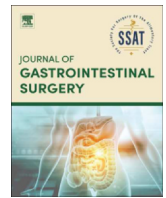




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Inside the Operating Room

## Robotic modified Puestow procedure for chronic pancreatitis

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## Introduction

Patients with chronic pancreatitis (CP)-related pain are often treated with opioids and undergo endoscopic interventions for stone extraction. If these interventions fail, surgical drainage procedures, such as the Puestow and Frey procedures, are effective in ameliorating pain and pancreatitis episodes. The Puestow procedure entails a lateral pancreaticojejunostomy (LPJ) for pancreatic duct decompression and is often performed in an open fashion. Herein, we proposed a robotic modified Puestow procedure that involves minimal coring that facilitates ductal exposure and drainage.

## Methods

A 62-year-old woman, with a 4-year history of idiopathic CP, presented to us after failed nonsteroidal anti-inflammatory drug use and multiple endoscopic retrograde cholangiopancreatographies with pancreatic duct stenting. The most recent pancreatic duct stenting provided 18 months of pain relief until epigastric pain recurred. The computed tomography scan showed progressive pancreatic ductal dilation up to 8 mm.

The patient is placed supine with a slight reverse Trendelenburg. Four 8-mm robotic trocars are placed just below the dome of the abdomen (Fig. 1). A 12-mm assistant port trocar is placed in the right lower quadrant to allow passage of the 12-mm Endo-GIA stapler for the Roux limb creation for pancreaticojejunostomy.

The procedure starts with the opening of the gastrocolic ligament to enter the lesser sac. There are often retrogastric adhesions from previous pancreatitis episodes, and the pancreas is mobilized to its

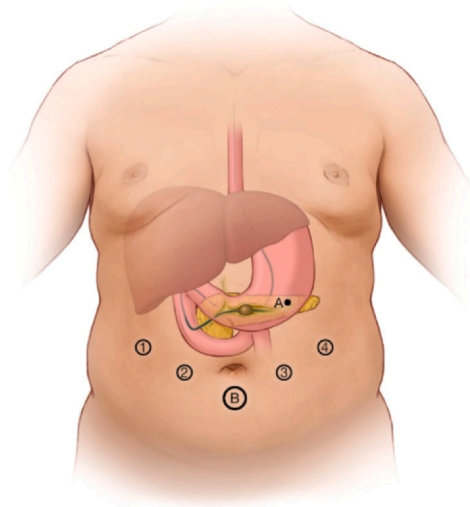
tail end. A 0-Prolene on a Keith needle is used to retract the posterior wall of the stomach up against the abdominal wall to provide optimal exposure to the pancreas' anterior surface in the lesser sac (Fig. 2).

The pancreatic duct and splenic vein are identified using an intraoperative ultrasound probe (Fig. 3), and the pancreatic duct is opened up using the monopolar scissors. The splenic vein lies immediately posterior to the pancreatic duct and should be carefully avoided to prevent uncontrolled hemorrhage. Maryland bipolar forceps are used to provide adequate exposure to further open the pancreatic duct with monopolar scissors. The duct is opened until the large intraductal stone is encountered (Fig. 4). We prefer to widely open the duct toward the head and uncinatate process for optimal ductal drainage. To facilitate the exposure of the pancreatic duct as it curves posteroinferiorly into the uncinatate, we performed the coring of the calcified, diseased portion of the pancreatic head, which is associated with better intraductal hypertension relief (Fig. 5). Our modification limits the coring of the pancreatic head to the diseased portion only and mitigates issues associated with extensive head coring such as biliary strictures. We opened the duct rightward of the gastroduodenal artery, which is dissected and divided between titanium clips as it courses anterior to the pancreas. The pancreatic stent is removed, the jejunum is transected approximately 40 cm distal to the ligament of Treitz, and a side-to-side jejunojejunostomy anastomosis is performed with a 60-mm tan load Endo-GIA stapler. The common enterotomy site is subsequently closed with a running 3-0 V-lock suture in 2 layers.

