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Video-assisted Retroperitoneal Debridement for Graft Pancreatitis

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Simultaneous kidney-pancreas transplant is the preferred treatment for end-stage renal disease in the setting of diabetes in appropriate candidates.[1] Although generally successful, complications of pancreas transplant can be difficult to manage, especially those typified by graft pancreatitis and recurrent graft infection, which often lead to the need for relaparotomy.[2,3] In the nontransplant population with pancreatitis, a step-up approach to pancreatitis has become the favored algorithm for the treatment of complicated pancreatitis with associated fluid collections.[4] Additionally, the use of minimal techniques for pancreatic debridement, especially video-assisted retroperitoneal debridement (VARD) is the optimal method for pancreatic necrosectomy where anatomically and clinically appropriate.[5]

In the present case, the patient underwent a simultaneous kidney-pancreas transplant complicated by recurrent peripancreatic infections and pancreatitis, which ultimately required retroperitoneal access and drainage. Ultimately, the patient recovered but only after the assistance of drainage via a VARD approach.

CASE DESCRIPTION

The patient is a 34-y-old woman with a history of type 1 insulin–dependent diabetes mellitus (on insulin for 20 y) and end-stage renal disease on peritoneal dialysis who underwent combined kidney-pancreas transplantation. Her donor pancreas graft was from a 20-y-old woman with a body mass index of 22 and the cause of death was a drug overdose with an arrest of, at maximum, 40 min on scene with benzodiazepines and marijuana on her toxicology screen. Donor laboratory values at the time of procurement were notable for amylase 20 U/L, lipase 20 U/L, creatinine 0.55 mg/dL, total bilirubin 0.4 mg/dL, aspartate aminotransferase 7 U/L, alanine aminotransferase 13 U/L, alkaline phosphatase 108 U/L, and international normalized ratio 1.3. The recipient was a good candidate with a calculated panel-reactive antibody of 0/0 and a body mass index of 32. The patient was cytomegalovirus and Epstein-Barr virus positive and the graft was cytomegalovirus negative and Epstein-Barr virus positive. Her initial operation was uncomplicated with 8 h 2 min of cold ischemic time and 30 min of warm ischemic time for the pancreas and 10 h of cold ischemic time and 24 min of warm ischemic time for the kidney. Both organs were implanted intraperitoneally, with the kidney on the left and the pancreas on the right. The pancreas was anastomosed to the right common iliac artery and the kidney to the left external iliac artery. The pancreas's duodenal segment was drained enterally. Immunosuppression was managed with antithymocyte globulin induction, tacrolimus, mycophenolate mofetil, and a prednisone taper.

The patient's initial postoperative course was complicated by delayed graft function of the kidney, which was concerning given the high quality of the graft. We therefore performed an exploratory laparotomy on postoperative day (POD) 6 to examine the graft and noted that there were bloody ascites and saponification, but there was no obvious cause of delayed graft function and surgical drains were placed adjacent to the pancreas graft. On POD 14, the patient underwent a second reoperative laparotomy for sanguineous drain output. Bloody drainage was seen around the pancreas, but there was no obvious bleeding. On POD 31, another exploratory laparotomy was performed because of copious wound drainage with evacuation of ~300 mL of gelatinous material. By POD 34, the patient had developed a peripancreatic fluid collection (Figure 1) that was drained percutaneously with a 12-Fr drain and cultures grew both *Candida tropicalis* and *Enterobacter cloacae*. Notably, this fluid collection was not seen on the laparotomy 3 d prior likely because of the dense adhesive disease and inability to visualize the transplanted pancreas. This drain was removed on POD 55 when its output was <10 mL/d. However, the patient re-presented abdominal pain with additional fluid collections that required percutaneous drainage on POD 83, with drains removed approximately 2 wk later.

The patient continued to have persistent peripancreatic fluid collections by imaging as an outpatient despite antibiotics and drain placement, and she was readmitted on POD 103 because of worsening right facial droop (the patient had had an ischemic stroke previously), which was ultimately

