

Analysis of Outcomes of Surgery for Chronic Pancreatitis according to International Study Group for Pancreatic Surgery Reporting System

Nimesh Bista, Paleswan Joshi Lakhey, Bishnu Prasad Kandel, Sumita Pradhan, Narendra Maharjan, Deepak Sharma, Nishnata Koirala, Ramesh Singh Bhandari

Author(s) affiliation

Department of Surgical
Gastroenterology, Maharajgunj
Medical Campus, Tribhuvan
University Teaching Hospital,
Institute of Medicine, Kathmandu,
Nepal

Corresponding author

Bishnu Prasad Kandel, MBBS, MS
drkandel@hotmail.com

DOI

[10.59779/jiomnepal.1389](https://doi.org/10.59779/jiomnepal.1389)

Submitted

May 13, 2025

Accepted

Jul 26, 2025

ABSTRACT

Introduction

Due to lack of standard reporting system for chronic pancreatitis that could include all the aspect of the disease process. International Study Group for Pancreatic Surgery (ISGPS) formulated a framework for reporting the surgery for chronic pancreatitis. This framework incorporates our recent understanding, management and outcomes of chronic pancreatitis. We aimed to report surgery performed at our department for chronic pancreatitis with this standard reporting system.

Methods

From January 2021 to December 2024, 32 patient who underwent surgery for chronic pancreatitis were enrolled in the study. Patients details of clinical baseline prior to surgery, morphology of diseased pancreas, type of surgery and post operative outcomes were evaluated and reported according to four domains of ISGPS.

Results

A total of 32 patients underwent surgery. Alcohol was the etiology in six (18.75 %) and rest were identified as idiopathic. Diabetes was prevalent in 13 (40.6%) of patient with exocrine insufficiency in only one patient. All patient had parenchymal calcification. Ductal stone was present in 29 (90.6%) with stricture in 16 (50.0%) patients. Longitudinal pancreatojejunostomy with partial pancreatic head resection was the most common surgery performed in 27 (84.3%) patients. Postoperatively two patients had major complications. There was no 90 days re-operation and mortality.

Conclusion

This reporting system is feasible to report surgery for chronic pancreatitis. However, large scale prospective study validation is required.

Keywords

Chronic pancreatitis; ISGPS; reporting; surgery

INTRODUCTION

Chronic pancreatitis is a fibroinflammatory syndrome of pancreas, where there is an irreversible damage of pancreatic tissue due to repeated pancreatic inflammation.¹ Out of various treatment options, surgery is considered superior in chronic pancreatitis associated with pain.² Surgical procedures performed are partial pancreatic head resection, drainage of main pancreatic duct and combination of both procedures. These procedures are described by terms such as Frey, Puestow or Beger with some variations and modifications based on center. The choice of surgery depends upon the morphological variation such as presence of head mass, calcification, stricture and dilation of duct of the diseased pancreas. These factors eventually influence the outcome of surgery.³

With increase in understanding of etiology, pathophysiology and management of this complex disease there was lack of standard reporting system that could include all aspect of disease. As in a study by Benzing C et al the morphology of disease pancreas were not reported.⁴ Similarly in a study by Ke N et al surgery was reported as Frey, Beger.⁵ Therefore, ISGPS in 2020 provided a standard reporting framework that provide information on clinical baseline of disease, morphology of pancreas, operative procedure and outcome of patient.³ Recently a study by Kempeneers MA et al and Waage A et al reported the outcomes as the ISGPS framework that was standard and complete.^{6,7}

Hence, the study was performed with the aim to report the outcomes of patient according to ISGPS that underwent surgery for chronic pancreatitis at department of Surgical Gastroenterology Tribhuvan University Teaching Hospital.

