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Total Pancreatectomy and Islet Autotransplantation: A Decade Long Nationwide Analysis

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Open and Minimally Invasive Pancreaticoduodenectomy for Pancreatic Cancer: Perioperative, Oncologic, and Survival Outcomes


Aim: To evaluate the perioperative, oncologic, and survival outcomes of open and minimally invasive pancreaticoduodenectomy (PD) for pancreatic cancer.

Methods: A retrospective review of patients undergoing PD for pancreatic cancer from 2010 to 2015. Patients were divided into open and minimally invasive groups.

Results: A total of 210 patients underwent PD. The minimally invasive group had a shorter operative time (65 vs. 170 minutes), lower blood loss (170 vs. 500 ml), and shorter ICU stay (1 vs. 3 days). The resection margins were comparable between the two groups. The 30-day mortality was 2% in the open group and 0% in the minimally invasive group. At 5 years, the overall survival was 32% in the open group and 42% in the minimally invasive group (p = 0.04).

Conclusion: Minimally invasive pancreaticoduodenectomy is associated with shorter operative time, lower blood loss, and shorter ICU stay compared to open PD. It offers comparable resection margins and survival outcomes at 5 years.

The Effect of an Integrated Health System Algorithm Based on 2012 International Consensus Guideline on the Local Practice Pattern for the Management of Pancreatic Cystic Neoplasms


Aim: To evaluate the effect of an integrated health system algorithm on the management of pancreatic cystic neoplasms (PCLs).

Methods: A retrospective review of patients with PCLs treated at a single center from 2010 to 2015. The algorithm was based on the 2012 International Consensus Guideline on the Local Practice Pattern for the Management of Pancreatic Cystic Neoplasms.

Results: A total of 210 patients were identified. The algorithm resulted in a decrease in the number of EUS and GI/surgery referrals, postoperative complications, and hospital stays.

Conclusion: The integrated health system algorithm based on the 2012 International Consensus Guideline on the Local Practice Pattern for the Management of Pancreatic Cystic Neoplasms is effective in improving the management of PCLs.

Pancreatic Cancer: Operative, Oncologic, and Survival Outcomes


Aim: To evaluate the operative, oncologic, and survival outcomes of patients undergoing pancreaticoduodenectomy for pancreatic cancer.

Methods: A retrospective review of patients undergoing pancreaticoduodenectomy from 2010 to 2015. Patients were divided into open and minimally invasive groups.

Results: A total of 210 patients underwent pancreaticoduodenectomy. The minimally invasive group had a shorter operative time (65 vs. 170 minutes), lower blood loss (170 vs. 500 ml), and shorter ICU stay (1 vs. 3 days). The 30-day mortality was 2% in the open group and 0% in the minimally invasive group. At 5 years, the overall survival was 32% in the open group and 42% in the minimally invasive group (p = 0.04).

Conclusion: Minimally invasive pancreaticoduodenectomy is associated with shorter operative time, lower blood loss, and shorter ICU stay compared to open PD. It offers comparable resection margins and survival outcomes at 5 years.

New Therapeutic Approach in the Successful Surgical Therapy of Pancreatic Cancer

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Aim: To evaluate a new therapeutic approach in the successful surgical therapy of pancreatic cancer.

Methods: A retrospective review of patients undergoing PD for pancreatic cancer from 2010 to 2015. Patients were divided into open and minimally invasive groups.

Results: A total of 210 patients underwent PD. The minimally invasive group had a shorter operative time (65 vs. 170 minutes), lower blood loss (170 vs. 500 ml), and shorter ICU stay (1 vs. 3 days). The 30-day mortality was 2% in the open group and 0% in the minimally invasive group. At 5 years, the overall survival was 32% in the open group and 42% in the minimally invasive group (p = 0.04).

Conclusion: Minimally invasive pancreaticoduodenectomy is associated with shorter operative time, lower blood loss, and shorter ICU stay compared to open PD. It offers comparable resection margins and survival outcomes at 5 years.
Results: A total of 923 patients underwent IAT after pancreatoduodenectomy during 2002-2012. There were 754 patients who had TP+IAT. The most common indication for TP+IAT was chronic pancreatitis (86%) followed by acute pancreatitis (12%). The number of patients undergoing TP+IAT annually significantly increased during the 11 years of study from 53 cases in 2002 to 155 cases in 2012. Overall mortality and morbidity of patients were 0% and 57.8%, respectively. Post-surgical hypoinsulinemia was reported in 42.3% of patients, indicating 57.7% of patients were insulin independent during hospitalization. Predictors of in-hospital morbidity were obesity (AOR: 3.02, P<0.05), fluid and electrolyte disorders (AOR: 2.71, P<0.05), alcohol abuse (AOR: 2.63, P<0.01), and weight loss (AOR: 2.43, P<0.01).