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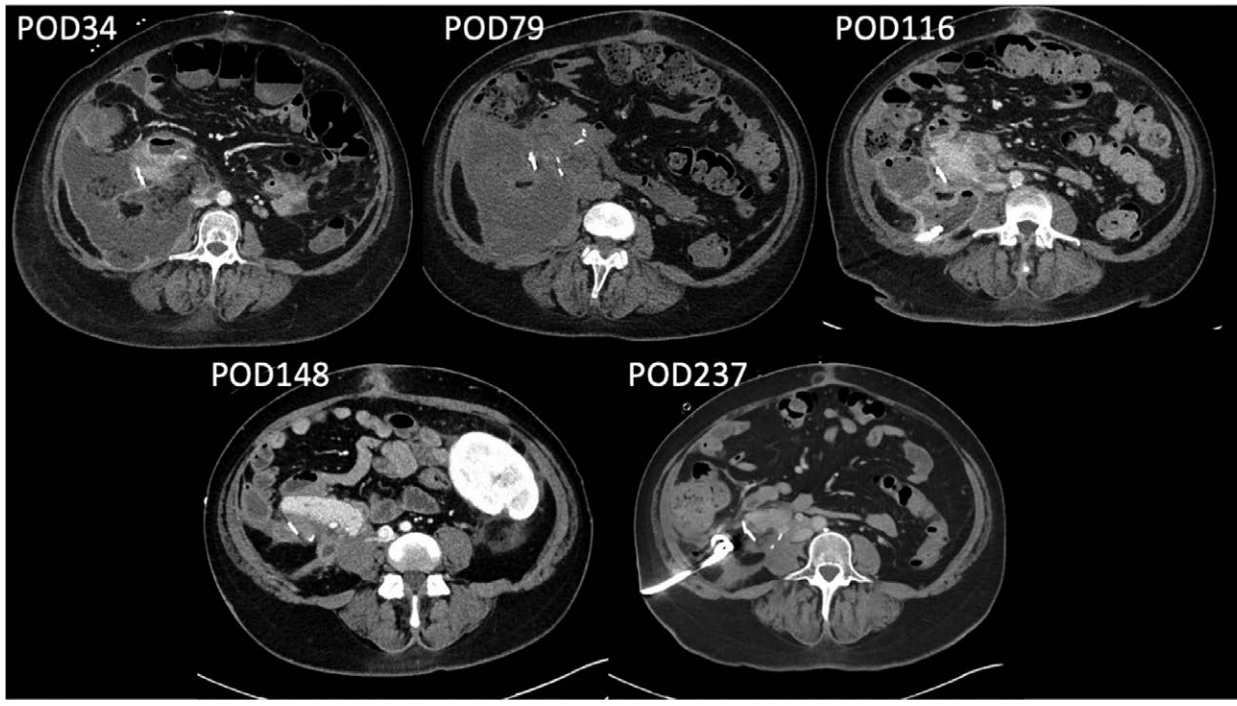

FIGURE 1. Images of abscess progression over time. VARD performed between POD116 and POD 148 and POD 148 and POD 237. POD, postoperative day; VARD, video-assisted retroperitoneal debridement.

thought to be because of relative hypotension and sepsis. We initially attempted to repeat percutaneous drainage but ultimately elected for a VARD approach after multidisciplinary consultation, which was performed on POD 117. VARD was elected in particular because of the close proximity (6 cm) of the undrained fluid collection (located lateral and deep to the pancreas graft) to the lateral abdominal wall compared with the anterior abdominal wall (24 cm) in this patient with a prominent abdomen and her previously frozen abdomen. We fully discussed the risks and benefits with the patient and our rationale for a retroperitoneal approach. We used preoperative imaging and a previously placed percutaneous drain to enter the infected cavity in this procedure. We first preexpand the cavity by injecting 100 mL of saline into the previously placed drain. Using a 30° laparoscope and a 5-mm optical trocar, we followed the path of a previously placed percutaneous drain into the infected cavity. Once in the cavity, we insufflated. An additional 5-mm trocar was placed using a spinal needle to find the trajectory. This was then upsized to a 12-mm AirSeal trocar. We performed debridement of as much necrotic tissue (including both pancreas and peripancreatic tissue) as possible until we encountered a prolene suture, at which point we halted further debridement. A 19-Fr Blake drain and a 22-Fr Malencot drain were placed in the tracts of the 5- and 12-mm ports, respectively (Figure 2). Postoperatively, we performed continuous irrigation debridement for approximately 1 wk,