METHODS

This is a retrospective study with analysis of data of surgery of chronic pancreatitis from January 2021 to December 2024 carried out in Department of Surgical Gastroenterology, Tribhuvan University Teaching Hospital, Maharjunj Medical Campus, Kathmandu, Nepal. The protocol was approved by the Institutional review committee of Institute of Medicine, Tribhuvan University.

All Patients undergoing surgery for chronic pancreatitis were included in the study. Analysis of preoperative, intraoperative and postoperative variables such as etiology, durations of symptoms, duct size, postoperative complications were performed and reported according to domain as per reporting system of ISGPS for surgery of chronic pancreatitis.

The domains are in the list as in the original article.³

List 1: Domain 1, Clinical baseline prior to surgery

- Etiology

- Duration of symptoms
- Opiate use
- Duration of opiate use
- Presence/absence of diabetes mellitus
- Presence/absence of exocrine insufficiency
- Prior intervention (radiologic, endoscopic, or surgical)
- Quality of life prior to operation (EQ-5D-5L* or similar)
- Employment status prior to operation

List 2: Domain 2, Morphology of diseased pancreas

- Maximum duct size
- A-P diameter of pancreatic head
- Pancreatic gland calcification
- Ductal stones
- Ductal strictures.
- Patency status of portal vein
- Concomitant biliary stricture
- Concomitant duodenal stenosis

List 3: Domain 3, Standard operative descriptors

- Longitudinal pancreaticojejunostomy
- Longitudinal pancreaticojejunostomy with partial pancreatic head resection
- Duodenum-preserving subtotal pancreatic head resection with transection at neck of pancreas
- Duodenum-preserving subtotal pancreatic head resection without transection at neck of pancreas
- Pancreatoduodenectomy
- Total Pancreatectomy ± islet auto transplantation
- Distal pancreatectomy ± splenectomy

List 4: Domain 4, Minimum outcome dataset

- In-patient morbidity using the Dindo-Demartines-Clavien system.
- Postoperative opiate use.
- Postoperative diabetes mellitus
- Postoperative exocrine insufficiency.
- In-patient stay (days) and re-admission.
- Re-operation within 90 days
- Operative mortality (in-patient, 90 days and 12 months)
- Quality of life after operation (EQ-5D-5L* or similar)
- Employment status after operation

*EQ-5D-5L: EuroQol 5-Dimension 5-Level

The collected data was entered in Microsoft Excel and statistical analysis was done by using SPSS 30.0. Data was analyzed by descriptive statistics (frequencies, percentage, mean, median and standard deviation).

RESULTS

A total of 32 patients, who underwent surgery for chronic pancreatitis were studied. The etiology was likely to be idiopathic in 26 patients (81.25%)

Table 1. Domain 1,
Clinical baseline prior to surgery

Variables	Number (%)
Etiology, n (%)	
Alcohol	6 (18.75 %)
Idiopathic	26 (81.25%)
Durations of symptoms, mean \pm SD, months	45 \pm 23.21
Opiate use, n (%)	16 (50%)
Duration of opiate use	Not assessed
Diabetes mellitus, n (%)	13 (40.6%)
Exocrine insufficiency, n (%)	1 (3.12%)
Prior intervention, n (%)	
PD stenting	4 (12.5%)
Pancreaticoduodenectomy	1 (3.12%)
Quality of life	Not assessed
Employment status	Not assessed

and six patients (18.75%) alcohol was the likely cause of chronic pancreatitis. The mean duration of symptoms was 45 months and 13 (40.6%) patients had diabetes mellitus before surgery. As tests for exocrine insufficiency are not widely available, only one patient had documented fecal elastase test positive for chronic pancreatitis. Prior pancreatic duct (PD) stenting was performed in four patients (12.5%). One patient had previous history of pancreaticoduodenectomy, which was performed for pancreatic head mass with chronic pancreatitis. On evaluation for recurrent pain abdomen after surgery, Contrast enhanced computed tomography (CECT) scan was suggestive of diffuse pancreatic calcification, dilated main pancreatic duct (MPD) with calculi (Table 1).

