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Short Communication

# Chemical Pancreatectomy Exocrine Ablation with Innervation and Islet Preservation

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## DESCRIPTION

Pancreatic diseases such as chronic pancreatitis and pancreatic cancer often necessitate partial or total removal of the pancreas (pancreatectomy), which can lead to significant metabolic and digestive complications. Traditional surgical pancreatectomy involves the removal of both exocrine (acinar) and endocrine (islet) components of the pancreas. However, recent research has explored a novel approach known as chemical pancreatectomy, which selectively targets and ablates the exocrine pancreas while preserving critical elements such as pancreas innervation and islet vasculature. This article reviews the concept, techniques, preclinical findings, and potential clinical implications of chemical pancreatectomy in Non-Human Primates (NHPs).

### Understanding chemical pancreatectomy

Chemical pancreatectomy involves the administration of agents that selectively destroy exocrine pancreatic tissue while sparing the innervation and vasculature crucial for pancreatic function [1]. This approach aims to mitigate the severe consequences of total pancreatectomy, including diabetes mellitus and impaired digestion, by maintaining the endocrine function of the pancreas.

### Techniques and agents used

Various agents have been explored for chemical pancreatectomy, including

**Alcohol-based solutions:** Ethanol and other alcohol-based solutions are injected directly into the pancreatic ducts or parenchyma, leading to necrosis of acinar cells.

**Cholecystokinin (CCK) analogs:** CCK analogs stimulate acinar cells to release digestive enzymes excessively, leading to auto digestion and subsequent necrosis.

**Electrolytic agents:** Electrolytic solutions are used to induce local tissue destruction through electrochemical reactions. These agents are administered under imaging guidance (e.g., endoscopic ultrasound) to ensure precise targeting and minimize damage to surrounding tissues [2].

### Preservation of pancreas innervation

One of the significant advantages of chemical pancreatectomy is its ability to preserve the innervation of the pancreas [3]. The pancreatic nerves, including sympathetic and parasympathetic fibers, play crucial roles in regulating pancreatic exocrine and endocrine functions [4]. Preserving these nerves can potentially mitigate post-procedural complications such as impaired digestion and hormonal imbalances.

### Preservation of islet vasculature

Islets of Langerhans, which house the endocrine cells responsible for insulin and glucagon production, require robust vascularization for proper function. Chemical pancreatectomy aims to spare the intricate network of blood vessels that supply the islets, thereby preserving their viability and function [5]. This preservation is critical for maintaining glucose homeostasis and preventing the onset of diabetes mellitus following pancreatectomy.

### Preclinical studies in non-human primates

Research in non-human primate models has provided valuable insights into the feasibility and efficacy of chemical pancreatectomy

**Safety and efficacy:** Studies have demonstrated that chemical agents can effectively ablate the exocrine pancreas while preserving pancreatic innervation and islet vasculature without significant adverse effects on systemic health.

**Functional preservation:** Functional assessments, including glucose tolerance tests and hormonal analyses, have shown maintained endocrine function post-procedure, highlighting the potential of chemical pancreatectomy to prevent diabetes mellitus.

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**Long-term follow-up:** Longitudinal studies have monitored NHPs post-chemical pancreatectomy to assess long-term outcomes, including pancreatic function, metabolic stability, and overall health. These studies provide critical data for translating chemical pancreatectomy into clinical practice [6].

## Clinical implications and future directions

The translation of chemical pancreatectomy from preclinical research to clinical application holds significant promise for patients requiring pancreatic surgery

**Reduced morbidity:** Preservation of pancreatic innervation and islet vasculature may reduce the incidence of diabetes mellitus and improve overall metabolic outcomes compared to traditional pancreatectomy.

**Patient selection:** Identifying suitable candidates for chemical pancreatectomy based on disease severity, anatomical considerations, and comorbidities is essential for optimizing outcomes.

**Technological advancements:** Continued advancements in imaging modalities, minimally invasive techniques, and targeted delivery systems will further enhance the precision and safety of chemical pancreatectomy.

**Regulatory considerations:** Regulatory agencies will play a pivotal role in evaluating the safety, efficacy, and long-term outcomes of chemical pancreatectomy before widespread clinical adoption [7].

# CONCLUSION

In conclusion, studies on extra genital LS need to be implemented to improve the specialist's diagnostic capabilities. This exhortation should also be extended to the treatment of this pathology, which in most cases is limited to corticosteroids and topical calcineurin inhibitors. ALA-PDT has proven to be an effective and safe treatment in this respect and should be considered in cases refractory to first-line therapies. Finally, the increasing uptake of JAKi offers an important alternative for the long-term management of these patients.

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