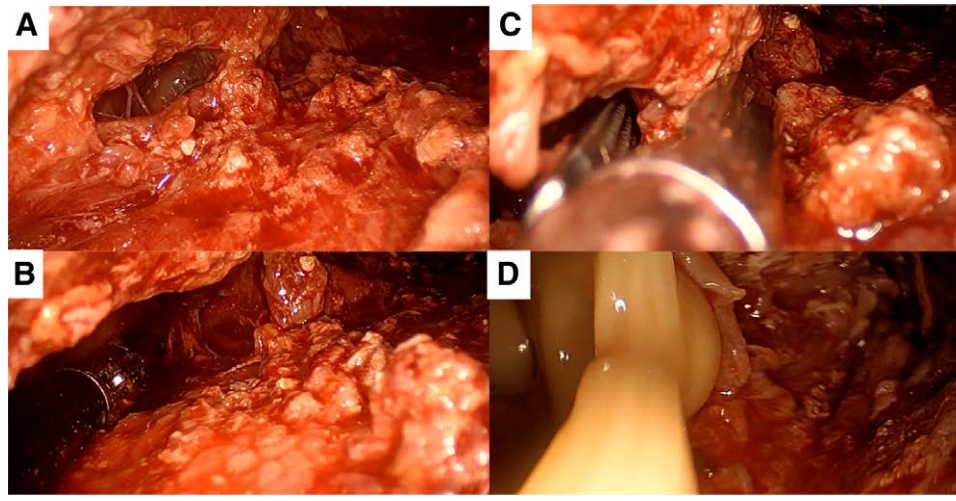

FIGURE 2. Representative images of VARD. A and B, The cavity (with grasper in B for relative size). C, Debridement using a grasper. D, Placement of a Malecot drain. VARD, video-assisted retroperitoneal debridement.

she was ultimately discharged on POD 139. Cultures of the debrided material were negative for growth.

She was readmitted on POD 148 with recurrent fever. A repeat VARD was performed in a similar manner to the prior on POD 151. The patient continued on antibiotics with drains until POD 237, when all drains were removed, and the patient has been drained and antibiotic-free since that time, now >1 y post-transplant. She has maintained excellent kidney function (creatinine 0.9 mg/dL) and normoglycemia since the second week posttransplant. She has returned to work and reports feeling well. Imaging shows the resolution of peripancreatic collections.

DISCUSSION

Peripancreatic fluid collections and graft pancreatitis may complicate pancreas transplantation and become particularly concerning when infection and/or fever accompany them. Percutaneous drainage and antibiotics are the usual treatment. However, the utilization of minimally invasive debridement approaches, especially for difficult-to-approach collections, as in the present case, may be useful for some patients.

One of the challenges of native pancreatitis is the anatomic location of the pancreas. This is somewhat alleviated in transplantation, where most often the pancreas is placed intraperitoneally. However, the close apposition of the pancreatic graft to the retroperitoneum (necessary to perform vascular anastomoses) means that some aspects of the transplanted pancreas are difficult to approach anteriorly. Even an intraperitoneal organ may sometimes be best accessed retroperitoneally.

The principles of management of graft pancreatitis are similar to those of native pancreatitis, with the complicating factor of immunosuppression, which impedes healing. Patience, serial debridement, and continued drainage were necessary to manage this difficult complication. Total graft pancreatectomy should be considered, even in a functioning graft, if the nature of the pancreatic complication or infection is considered too great.

Simultaneous kidney-pancreas transplant affords the best outcome for patients with concomitant renal disease and diabetes.[6] Although complications of graft pancreatitis are real, most can be managed without explantation. The use of VARD is one method to consider for the management of persistent infected peripancreatic fluid and necrotic material unresponsive to percutaneous drainage.

REFERENCES

1. Gruessner AC, Laftavi MR, Pankewycz O, et al. Simultaneous pancreas and kidney transplantation—is it a treatment option for patients with type 2 diabetes mellitus? An analysis of the International Pancreas Transplant Registry. *Curr Diab Rep*. 2017;17:1–9.
2. Manrique A, Jiménez C, López RM, et al. Relaparotomy after pancreas transplantation: causes and outcomes. *Transplant Proc*. 2009;41:2472–2474.
3. Nadalin S, Girotti P, Königsrainer A. Risk factors for and management of graft pancreatitis. *Curr Opin Organ Transplant*. 2013;18:89–96.
4. Van Santvoort HC, Besselink MG, Bakker OJ, et al. A step-up approach or open necrosectomy for necrotizing pancreatitis. *N Engl J Med*. 2010;362:1491–1502.
5. van Brunschot S, Besselink MG, Bakker OJ, et al. Video-assisted retroperitoneal debridement (VARD) of infected necrotizing pancreatitis: an update. *Curr Surg Rep*. 2013;1:121–130.
6. Al-Qaoud TM, Kaufman DB, Odorico JS, et al. Pancreas and kidney transplantation for diabetic nephropathy. In: *Kidney Transplantation: Principles and Practice*, 8th ed. Elsevier, 2020.