

Robotic Assisted Pylorus Preserving Pancreatoduodenectomy with a Next Generation Decellularized Dermal Allograft for Soft Tissue Reinforcement

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Surgical Summary

Clinical Presentation:

- A 65-year-old male with history of pancreatic head cancer.
- CT scan of the chest, abdomen, and pelvis:
 - Pancreatic neoplasm ill-defined and not well margined. 17 mm x 12 mm slightly hyperdense lesion immediately anterior to the biliary stent.
 - Mild enlargement of the ascending thoracic aorta measuring 4.2 cm in maximal transverse diameter.
 - Severe coronary artery calcification, indicating coronary artery disease.
 - Mild splenomegaly, mild enlarged prostate, and diverticula of the colon without evidence of acute diverticulitis.
- Decision made to proceed with a laparoscopy, laparotomy, retroperitoneal exploration, intraoperative ultrasound of the liver and pancreas, and pylorus preserving pancreatoduodenectomy utilizing DermaPure®, a decellularized dermal allograft, for soft tissue reinforcement.

Intraoperative Findings:

- Proximal pancreatic head mass involving the uncinate process and extending into the biliary portal structures. Locally advanced pancreatic cancer, adhesive disease.

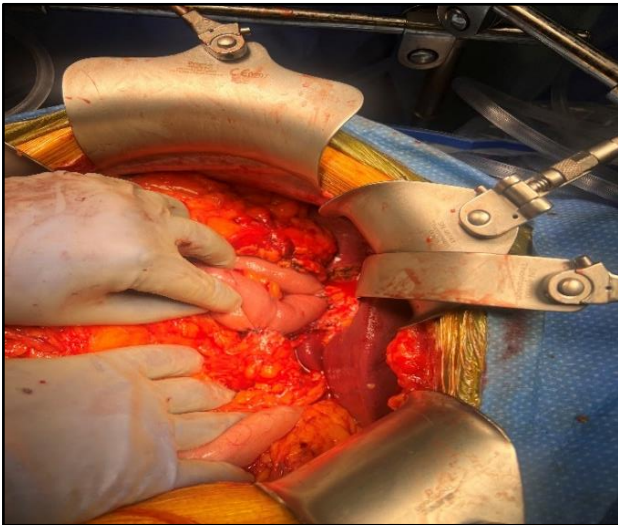


Figure 1. End-to-side pancreaticojejunostomy anastomosis.

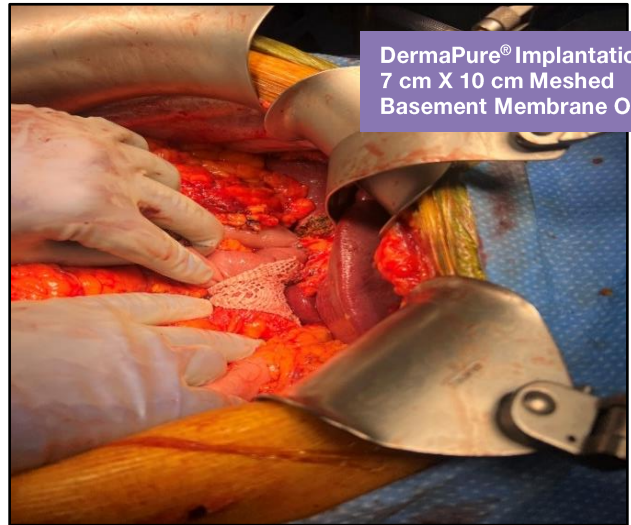


Figure 2. Placement of DermaPure® for soft tissue reinforcement.

Surgeon Perspective:

"Pancreatic cancers are ranked as one of the most devastating forms of cancers partly due to the increased morbidity associated with its surgical treatment. Pancreatic cancer patients are typically immunocompromised, immunosuppressed, and malnourished. This trifecta of conditions can exaggerate the already increased complication rates seen in pancreatic surgery patients. My utilization of Dermapure biologic matrix as a soft tissue reinforcement for the pancreaticojejunal anastomosis was to ameliorate some of the increased leak rates observed with this specific type of anastomosis.^{1"}

1. Fuks D, Piessen G, Huet E, Tavernier M, Zerbib P, Michot F, Scotte M, Triboulet JP, Mariette C, Chiche L, Salame E, Segol P, Pruvot FR, Mauvais F, Roman H, Verhaeghe P, Regimbeau JM. Life-threatening postoperative pancreatic fistula (grade C) after pancreaticoduodenectomy: incidence, prognosis, and risk factors. Am J Surg. 2009 Jun;197(6):702-9. doi: 10.1016/j.amjsurg.2008.03.004. Epub 2008 Sep 7. PMID: 18778804.