The mean maximum diameter of MPD was 8.39 ± 3.81 mm. Atrophic pancreatic head was present in 26 patients (81.25%) with the mean anteroposterior (AP) diameter of pancreatic head being 2.92 ± 0.71 cm. All of the 32 patients had parenchymal calcification with ductal stone present in 29 (90.6%) and stricture in 16 (50%) of patients. The portal vein was patent in all 32 patients with no duodenal stenosis. Biliary stricture was present in two patient (6.25%) (Table 2).

Longitudinal pancreaticojejunostomy with partial pancreatic head resection (Frey's procedure) was the most frequent surgery performed in 27 (84.3%) patients, followed by pancreaticoduodenectomy in four (12.5%) patients (Table 3). The indication of pancreaticoduodenectomy were biliary stricture in two patient and inflammatory head mass in two patients.

Postoperative complication occurred in 13 patients (40.62%) in which Clavien-Dindo grade II was the

Table 2. Domain 2,
Morphology of diseased pancreas

Variables	Number (%)
Maximum duct diameter, mean \pm SD, mm	8.39 ± 3.81
AP diameter of pancreatic head, mean \pm SD, cm	2.92 ± 0.71
Pancreatic gland calcification, n (%)	32 (100%)
Ductal stone, n (%)	29 (90.6%)
Ductal stricture, n (%)	16 (50.0%)
Patency status of portal vein, n (%)	32 (100%)
Concomitant Biliary stricture, n (%)	2 (6.25%)
Concomitant Duodenal stenosis, n (%)	0

most common grade of complication in seven (18.75%) of patients followed by grade I in 12.5%. Grade III complication occurred in one patient who required angioembolization for post-pancreatectomy hemorrhage (PPH) after Frey's procedure on eight post operative day. One patient developed grade IV complication after pancreaticoduodenectomy with postoperative inotropes requirement. PPH occurred in four (12.5%) patients and post operative pancreatic fistula (POPF) in three (9.37%) patients. No patients developed delayed gastric emptying (DGE) or postoperative chylous fistula. There was no mortality or 90 days reoperation. The mean

Table 3. Domain 3, Standard operative descriptors

Variables	Number (%)
Longitudinal pancreaticojejunostomy	1
Longitudinal pancreaticojejunostomy with partial pancreatic head resection,	27 (84.3%)
Duodenum-preserving subtotal pancreatic head resection with transection at neck of pancreas	0
Duodenum-preserving subtotal pancreatic head resection without transection at neck of pancreas	0
Pancreaticoduodenectomy	4 (12.5%)
Total Pancreatectomy \pm islet auto transplantation	0
Distal Pancreatectomy \pm splenectomy	0

Table 4. Domain 2, Minimum outcome dataset

Variables	Number (%)
Morbidity by Clavein-Dindo system	
Grade I, n (%)	4 (12.5%)
Grade II, n (%)	7 (18.75%)
Grade III, n (%)	1 (3.12%)
Grade IV, n (%)	1 (3.12%)
Postoperative opiate use, n (%)	3 (9.37%)
Postoperative diabetes mellitus, n(%)	13 (40.6%)
Postoperative exocrine insufficiency	NA
In patient stay day, mean \pm SD	14.78 \pm 6.61
Readmission, n (%)	2 (6.25 %)
Reoperation within 90 days	0
Operative mortality	0
Quality of life after operation, EQ-VAS (mean \pm SD)	90.33 \pm 11.53
Employment status after operation	22

EQ-VAS: EuroQol visual analogue score

duration of hospital stay was 14.78 \pm 6.61 days. Postoperative opiate use was in three patients (9.37%) and diabetes was present in 13 patients (40.6%). After discharge, two patients were readmitted for pain abdomen within 90 days (Table 4).

