

RESPONSE TO REVIEWERS

We thank the reviewers for providing constructive feedback. We have fully revised our manuscript and have addressed all of the reviewers' comments, as well as added new analysis to further strengthen our work. We appreciate the positive comments highlighting the contributions of our study. The major revisions and new analyses we have undertaken are summarized below and discussed in detail in the point-by-point responses.

Detailed response to Reviewer #1

"This is an interesting work with a relatively large cohort of patients dealing with the issue of postoperative pancreatic complications in traumatized patients. Nevertheless, I have a few comments on the text."

We thank the reviewer for their positive reviews regarding the impact of this study and appreciate the feedback.

"1. Method Similar to Table 1, 5 grades of pancreatic injury are mentioned, but it is not stated which classification the division is based on."

Response: We thank the reviewer for catching this deficiency and apologize for not clarifying the specific basis of the classification. In this study, pancreatic injuries are classified into 5 grades (I - V) according to the Organ Injury Scale (OIS) proposed by the American Association for the Surgery of Trauma (AAST) in 1990 (**Table R1**). There are several classification systems for pancreatic trauma, but the AAST-OIS classification is universally accepted at present. In the revised manuscript, we have clearly defined the AAST-OIS grading of pancreatic trauma in the Methods section.

Table R1: AAST-OIS grading of pancreatic trauma.

Grade*	Description*	Injury Morphology
I	Minor contusion without ductal injury	Contusion
	Superficial laceration without ductal injury	Laceration
II	Major contusion without ductal injury or tissue loss	Contusion
	Major laceration without ductal injury or tissue loss	Laceration
III	Distal pancreatic transection (through-and-through laceration)	Laceration
	Deep parenchymal injury with ductal injury (can involve tissue loss)	Laceration
IV	Proximal pancreatic transection (through-and-through laceration)	Laceration
	Deep parenchymal injury involving the ampulla (can involve tissue loss)	Laceration
V	Massive disruption of pancreatic head	Combination†

*AAST -OIS grade I and grade II injuries do not involve ductal injury and are considered low grade. AAST -OIS grade III–V injuries involve ductal injury and are considered high grade. In cases of multiple injuries, the classification should be advanced one grade, up to grade III.

†Combination of lacerations and contusions.

“2. When necessary, a pig tail catheter was placed...What was the indication for performing CT-drainage, possibly another (additional) procedure, and in how many patients was CT-drainage performed?”

Response: We thank the reviewer for raising this important point. CT-guided percutaneous drainage procedure was performed in patients with local pancreatic complications after failed initial drainage and/or new-onset gastrointestinal fistula and localized intra-abdominal abscess requiring source control. The key indications are as follows: 1) acute peri-pancreatic fluid collection or acute necrotic collection in combination with infection, 2) symptomatic or infected pseudocysts (diameter ≥ 6 cm) or walled-off necrosis, 3) infected pancreatic necrosis, 4) gastrointestinal fistula was confirmed by

fistulography, 5) localized intra-abdominal abscess (diameter ≥ 3 cm) without signs of generalized peritonitis. We have added it in the Methods section and rearrangements are made without losing the main information.

As the reviewer pointed out, CT- drainage is another procedure. In the entire cohort, CT-guided percutaneous drainage was performed in 18.0% (9/50) of patients in the NPI group versus 32.2% (47/146) in the PG group, and the difference was statistically significant ($P = 0.038$). After PSM, the proportion of the NPI group underwent CT-drainage still significantly lower than that of the PG group in the matched cohort (15.9% vs. 34.1%, $P = 0.042$) (**Table 3**). From this we found that patients in the NPI group could receive less invasive reinterventions.

“3. We regularly replaced the catheter...Does this mean that the catheter was replaced regardless of its functionality, i.e., even with continued high waste?”

Response: We thank the reviewer for pointing out this issue and providing constructive feedback. Two replacement strategies are employed for management of NPI drainage in clinical practice: 1) planned replacement for prophylactic drainage, 2) on-demand replacement for therapeutic drainage. If patients not develop pancreatic fistula grade B/C or gastrointestinal fistula and the volume of drainage fluid is decreasing, prophylactic NPI drainage is planned to be replaced every 3 days. For patients with pancreatic fistula grade B/C or gastrointestinal fistula, on-demand replacement is adopted due to the role of NPI has been convert to therapeutic drainage. Retaining the catheter in situ to a create controlled pancreaticocutaneous fistula or enterocutaneous fistula when there is a large volume of drainage fluid. In addition, on the basis of the nature of drainage fluid and the irrigation and drainage fluid in and out volume per unit time to judge whether catheter blockage occurred. If blockage occurs, replace it promptly. Moreover, in the presence of a decreasing volume of drainage fluid and no evidence of intra-abdominal infection, we switching the NPI drainage from on-demand to planned replacement. We have added

this description in the Methods section of the revised manuscript.

