Arterial Mycotic Aneurysm and Rupture
A Potentially Fatal Complication of Pancreas Transplantation in Diabetes Mellitus
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- Mycotic aneurysm at the site of a Carrel patch arterial anastomosis occurred in four patients who had undergone whole pancreas transplantation 2.5 to 14.5 months previously. In all patients, the graft had been removed, leaving the Carrel patch on the iliac artery. The aneurysms ruptured into the intestine or the extraperitoneal space. The ruptures were sudden and life-threatening in three of four cases. This diagnosis must be suspected in patients with a history of pancreas transplantation in the immediate or distant past if they present with unexplained hypotension, cardiac arrest, or gastrointestinal tract bleeding. (Arch Surg. 1989;124:660-661)

Pancreas transplantation has been performed with increasing frequency in patients with diabetes mellitus, often at the same time as renal transplantation. Mycotic arterial aneurysms developed in four patients at the site of the Carrel patch, which was used to rearterialize the whole pancreas homograft. This life-threatening complication could be confused with cardiac arrhythmias or myocardial infarction, the most common causes of sudden death in advanced diabetes.

PATIENTS AND METHODS

The four complications occurred in 16 patients who received 17 pancreas grafts between 1983 and 1985 in a pilot study of whole pancreas transplantation at the University of Pittsburgh (Pa.) The 4 patients were 24 to 36 years of age and had type I diabetes mellitus and a history of ketosis for 18 years or more. All patients had neuropathy and retinopathy. All but 1 had renal failure, which was treated earlier or at the same time with cadaveric kidney transplantation.

A pancreaticoduodenal graft was used in each case. The donor celiac axis and origin of the superior mesenteric artery were included in a Carrel patch of the donor aorta, which was anastomosed to the side of the recipient common iliac artery. The end of the graft portal vein was anastomosed to the side of the common iliac vein of the recipient. The graft exocrine secretions were directed into the recipient jejunal by anastomosing the duodenum directly into the recipient jejunum (cases 1 and 2) or through a defunctionalized Roux-en-Y limb of jejunum (cases 3 and 4), with techniques that have been described elsewhere. Immunosuppression was achieved with cyclosporine and prednisone, supplemented with azathioprine and monoclonal antibody (OKT3, Orthoclone), as indicated.

Perioperative antibiotics administered at the time of transplantation consisted of cefazolin in patients 1 and 2, cephalaxin in patient 3, and cefotaxime and ampicillin in patient 4.

RESULTS

Clinical Presentation

Failed pancreatic grafts had been removed 6 days to 14 months before the aneurysm ruptures occurred (Table). In patients 1, 2, and 3, the ruptures occurred, fortunately, while the patients were in the hospital. Patient 1 had a peripancreatic abscess drained 1 week before pancreatectomy. No abscess was encountered in patient 2. There was no disruption of the enteric anastomosis. Both patients became pulseless at the same time that they developed swelling in the area of the graft and bleeding through the graft pancreatectomy incision. The incisions were opened at the bedside, and the bleeding was controlled as the patients were rushed to the operating room.

The graft in patient 3 had been removed 2½ months previously because of venous thrombosis, 10 days after the transplantation. The reason for his hospitalization was persistent serous wound drainage. A few hours after admission he had a cardiac arrest after suddenly developing abdominal pain and distention. The diagnosis was obvious, and the patient was resuscitated as he was brought to the operating room.

Patient 4 presented with upper gastrointestinal tract bleeding 1 year after graft pancreatectomy for pancreatitis. Upper and lower gastrointestinal tract endoscopy, technetium bleeding scanning, ultrasound examination, and arteriography of the abdominal aorta and iliac and visceral arteries did not reveal a bleeding source. She was discharged. Two months later, another episode of massive upper and lower gastrointestinal tract bleeding occurred. She was readmitted and collapsed within a few hours. At emergency operation, a rupture was found of the arterial anastomosis site into the tip of the Roux-en-Y loop previously used for enteric drainage.

Bacterial Cultures

The bacteria cultured from the rupture sites are listed in the Table. Results of cultures were negative in patient 4 but were considered to be falsely negative because there was communication with the intestine.