The Roux limb is brought up to the pancreas in an antecolic fashion because these patients often have a lower body mass index, and a tension-free anastomosis can similarly be achieved without needing to tunnel through a retrocolic route. The length of the opened pancreatic duct is measured, and a longitudinal enterotomy that matches its length is performed. A side-to-side

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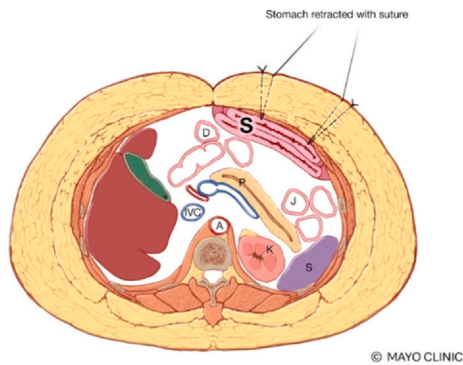
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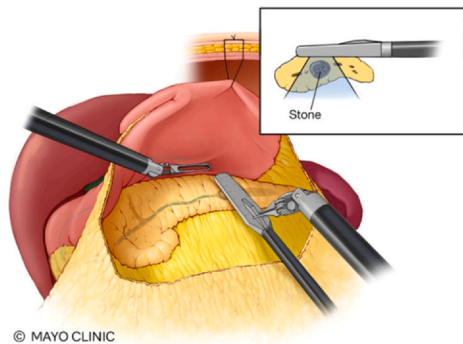
**Figure 1.** Four 8-mm robotic trocars positioned below the dome of the abdomen (1–4). The midline port (B) is a 12-mm assistant port.

pancreaticojejunostomy is performed from the left corner toward the right corner (Fig. 6). At the end of the procedure, we performed a cholecystectomy in the setting of idiopathic pancreatitis with a clear view of safety. A step-by-step demonstration is provided in the [supplementary video](https://www.jogs.org/article/S1091-255X(25)00348-8/fulltext) (available online at [https://www.jogs.org/article/S1091-255X\(25\)00348-8/fulltext](https://www.jogs.org/article/S1091-255X(25)00348-8/fulltext)).



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**Figure 2.** A 0-Prolene on a Keith needle is used to retract the posterior wall of the stomach to the abdominal wall to expose the anterior surface of the pancreas.



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## Results

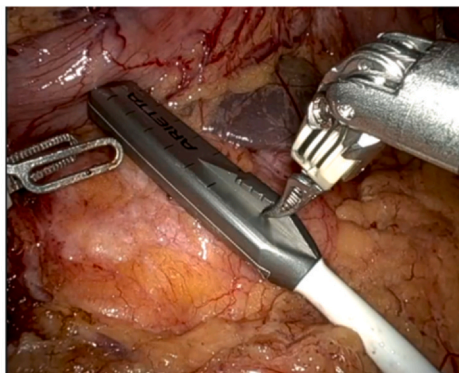
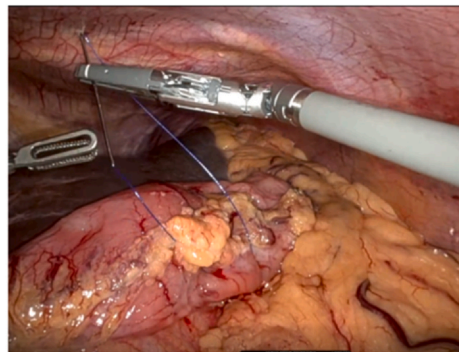
The total operative time was 5 h with minimal blood loss. The patient was discharged on postoperative day 3 but was readmitted on day 4 for vomiting, secondary to swelling and edema at the jejunojunction anastomosis. An upper gastrointestinal swallow study showed that the anastomosis was patent. The patient improved clinically and was discharged the next day. She has remained pancreatitis-free for 22 months thus far.

## Discussion

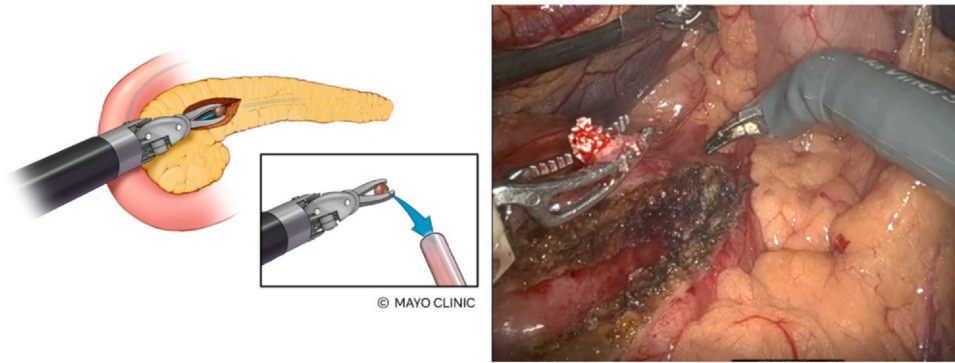
The management of CP-related pain centers on effective medical pain control and ductal decompression via endoscopic approaches, with surgery reserved for refractory cases. Several studies have suggested that early surgical intervention may be beneficial for selected patients with CP [1]. A trial conducted by Issa et al. [2] demonstrated that patients who underwent surgery within 6 weeks of randomization reported lower pain scores at the 18-month follow-up than those who underwent endoscopy first.