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Surgical Procedure:

- Open exploration of the abdomen was undertaken. Intraoperative ultrasound was performed. No intrahepatic lesions were identified. Adhesions from a previous cholecystectomy were evident in the right upper quadrant. Performed adhesiolysis. Retroperitoneum explored by coming across the gastrocolic ligament and performing a Cattell-Braasch and wide Kocherization of the duodenum.
- A mass was identified in the proximal pancreatic head involving the uncinate process and extending into the biliary portal structures. Intraoperative ultrasound of the pancreas was performed. The mass was in close proximity to the lateral aspect of the superior mesenteric vein (SMV). Identified a plane between the SMV, the neck, and the inferior aspect of the pancreas. Proceeded to skeletonize the portal structures.
- Identified the common and proper hepatic arteries. Ligated the gastroduodenal artery at its base with 2-0 and 0 silk tie suture. Created a plane between the portal vein (PV) and the neck and superior aspect of the pancreas. Identified a plane within the body of the pancreas away from the area of involvement, in order to remove the mass anteriorly, and address if any vascular involvement.
- Significant inflammation surrounding the pancreas possibly due to pancreatitis or a metallic stent that was identified. Circumferentially freed up the common hepatic duct beyond the insertion of the cystic duct. Transected the common hepatic duct with Bovie® electrocautery and removed the metallic stent that was in place.
- Mobilized the neck of the pancreas superiorly and inferiorly. Once the pancreatic neck was completely transected, identified the pancreatic duct which measured 2 mm. Transected the loop of jejunum distal to the Treitz ligament with an Echelon Flex® 60 mm blue load stapler. The mesentery of the loop of jejunum was taken down with a LigaSure® device, then rotated through the retroperitoneal defect into the right upper quadrant. Transected the first part of the duodenum with an Echelon Flex® 60 mm blue load stapler and took down the gastroepiploic vessels with an Echelon Flex® vascular load stapler, then packed the stomach in the left upper quadrant.
- Meticulously mobilized the pancreatic uncinate process away from the retroperitoneum. The mass appeared to involve the lateral aspect of the PV. Used a vascular clamp to gain control of the PV where the mass was involved, and transected part of the PV away from the mass. Proceeded with NanoKnife® irreversible electroporation (IRE) for marginous attenuation of the area, especially the pancreatic parenchyma, in close proximity to the PV, to ensure the mass was completely resected. Ensured good repair of the PV with 5-0 Prolene®. Specimen sent to pathology for frozen section analysis. All margins were negative.
- Proceeded with reconstruction. Brought the loop of the jejunum in a retrocolic manner into the right upper quadrant and performed an end-to-side pancreaticojejunostomy anastomosis (Figure 1) over a 7 Fr pediatric feeding tube using 5-0 PDS® and reinforced with 4-0 PDS®. An end-to-side hepaticojejunostomy anastomosis was undertaken using 4-0 PDS® over an 8 Fr pediatric feeding tube. Antecolic duodenojejunostomy anastomosis was undertaken using 3-0 Vicryl® and reinforced with 2-0 silk in a seromuscular fashion. Placed a meshed 7 cm x 10 cm DermaPure® decellularized dermal allograft over the pancreaticojejunostomy anastomosis for soft tissue reinforcement (Figure 2). The falciform ligament was used as a vascular pedicle flap to reinforce the hepaticojejunal and pancreaticojejunal anastomosis sites. A 19 Fr Blake® drain was brought out from the right flank and secured to the skin. Seprafilm® was placed in the anterior wall and closed the fascia with looped 1-0 PDS®. Approximated the deep dermal tissue with 2-0 Vicryl®. Skin was approximated with staples. Prevena® Therapy applied to the incision.

Post-Operative Notes:

- Pathology findings - 3.5 cm moderately differentiated adenocarcinoma with negative margins. 2 of 28 lymph nodes (LN) were positive for regional LN metastasis, pT2N1cM0, R0.
- 3 weeks post-op - Incision well healed. CT showed no acute findings. Labs within normal limits.
- Follow-up with oncologist to discuss adjuvant therapy.

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