“4. Did catheter blockage occur in any case (another potential advantage of active drainage might just be a lower risk of catheter blockage).”

Response: We thank the reviewer for this observation. The incidence of catheter blockage was 9.6% (14/146) in the PG group, whereas it did not occur in the NPI group. As indicated by the reviewer, the patency of the catheter can be better provided by active drainage such as NPI. Interestingly, we also found the postoperative day 7 infection rate of drainage fluid in the NPI group was significantly lower than that in the PG group (11/36 [30.6%] vs. 27/43 [62.8%], $P = 0.004$) (Table S3). Irrigation enables dilution of the drainage fluid and maintains catheter patency, while continuous negative pressure suction prevents drainage fluid accumulation and further spread of inflammation. Under the dual effects, NPI drainage could achieve significant clinical benefits for patients with pancreatic trauma.

“5. Results ...The NPI group had less duodenum injury and more concomitant vascular injury...According to table 1 there was less vascular injury.”

Response: We apologize for not wording clearly the details of Table 1. In this study, to minimize the confounding effects of the baseline characteristics of the compared patients due to a non-randomized assignment, a 1:1 propensity score matching (PSM) study group was created to assess the effect of PG and NPI group on the primary outcome. Table 1 shows the comparison of baseline characteristics between the two groups in the entire cohort and matched cohort. In the entire cohort, the NPI group had more concomitant vascular injury than PG group (26% vs. 13%, $P = 0.032$). The reviewer observed less vascular injury in the NPI group (18.2% vs. 20.5%, $P = 0.787$), which was actually the result in the matched cohort. Some modifications in the Results section have made in order to make it clearer and easier for the readers to understand the comparison of baseline characteristics between the two groups.

“6. Discussion Another limitation is the lack of evaluation of the influence of other therapeutic procedures (especially CT-drainage). This is not necessarily a significant limitation, given that it is not stated in how many patients this occurred.”

Response: We thank the reviewer for their very careful review of our manuscript and their constructive comments, which have helped us to substantially improve the quality of the manuscript. As in response to the question 2, we added a comparison of CT-drainage between the two groups and found patients in the NPI group could receive less invasive reinterventions (**Table 3**).

Detailed response to Reviewer #2

“This is an interesting paper.”

We sincerely thank the reviewer for their kind summary regarding the impact of this study and appreciate the feedback.

“1. Please add the drainage period for both groups.”

Response: We thank the reviewer for providing constructive feedback and have added this data in the Results section accordingly. In the entire cohort, the drainage period in the NPI group was significantly lower than in the PG group (median [IQR], 37.0 [20.0-54.25] vs. 47.0 [30.0-75.25] days; $P = 0.002$). In the matched cohort, the NPI group still had lower drainage period (median [IQR], 35.0 [20.0-54.75] vs. 47.0 [30.0-68.0] days; $P = 0.009$) (**Table 3**). These data would further enrich the results regarding the NPI drainage is superior to the PG drainage.

“2. Please elaborate on why primary NPI drainage has a lower postoperative complication rate than PG drainage.”

We thank the reviewer for this thoughtful suggestion. Maintaining patency of the postoperative drainage is essential for ensuring a successful operation. However, catheter blockage and poor drainage may lead to failed surgery. For

NPI drainage, the outer cannula can prevent both aspiration damage to surrounding tissues and blockage of the inner suction cannula. Irrigation with sterilized saline and continuous suction through low negative pressure keeps the catheter patency, and collections such as pancreatic fluid and non-liquid materials can be effectively suctioned out following the irrigating water stream. Besides, continuous irrigation enables dilution of the drainage fluid, while low negative pressure suction prevents drainage fluid accumulation and further spread of inflammation. Passive gravity drainage generally relies on the pressure difference and gravity, which may not obtain adequate drainage and predisposes to catheter blockage. Therefore, the results of this study also indicate that initial NPI drainage has a lower postoperative complication rate than PG drainage (**Table 3**). We have added this description in the Discussion section of the revised manuscript.

We thank the editor and two reviewers for their constructive comments on our manuscript and for the opportunity to revise and resubmit.