Surgical Treatment

All patients underwent ligation of the proximal and distal common iliac artery. In all but patient 4, crossover femoral-femoral bypass was performed immediately. In patient 4, the extremity seemed well perfused, and the limb was not vascularized. Ten months later, she developed intermittent claudication in the left leg. At the time of this writing, she is scheduled for arterial bypass.

The patients are all alive and well and are currently receiving exogenous insulin. Renal function, if it was present before, was not adversely affected by the complication (Table).

COMMENT

Since the advent of immunosuppression with cyclosporine, 1-year graft survival has improved and is currently reported to be 50% or more. Breakdown of the constructed anastomoses for exocrine drainage has been common and has often been ascribed to the proteolytic activities of the pancreatic juices, or less often to infections.

Both factors could have contributed to the aneurysm formation and rupture in our four patients. The bacteria cultured from the rupture site in three patients were indigenous to the gastrointestinal tract, and in the patient with a negative culture, the rupture was into the intestine. Thus, we classified all of the pseudoaneurysms as mycotic.

Mycotic aneurysm and rupture may be a relatively specific complication of whole pancreas transplantation. Although Carrel patches to the iliac vessels are almost always used for kidney transplantation at the University of Pittsburgh, only one mycotic aneurysm was observed after 1375 cadaveric
Clinical Characteristics of Patients With Arterial Aneurysms After Pancreatic Transplantation*

<table>
<thead>
<tr>
<th>Patient/ Age, y/Sex</th>
<th>Time of Kidney Transplant</th>
<th>Time Between Pancreas Graft Removal</th>
<th>Aneurysm Rupture, Time After Pancreas Graft Removal</th>
<th>Findings</th>
<th>Arterial Site Culture Results</th>
<th>Repair</th>
<th>Current Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/30/M Previous</td>
<td>15 mo (rejection)</td>
<td></td>
<td>5 d</td>
<td>Pseudaneurysm of LCIA</td>
<td>Citrobacter freundii, Bacteroides melaninogenicus, Enterobacter aerogenes, Clostridium subterminale</td>
<td>Femoral-femoral, bypass ligation of LCIA</td>
<td>Alive and well; functional kidney transplant</td>
</tr>
<tr>
<td>2/28/M Previous</td>
<td>2.5 mo (rejection)</td>
<td>1 wk</td>
<td>Pseudaneurysm of LCIA</td>
<td>Bacteroides fragilis, Fusobacteria nuculatum</td>
<td>Femoral-femoral, bypass ligation of LCIA</td>
<td>Alive and well; dialysis</td>
<td></td>
</tr>
<tr>
<td>3/36/M Simultaneous</td>
<td>10 d (venous thrombosis)</td>
<td>2.5 mo</td>
<td>Pseudaneurysm of LCIA</td>
<td>C. freundii, microaerophilic philic strept Vindans</td>
<td>Femoral-femoral, bypass ligation of LCIA</td>
<td>Alive and well; functional kidney transplant</td>
<td></td>
</tr>
<tr>
<td>4/24/F None</td>
<td>3 wk (pancreatitis)</td>
<td>14 mo</td>
<td>Pseudaneurysm of LCIA</td>
<td>Negative</td>
<td>Ligation of LCIA</td>
<td>Alive and well; native renal function</td>
<td></td>
</tr>
</tbody>
</table>

*LCIA indicates left common iliac artery.

References


Editorial Comment

This concise article describes a devastating complication (mycotic aneurysm at the arterial suture line) that has occurred with surprisingly high frequency in patients with pancreatic transplantation at the University of Pittsburgh. There have also been a significant number of identical complications reported by the Iowa City and Stockholm groups. The common denominator in all of these cases has been drainage of the pancreatic secretions into the gastrointestinal tract. There is little general recognition even in the transplant community as to the prevalence of this complication, even though the danger of gastrointestinal tract contamination in the immunosuppressed patients is well known. The authors' recommendation for a high index of suspicion of this complication and for its aggressive treatment by ligation of the iliac artery and extra-anatomic bypass is well taken, as is their suggestion that ligation of the artery should even be considered prophylactically in instances where contamination of the suture line is recognized.

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Arch Surg—Vol 124, June 1989

Printed and Published in the United States of America