DISCUSSION

This study is an attempt to report the outcomes of surgery for chronic pancreatitis according to ISGPS guidelines.³ In the first domain of ISGPS, etiology plays a key role in disease pathogenesis. The TIGAR-O classification system was adopted by ISGPS for reporting. Alcohol a toxin-metabolic factor accounted for 18.75% patients in this study. The susceptibility to chronic pancreatitis increases with duration and amount, approximately 4-5 drinks per day and even higher with binge drinking. Remaining 81.25% cases were idiopathic in this study. The mutation of PRSS 1, CFTR 2, SPINK-1 genes should be suspected in a young patient < 35 yrs of age without obvious cause.⁸ While other metabolic causes like hypercalcemia, hyperlipidemia were evaluated. The genetic mutation and autoimmune pancreatitis were not assessed at our center before classifying as idiopathic cause.

Pain is the frequent complaint and difficult to manage. Substantial number of patients are on chronic pain management with analgesic requiring opioids. Because of use of opioids, these patients

are at risk of developing opioid use disorder with clinical impairment and distress. Opioid is a leading contributor of acute exacerbation of chronic pancreatitis.⁹ The opioid use was prevalent in 50% of our patients preoperatively that reduced to 9.37% after surgery. All of the opioid use was tramadol which is commonly available that has a morphine equivalence of 0.2.¹⁰

Diabetes mellitus is a late complication occurring in 15-20% of patients with chronic pancreatitis due to depletion of pancreatic beta cells. Main treatment of diabetes in chronic pancreatitis is insulin.¹¹ Only five patients (15.65%) were on insulin therapy. The patients in this study had mean duration of symptoms of 45 \pm 23.21 months. Early surgery in these patients might be the reason for 19 patient (59.37%) have preservation of endocrine function and insulin requirement only in five patients. In this study 13 patients (40.6%) had diabetes and postoperatively it remains same till 90 days follow up. Exocrine insufficiency is caused due to inadequate secretion pancreatic digestive enzymes and bicarbonate. The maldigestion caused by exocrine insufficiency is associated with increased morbidity and mortality.¹² Only one patient in our study was diagnosed to have exocrine insufficiency by fecal elastase test. ISGPS recommends its diagnosis by secretin-enhanced magnetic resonance cholangiopancreatography, measurement of fecal elastase or coefficient of fat absorption.³ As this test are not readily available and uneconomical, they were not performed in all patients. Pancreatic calcification is pathognomy of chronic pancreatitis with incidence ranging 70-90%.¹³ These stone are situated in parenchyma, side branches and main duct of pancreas. They cause ductal obstruction that results in ductal hypertension, pain, ischemia and ductal strictures.¹⁴ In this study the pancreatic parenchymal calcification was present in all patient with 90% of them having ductal calculi and ductal stricture in 50%. Biliary and duodenal stricture are other common complication, with incidence up to 35% and 12% respectively. As the stricture are in proximity with chronically inflamed pancreatic head, this inflammation process can extend to bile duct, duodenum and major blood vessels.¹⁵ Pseudocyst are relatively common in chronic pancreatitis with incidence of 20-40%.¹⁶ However this complication is not included in ISGPS reporting system

Endoscopic pancreatic duct dilation and stenting are performed for duct strictures. Stenting is done with pancreatic duct stent, exchanged yearly and removed after two years. About 40- 51% of patients pain persist after stent removal.² Stenting was performed in two patients however they ultimately required surgery for persistent pain. Surgery is considered superior to endoscopic stenting for pain control.¹⁷ A randomised control trial by Cahen DL et al in 39 patients randomised to endoscopic

treatment and pancreaticojejunostomy. Surgical treatment had lower Izbicki pain scores (25 vs. 51, $P < 0.001$) at 24 months with similar quality of life and pancreatic function.¹⁷ Izbicki score is commonly used pain scale that was developed for objective assessment of pancreatic pain. This scoring system is commonly used in our department. However, due to lack of adequate validation, ISGPS has not included it in its reporting system.¹⁸