Surgical interventions typically adopt one of these approaches: resection of diseased tissues, ductal drainage, or a combination of both [2]. Resection procedures may provide better long-term pain relief at the cost of higher morbidity and mortality rates, whereas hybrid approaches provide durable long-term relief with lower morbidity and mortality rates than resection-only procedures.

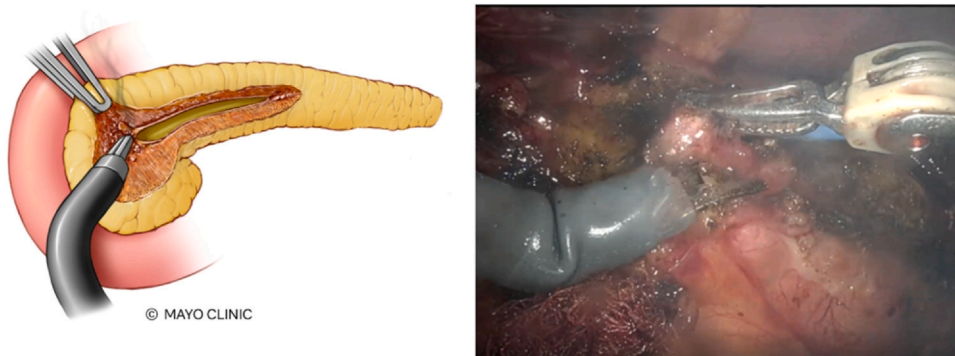
The wristed instruments of a robotic approach have better facilitated pancreatitis procedures such as the Puestow procedure to be performed in a minimally invasive fashion. The robotic LPJ has a learning curve and may require longer operative time in the early phases of the learning curve. However, minimally invasive LPJ is



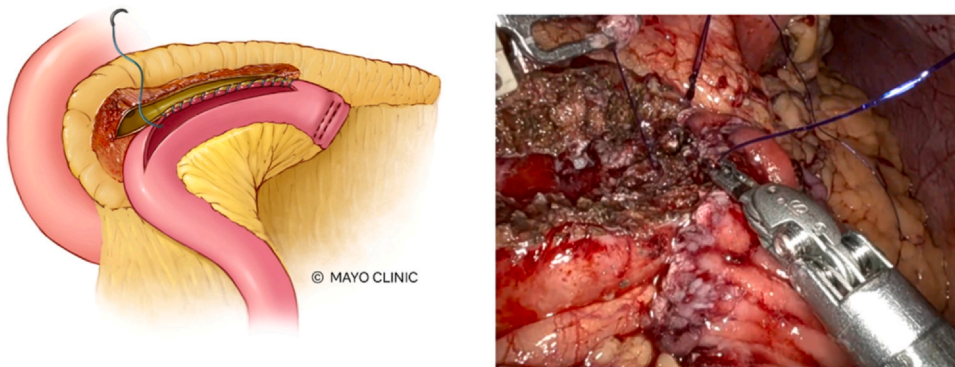
**Figure 3.** The pancreatic duct is identified using an intraoperative robotic ultrasound probe.



**Figure 4.** The intraductal stones were successfully extracted using the Maryland bipolar forceps.



**Figure 5.** The coring of the calcified, diseased portion of the pancreatic head is performed.



**Figure 6.** A side-to-side pancreaticojejunostomy is performed from the left corner toward the right corner using running 3-0 polydioxanone sutures.

associated with improved cosmesis, reduced blood loss, and faster recovery than open LPJ, while maintaining comparable complication rates [3]. We aim to provide a step-by-step demonstration of a robotic modified Puestow approach for CP.

### Conclusion

The Puestow procedure has increasingly been performed in a minimally invasive fashion with the advent of the robotic platform. The robotic approach may be associated with longer operative time than the open approach in the early phases of the learning curve. However, as experience increases, the operation can be performed efficiently in a minimally invasive fashion and may contribute to

more consistent outcomes with durable symptom relief in selected patients.

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### Declaration of competing interest

The authors declare no competing interests.

### Supplementary material

The video associated with this article can be found at [doi:10.1016/j.gassur.2025.102289](https://doi.org/10.1016/j.gassur.2025.102289).

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