22</td>
<td>38</td>
<td>2.6</td>
</tr>
<tr>
<td>Van Vyve et al,\textsuperscript{1} 1992 (N = 15)</td>
<td>20</td>
<td>42</td>
<td>5.0</td>
</tr>
<tr>
<td>Chambón et al,\textsuperscript{1} 1995 (N = 14)</td>
<td>0</td>
<td>42</td>
<td>NA</td>
</tr>
<tr>
<td>Nakasaki et al,\textsuperscript{1} 1999 (N = 8)</td>
<td>25</td>
<td>62</td>
<td>0</td>
</tr>
<tr>
<td>Carter et al,\textsuperscript{1} 2000 (N = 25)\textsuperscript{†}</td>
<td>0</td>
<td>25</td>
<td>0</td>
</tr>
<tr>
<td>Present series, 2001 (N = 15)\textsuperscript{‡}</td>
<td>27</td>
<td>40</td>
<td>0</td>
</tr>
</tbody>
</table>

*NA indicates not available.
†Retroperitoneal approach and management with retroperitoneoscopy in 4 patients.
‡Necrosectomy, lavage, drainage, and periodic debridement (endoscopic management in 2 patients).
astellanos and colleagues report their experience using a translumbar approach to treat infected pancreatic necrosis in 15 patients. The authors conclude that this approach, combined with continuous lavage, is safe, facilitates subsequent debridements, and is generally less morbid than a transperitoneal approach. In the last 2 patients presented, the authors added retroperitoneoscopy using a flexible endoscope to the treatment regimen. This addition purportedly facilitated control of the evolving peripancreatic necrosis.

The need for surgical intervention in patients with infected pancreatic necrosis is universally accepted. However, controversy exists regarding the timing of surgery and the recommended surgical procedure. There are no class 1 data (randomized controlled trials) to quiet the debate. Thus, clinicians, often with religious fervor, promote various surgical procedures in this clinical setting cite a desire to minimize the physiological insult of surgery in patients who are already critically ill. There are no data, including those presented by Castellanos and colleagues, to clearly demonstrate that minimally invasive techniques have been used to either supplement or supplant open surgical approaches. Therewith surgeons have successfully used standard laparoscopic instruments, flexible endoscopes, and rigid nephroscopes in their efforts to avoid the standard open, transabdominal approach to pancreatic necrosectomy. Proponents of using minimally invasive technologies in this clinical setting cite a desire to minimize the physiological insult of surgery in patients who are already critically ill. There are no data, including those presented by Castellanos and colleagues, to clearly demonstrate that minimally invasive approaches are less morbid than open surgery in these patients, let alone that they result in improved outcomes.


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