Surgical treatment is divided into drainage, resection and combination procedure. Type of procedure depend upon the pancreatic morphology (e. g dilated MPD, head mass) and complications of adjacent organ (e.g biliary stricture). The lateral pancreaticojejunostomy is a drainage only procedure performed with MPD more than 5 mm without head mass. It was performed in one patient with previous history of pancreaticoduodenectomy. Longitudinal pancreaticojejunostomy with partial pancreatic head resection (also known as Frey's procedure) was the most common procedure performed at our center in 27 patient (84.3%). Our institute performs Frey's procedure in majority as it deals with pacemaker of inflammation (head of pancreas) and drainage of obstructed ductal system. In addition, it is less morbid and require only one anastomosis. Pancreaticoduodenectomy is performed in four patients, in which two patients had biliary stricture and two had suspected pancreatic head mass. Both were the indications of pancreaticoduodenectomy in chronic pancreatitis.¹⁹ Eponymous terms such as Frey, Beger or Puestow are not used by ISGPS as there are variations of this procedure among surgeons and centers. A standard description is provided for each type of surgery.³

The postoperative complication is graded according to Clavein-dindo system, an easy and well accepted system. Complication greater than grade II is regarded as a major complication which was present in two patients.²⁰ One patient required post operative inotropes and another angioembolization for post pancreatectomy intraluminal haemorrhage. The mean duration of stay of was 14.78 ± 6.61 days. There were two patients readmitted within 90 days for pain abdomen. Both of them were managed conservatively and discharged with no postoperative mortality and reoperation in our study. Our study has a limitation; it is a single center retrospective study. The duration of opioid use, quality of life pre operatively could not be evaluated. Postoperatively 23 patients were evaluated for quality of life and employment status. Quality of life was calculated with EuroQol visual analogue score (EQ-VAS). The score of zero represent worst imaginable health and 100 represent best imaginable health.²¹ The mean EQ-VAS score was 90.33 ± 11.53 . Almost all of the patients (95.6%) were employed post operatively

after surgery and able to perform daily activities normally.

CONCLUSION

ISGPS reporting system has included all the aspect of this complex disease. This reporting system is feasible and helps to make a proper record of patient with meaningful comparison. However, validation of this reporting system by large prospective study is needed.

ACKNOWLEDGEMENT

We will like to thank all residents, faculties and Head of Department of Surgical Gastroenterology, Maharajgunj Medical Campus, Tribhuvan University for providing encouragement and support for writing this paper

FINANCIAL SUPPORT

There is no any financial support in this study.

CONFLICT OF INTEREST

The author(s) declare that they do not have any conflicts of interest with respect to the research, authorship, and/or publication of this article.

REFERENCES

- G, Habtezion A, Werner J et al. Chronic pancreatitis. *The Lancet*. 2020;396(10249):499-512. doi:10.1016/S0140-6736(20)31318-0
- Udd M, Kylänpää L, Kokkola A et al. The role of endoscopic and surgical treatment in chronic pancreatitis. *SJS*. 2020;109(1):69-78. doi:10.1177/1457496920910009
- Siriwardena AK, Windsor J, Zyromski N et al. Standards for reporting on surgery for chronic pancreatitis: a report from the International Study Group for Pancreatic Surgery (ISGPS). *J.Surg*. 2020;168(1):101-5. doi:10.1016/j.surg.2020.02.007
- Benzing C, Hau HM, Atanasov G et al. Surgical therapy of chronic pancreatitis: clinical results and health-related quality of life. *Gastroenterol*. 2018;56(11):1354-64. doi:10.1055/a-0713-0873
- Ke N, Jia D, Huang W et al. Earlier surgery improves outcomes from painful chronic pancreatitis. *Medicine*. 2018;97(19):e0651. doi:10.1097/MD.00000000000010651
- Kempeneers MA, van Hemert AK, van der Hoek M et al. Short- and long-term outcomes of selective use of Frey or extended lateral pancreaticojejunostomy in chronic pancreatitis. *BJS*. 2022;109(4):363-71. doi:org/10.1093/bjs/znab473
- Waage A, Vinge-Holmquist O, Labori KJ et al. Tailored surgery in chronic pancreatitis after implementation of a multidisciplinary team assessment; a prospective observational study. *HPB*. 2022;24(12):2157-66. doi:org/10.1016/j.hpb.2022.09.007
- Whitcomb DC, North American Pancreatitis Study Group. Pancreatitis: TIGAR-O version 2 risk/etiology checklist with topic reviews, updates, and use primers. *CTG*. 2019;10(6):00027. doi:10.14309/ctg.0000000000000027
- Charilaou P, Mohapatra S, Joshi T et al. Opioid use disorder in admissions for acute exacerbations of chronic pancreatitis and 30-day readmission risk: a nationwide matched analysis. *J.Pan* 2020;20(1):35-43. doi:10.1016/j.pan.2019.11.004

