

Reviewer A

The authors present a retrospective study comparing two types of laparoscopic duodenum-preserving pancreatic head resections for cystic neoplasm: conventional five-port laparoscopic DPPHR (cLDPPHR) and single-incision laparoscopic surgery with additional 12-mm trocar (SILDPPHR+1).

The major advantage of SILDPPHR+1 was the cosmetic advantage (cosmetic score 3 compared to 2 in cLDPPHR) $p=0.001$. The early postoperative outcome of the 43 patients with laparoscopic DPPHR was excellent in terms of frequency of POPF, biliary leakage, estimated blood loss and postoperative hospital stay, compared to large series of open DPPHR (J Gastrointest Surg 2023;27:2611-) or even in comparison with recently published results of cohort studies with conventional laparoscopic multi-port DPPHR (Surg Endosc 2019; 33:633-; Surg Endosc 2021;35:1355-). The authors confirm the advantages of laparoscopic DPPHR of shorter OP time, less estimated blood loss and shorter length of in-hospital stay and add the cosmetic factor as additional advantage when applying SILDPPHR+1.

Concern:

1. The manuscript focuses entirely on technical aspects of cLDPPHR vs. SILDPPHR+1.

However, the metrics postoperative of outcome are incompletely reported: POPF B+C?, Frequency of reoperation? Frequency of reintervention (endoscopic, radiologic, laparoscopic), in-hospital mortality? 90-day rehospitalisation?

Three patients developed abdominal infection. How many patients had additional drainage or extended transabdominal drainage in the postoperative course?

Reply1:

Thank you for your insightful comments, and we appreciate your attention to the details of our manuscript. Both patients with POPF had Grade B pancreatic fistulas and experienced symptoms such as fever and abdominal pain. Postoperative CT scans indicated abdominal fluid collections, and CT-guided catheter drainage was performed. There were no in-hospital deaths. This result is based on our centre's extensive experience of accumulating a large number of OPDs, LPDs and open DPPHRs. We routinely leave double-lumen drainage tubes in place. If postoperative drainage fluid shows elevated amylase levels, we can slowly irrigate through one lumen and aspirate through the other, thereby reducing the local concentration of pancreatic fluid."

We have included these additional details in the revised manuscript to provide a more comprehensive overview of the postoperative outcomes. We have updated the corresponding sections with these metrics for clarity and completeness.

Once again, thank you for your valuable feedback.

Changes in the text: Line 213-216

2. From the technical aspect, peritumoral lymph node sampling in patients with IPMN, SPN and MCN, as well as pNENTs is obligatory to establish histologically the final diagnosis regarding exclusion of a malignant process. The authors should comment on lymph node dissection when performing SILDPPHR+1.

Reply2:

We appreciate the reviewer's valuable comments, regarding the necessity of lymph node dissection when performing SILDPPHR+1. When performing SILDPPHR+1 surgery, we advocate for individualized assessment based on the specific patient situation, following these principles: Firstly, we begin with a preoperative assessment. If there is a high suspicion of tumor malignancy or lymph node metastasis, we do not perform DPPHR. Secondly, if suspicious lymph nodes are discovered during intraoperative exploration, we will change the surgical approach based on the frozen section pathology results. For patients with a higher risk of malignancy such as those with IPMN, MCN, and pNENTs, systematic lymph node dissection should be performed to ensure comprehensive pathological diagnosis and staging. For patients with low-grade malignancy such as SPN, moderate lymph node sampling should be performed to rule out a malignant

process and provide accurate prognostic information.

We have made the necessary revisions in the corresponding sections of the article. And we once again thank the reviewer for their attention to our work and their valuable comments.

Changes in the text: Line 93-94, Line123-125.

3. The authors performed in 43 patients a total pancreatic head resection with preservation of the duodenum and the intrapancreatic common bile duct. However, the description should be more precise with respect to the dissection of the rim pancreas between intrapancreatic CBD and duodenal wall and the uncinata process from caudal towards the papilla along the duodenum, preserving the inferior-anterior branch of the pancreaticoduodenal arcade.

Reply : Thank you for your detailed comments. We appreciate your attention to the precision of our surgical technique description. Below, we provide a more precise account of the dissection process in the 43 patients who underwent total pancreatic head resection with preservation of the duodenum and the intrapancreatic common bile duct (CBD). We have included these detailed steps in the revised manuscript to provide a clearer and more precise description of our surgical technique. Thank you once again for your valuable feedback.

Changes in the text: Line 146-158.

Reviewer B

This is an important article reporting the first paper on robot-assisted DPPHR using a single port. Although the number of DPPHR cases has been decreasing worldwide in recent years due to the difficulty of the procedure, the ability to perform robot-assisted DPPHR in such a situation is very impressive. The authors report on the surgical technique using intraoperative photographs, but the pictures are insufficient.