Conclusion: During 2002-2012, the overall number of patients who underwent TP+IAT has been increasing. Our study showed TP+IAT is a safe and feasible procedure with no mortality, acceptable morbidity rates and achieved high rate of early insulin independence. Obesity, fluid and electrolyte disorders, and alcohol abuse are the most significant predictors of in-hospital morbidity.

Pancreas-Specific Secretory Pathway Ca2+-ATPase 2 Affects GPCR-mediated Ca2+ Signalling

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Background: Enzymes are released from acinar cells through regulated exocytosis, which involves a signalling network that regulates spatial and temporal accumulation of Ca2+. Cytosolic Ca2+ levels are lowered, in part, by Ca2+-ATPase pumps. Our laboratory has previously identified a novel isoform of secretory pathway Ca2+-ATPase 2 (SPCA2) that appears to be pancreas specific. However, this isoform, designated SPCA2c (c for carboxy) contains only the last 136 amino acids of SPCA2, making it unlikely that SPCA2c functions as a Ca2+-ATPase. Other studies report that SPCA2 can increase cytosolic Ca2+ concentrations via interaction with the plasma membrane Ca2+ channel, Orai1. The goals of this study were to determine if SPCA2c could affect cytosolic Ca2+ levels and Ca2+ movement in response to GPCR-mediated signaling.

Methods and Results: SPCA2c tagged with FLAG (SPCA2c-FLAG) was transiently transfected into HEK293 with and without the stable expression of Orai1 or AR42J cells in combination with GFP. Co-immunofluorescence analysis (IF) for FLG and cell organelle markers was performed to localize SPCA2c within the cell. Also, transfected cells were identified by GFP expression, and then assessed for cytosolic Ca2+ using Fluor 3 ratiometric analysis before and after stimulation with carbamoyl. IF analysis revealed SPCA2c localization to both the endoplasmic reticulum and golgi apparatus in AR42J and HEK 295 cells. Transient expression of SPCA2c in HEK293 cells, both with and without the stable expression of Orai1, resulted in elevations in resting cytosolic Ca2+ levels, and altered responses to carbachol stimulation, indicating a functional role for SPCA2c in Ca2+-homeostasis.

Conclusions: Our findings suggest SPCA2c plays a unique role in maintaining cytosolic Ca2+ that involves interacting with Orai1. Further work is aimed at determining SPCA2c’s role in affecting the acinar cell response to injury.

Evaluation of Proposed Biomarkers in Early Stage Pancreatic Ductal Adenocarcinoma

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Background: Enzymes are released from acinar cells through regulated exocytosis, which involves a signalling network that regulates spatial and temporal accumulation of Ca2+. Cytosolic Ca2+ levels are lowered, in part, by Ca2+-ATPase pumps. Our laboratory has previously identified a novel isoform of secretory pathway Ca2+-ATPase 2 (SPCA2) that appears to be pancreas specific. However, this isoform, designated SPCA2c (c for carboxy) contains only the last 136 amino acids of SPCA2, making it unlikely that SPCA2c functions as a Ca2+-ATPase. Other studies report that SPCA2 can increase cytosolic Ca2+ concentrations via interaction with the plasma membrane Ca2+ channel, Orai1. The goals of this study were to determine if SPCA2c could affect cytosolic Ca2+ levels and Ca2+ movement in response to GPCR-mediated signaling.

Methods and Results: SPCA2c tagged with FLAG (SPCA2c-FLAG) was transiently transfected into HEK293 with and without the stable expression of Orai1 or AR42J cells in combination with GFP. Co-immunofluorescence analysis (IF) for FLG and cell organelle markers was performed to localize SPCA2c within the cell. Also, transfected cells were identified by GFP expression, and then assessed for cytosolic Ca2+ using Fluor 3 ratiometric analysis before and after stimulation with carbamoyl. IF analysis revealed SPCA2c localization to both the endoplasmic reticulum and golgi apparatus in AR42J and HEK 295 cells. Transient expression of SPCA2c in HEK293 cells, both with and without the stable expression of Orai1, resulted in elevations in resting cytosolic Ca2+ levels, and altered responses to carbachol stimulation, indicating a functional role for SPCA2c in Ca2+-homeostasis.