10. Nielsen S, Degenhardt L, Hoban B et al. Comparing opioids: a guide to estimating oral morphine equivalents (OME) in research. Sydney: National Drug and Alcohol Research Centre; 2014.
11. Shimizu K, Ito T, Irisawa A et al. Evidence-based clinical practice guidelines for chronic pancreatitis 2021. *J. Gastroenterol.* 2022;57(10):709-24. doi:10.1007/s00535-022-01911-6
12. Erchinger F, Engjom T, Dimcevski G et al. Exocrine pancreas insufficiency in chronic pancreatitis—risk factors and associations with complications. A multicentre study of 1869 patients. *Pan.* 2022;22(3):374-80. doi:10.1016/j.pan.2022.02.003
13. Ammann RW, Muench R, Otto R et al. Evolution and regression of pancreatic calcification in chronic pancreatitis: a prospective long-term study of 107 patients. *Gastroenterology.* 1988;95(4):1018-28. doi:10.1016/0016-5085(88)90178-3
14. Kaushik N, Dasari V, Jain D et al. Management of pancreatic calculi in chronic pancreatitis: a review article. *Cureus.* 2023;15(3). doi:10.7759/cureus.35788
15. Walia D, Saraya A, Gunjan D et al. Vascular complications of chronic pancreatitis and its management. *WJGS.* 2023;15(8):1574. doi:10.4240/wjgs.v15.i8.1574
16. Poulsen JL, Olesen SS, Drewes AM et al. The pathogenesis of chronic pancreatitis. In *Chronic Pancreatitis: From Basic Research to Clinical Treatment.* Springer Singapore 2017(29-62). doi:10.1007/978-981-10-4515-8_5
17. DL, Gouma DJ, Nio Y et al. Endoscopic versus surgical drainage of the pancreatic duct in chronic pancreatitis. *NEJM.* 2007;356(7):676-84. doi:10.1056/NEJMoa060610
18. Kuhlmann L, Teo K, Olesen SS et al. Development of the comprehensive pain assessment tool short form for chronic pancreatitis: validity and reliability testing. *CGH.* 2022;20(4):770-83. doi:10.1016/j.cgh.2021.05.055
19. Dankha R, Sparrelid E, Gilg S et al. Surgical management of chronic pancreatitis: A narrative review. *United European Gastroenterol J.* 2025;13(1):44-54. doi:10.1002/ueg2.12694
20. Dindo D, Demartines N, Clavien PA et al. Classification of surgical complications: a new proposal with evaluation in a cohort of 6336 patients and results of a survey. *Annals of surgery.* 2004;240(2):205-13. doi:10.1097/01.sla.0000133083.54934.ae
21. EuroQol Research Foundation. Eq-5D-5L user guide, 2015. <https://euroqol.org/publications/user-guides/>.