Major

First, the pancreatic head is suddenly exposed in the photos, but is the stomach elevated ventrally and cephalad to secure the field of view? Is the reticulum open? If so, please describe how.

Reply 1:

Thank you for your insightful comments. We appreciate the opportunity to clarify the surgical technique and address your concerns.

The stomach is elevated ventrally and cephalad to secure a clear field of view for the surgical procedure. This is achieved by using rubber tubing and Hem-o-Lok clips to suspend the stomach from the falciform ligament. This maneuver effectively moves the stomach out of the way and provides better visualization of the pancreatic head and surrounding structures.

The gastrocolic ligament, is opened during the initial stages of the procedure. This involves dissecting the gastrocolic ligament to access the lesser sac and fully expose the pancreatic head and duodenum. By carefully cutting through the gastrocolic ligament, we can mobilize the stomach and create an optimal surgical field.

Throughout the procedure, the elevated position of the stomach, combined with the opened gastrocolic ligament, ensures that the surgical field remains clear. This allows for precise dissection and manipulation of the pancreatic head, duodenum, and surrounding structures.

We have included these detailed steps in the revised manuscript to provide a clearer and more precise description of our surgical technique. Thank you once again for your valuable feedback.

Changes in the text: Line 126-130.

In the intraoperative photographs, the dissection of the bile duct and pancreatic parenchyma is described in detail, but there is no description of the dissection of the pancreatic parenchyma and duodenum.

Reply 2:

Thank you for your insightful comments. We appreciate the opportunity to clarify the surgical technique and address your concerns. These detailed steps have been included in the revised manuscript to provide a clearer and more precise description of our surgical technique.

Changes in the text: Line 146-158.

Although there is mention of preservation of the PSPDA and IPDA, there is no mention of dissection of the ASPDA and pancreatic parenchyma. In this case, is the pancreatic parenchyma around the pancreatic head artery arcade left as in the Begar method, or is the pancreatic rim left as in the Takada method? Or is the pancreatic parenchyma completely resected as in the Takada method?

Reply 3:

We appreciate the reviewer's valuable comments.

It has been shown (Surg Endosc 35, 1355-1361 (2021)) that routine dissections of the ASPDA with preservation of the intact posterior arch and the anterior pancreaticoduodenal inferior vessels all have a good duodenal blood supply, and there are no cases of duodenal ischaemic necrosis in the postoperative period. At our center, we do not consider the transection of the ASPDA as a standard practice, but the posterior branch must not be transected. In response to your query regarding the handling of the pancreatic parenchyma around the pancreatic head artery arcade, we provide the following reply:

At our center, we do not strictly follow either the Beger or Takada methods. Instead, our approach is to preserve the essential vascular structures while ensuring complete resection of the tumor. We prioritize the preservation of the posterior superior PSPDA and its branches to maintain adequate blood supply to the duodenum and CBD. The posterior branch is not transected in our procedure. The pancreatic parenchyma around the pancreatic head artery arcade is carefully dissected and resected. While we do not completely follow the Takada method, which involves complete resection, we ensure that sufficient pancreatic tissue is removed to achieve clear margins and effective tumor resection. The extent of resection is determined intraoperatively based on the tumor's location and its relation to the surrounding structures. Our technique can be seen as a tailored approach that combines elements of both the Beger and Takada methods. We aim to balance the need for thorough oncological resection with the preservation of vital vascular structures to minimize postoperative complications and ensure adequate blood supply

It says that ICG is administered preoperatively, but it should be stated exactly how many hours before the surgery.

Reply 4:

Thank you for your comments. There are many studies regarding the timing and dosage of ICG administration. Unlike the liver, we only need to clearly identify the common bile duct. Therefore, we can follow the protocol described in the literature (Langenbeck's Archives of Surgery (2022) 407:2823–2832), where 0.5 mg/kg of ICG is administered 24 hours before the surgery to achieve the best biliary imaging results. But in the past, we injected ICG 10mg half an hour before surgery, which also achieved good biliary imaging results.

Reviewer C

This is an interesting manuscript describing a new single port laparoscopic approach for a duodenum

preserving pancreatic head resection (Beger). The pictures are appreciated.

- Consider inclusion of a STROBE diagram for this study - how did you identify your patients (a prospective maintained database, parsing of electronic medical records, etc)? Were any patients excluded?

Reply 1:

Thank you for your valuable comments. We appreciate the opportunity to improve our manuscript.