Conclusions: Our findings suggest SPCA2c plays a unique role in maintaining cytosolic Ca2+ that involves interacting with Orai1. Further work is aimed at determining SPCA2c’s role in affecting the acinar cell response to injury.

The Effect of Cystathionine-Gamma-Lyase Gene Deletion on the Renin-Angiotensin System in Cerulein-Induced Acute Pancreatitis in Mice

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Background: Cystathionine-γ-lyase (CSE) is an endogenous hydrogen sulfide (H2S)-producing enzyme involved in inflammation. We previously demonstrated that H2S is synthesized by CSE in a pro-inflammatory role in cerulin-induced acute pancreatitis and associated lung injury. The renin-angiotensin system (RAS) components (ACE, ACE2, Ang II, and Ang(1-7)) play an important role in the regulation of inflammation. The present study investigated the effect of CSE gene deletion on RAS metalloproteases and their bioactive peptides in cerulin-induced acute pancreatitis and associated lung injury in mice.

Methods: Wild-type and CSE-deficient (CSE-KO) C57BL6 mice (male, 25-30 g) were each assigned into control (i.e. saline/cerulein) or interventional (cerulein) groups. Acute pancreatitis was induced by hourly cerulein injections (50 μg/kg) for 10 hours. Mice were sacrificed 1 h after the last saline/cerulein injection. Pancreas and lungs tissues were collected and processed to measure ACE, ACE2, Ang II and Ang(1-7) activity/levels.

Results: The RAS components in pancreas (ACE2 activity and levels, Ang(1-7)) and lung (ACE and ACE2 activity and levels, Ang II and Ang(1-7)) were significantly lower in CSE-KO mice. The cerulein treatment resulted in significant decreases in ACE2 activity (pancreas and lung) and Ang II levels (lung) in wild-type mice but not in CSE-KO mice.

Conclusion: These findings suggest that acute inflammation inhibits activation of the RAS system. However, in the absence of baseline H2S production (CSE deletion) both ACE and ACE2 and their bioactive peptides were reduced suggesting H2S has a role in the maintenance of normal homeostasis of the RAS system. This requires further study.

Laparoscopic Pancreaticoduodenectomy (LPD) With Uncinate Process First Approach


Background: Complete resection for pancreatic head cancer is of prognostic relevance; however, most patients will develop recurrence around superior mesenteric artery (SMA) and celiac trunk (CT). PD with uncinate process first approach dissects the pancreatic head in a caudal-cranial direction, aiming to improve exposure and complete dissection of SMA. LDP has flexible and unique view advantage from caudal, posterior and lateral side, which is ideal for uncinate process first approach.

Technique: After initial exploration, pancreas is tunneled above the portal vein; laparoscope was transferred to left lateral trocar, which provides a left lateral and posterior view. Then SMA trunk below pancreas was reached by incise Treitz ligament, the dissection followed SMA cranially, it is possible to follow SMA at this stage all the way down. The abdomen was closed after the dissection. Kocher’s maneuver is well facilitated by this view, pancreas head was complete mobilized, SMA root were dissected and looped above left renal vein. The uncinate was then completely dissected in a caudocranial direction along SMA axis, tissue between SMA and CT was resected. Finally laparoscope was transferred to the receiver operating characteristic curve and identifies analytes that most contribute to class discrimination using the lasso procedure. For the comparison of healthy controls and chronic pancreatitis from early stage PDAC, an optimal panel included analytes BAG3, CA 19-9, CEACAM1, HA, IGFBP2, PARK7, and SPPI yielding an area under the ROC curve (AUC) of 0.92. For the comparison of healthy controls and chronic pancreatitis from early stage PDAC, an optimal panel included analytes BAG3, CA 19-9, CEACAM1, EPCAM, LCN2, MSLN, PARK7, PRG4, SPPI, and TNFRSF1A, yielding an AUC of 0.88. These data suggest that suitably accurate algorithms (>90% accuracy) can be devised using subsets of the 30 analyte panel. It is expected that increased accuracy can be realized by incorporating additional analytes into the resulting algorithms.