The inclusion criteria comprised patients aged between 18 and 75 years, patients diagnosed with a benign pancreatic head tumor, and patients with complete clinical information. Exclusion Criteria: The exclusion criteria encompassed patients with malignant pancreatic tumors and patients with an American Society of Anesthesiologists (ASA) score of four or higher. The study collected data on relevant demographics, laboratory examinations, peri-surgical conditions, and clinical outcomes. If there was a high suspicion of tumor malignancy or lymph node metastasis, we do not perform DPPHR.

The revised manuscript now includes detailed information on the patient selection process and the criteria used for inclusion and exclusion. Thank you once again for your insightful feedback.

- Although briefly described in paragraph 6 of the discussion, expand upon the justification for a Beger procedure versus enucleation or whipple for non-inflammatory neoplastic processes as this is not standard of care.

Reply 2:

Thank you for your insightful comments. The reasons for choosing the Beger procedure over enucleation or Whipple for non-inflammatory neoplastic processes are as follows:

Tumor Location and Size: The Beger procedure is particularly advantageous for tumors located in the head of the pancreas that are too large or centrally located to be suitable for enucleation, yet not requiring the extensive resection involved in a Whipple procedure. This procedure allows for the complete removal of the tumor while preserving the duodenum and maintaining the integrity of the digestive tract.

Function Preservation and comorbidity: One of the primary reasons for selecting the Beger procedure is the preservation of pancreatic function. By sparing the duodenum and CBD. Compared to the Whipple procedure, the Beger procedure is associated with lower morbidity and mortality rates. This makes it a preferable option for patients who may not tolerate a more extensive surgery due to comorbid conditions or overall health status. **Oncological Outcomes:** For non-inflammatory neoplastic processes, the Beger procedure provides satisfactory oncological outcomes. It allows for adequate resection margins and lymph node dissection when necessary, ensuring the effective removal of the neoplasm while minimizing surgical trauma.

Enucleation: While enucleation is suitable for small, benign, or low-grade malignant tumors that are clearly demarcated from the surrounding pancreatic tissue, it is not appropriate for larger or more centrally located tumors. Enucleation also carries a higher risk of pancreatic fistula due to the proximity of the tumor to the main pancreatic duct. However, our research is preliminary and requires prospective studies for further validation.

- Please expand on the limitations of this retrospective review. Is it one surgeon that performs these procedures? What is that surgeon(s) learning curve? When was SILDPPHR+1 first attempted relative to the dates of this case series?

Reply 3:

Thank you for your valuable comments. We appreciate the opportunity to address the limitations of our retrospective review and provide additional context regarding the surgical procedures.

This study was conducted by a single surgeon, which introduces potential bias related to the individual surgeon's technique and experience. While this ensures consistency in the surgical approach, it may limit the generalizability of the findings to other surgeons with different levels of experience or techniques.

Learning curve: The learning curve related to SILDPPHR+1 is an important consideration factor. Prior to attempting SILDPPHR+1, the surgeons involved in this study had extensive experience in laparoscopic pancreatic surgery, with over 8 years of LPD experience and over 5 years of open DPPHR experience. Over time, as surgeons become more proficient in this technique, the results have improved.

The SILDPPHR+1 procedure was first attempted at our center in October 15, 2021. The initial cases were part of a learning phase, and we observed a progressive improvement in surgical outcomes as the surgeon gained more experience with the technique.

We have included these points in the revised manuscript to provide a more comprehensive discussion of the study's limitations. Thank you once again for your valuable feedback.

- I would be cautious with stating this procedure is safe and reliable for patients. Perhaps it is safe and reliable for specific surgeons with a certain amount of experience? (See previous comment)

Reply 4:

Thank you for your comments. We acknowledge the importance of emphasizing the role of surgical experience in the outcomes of the SILDPPHR+1 procedure. As you correctly pointed out, the safety and reliability of this procedure are closely linked to the surgeon's experience and expertise.

Based on our experience, the SILDPPHR+1 procedure can be considered safe and reliable when performed by surgeons with substantial experience in laparoscopic pancreatic surgeries. The outcomes presented in this study reflect the proficiency attained after overcoming the initial learning curve associated with this advanced surgical technique.

- An interesting future study would be to assess patient reported outcomes as cosmesis after surgery is subjective and cannot be definitely asserted from this study (although stated as a conclusion).

Reply 5:

Thank you for your comment. It cannot be denied that it would be interesting and more convincing to conduct prospective research on PRO-related cosmesis. We agree that the results reported by the patient self-assessment scale we use for beauty are subjective and require direct evaluation through patient feedback. We place greater emphasis on the perioperative complications and long-term survival of patients. Therefore, our current research conclusions on beauty are based on general observations and should be interpreted with caution.

Thank you again for your valuable feedback. Your suggestions will help guide future research and improve the comprehensiveness of our research.