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Case Series

Gastrointestinal function and quality of life in postoperative patients of pancreatoduodenectomy

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ABSTRACT

Pancreaticoduodenectomy (PD) is a complex, high-risk procedure with insufficient data on long-term quality of life and gastrointestinal function. Therefore, it is necessary to determine the level of quality of life and functional outcomes in these patients. In the following study, we present a case series analysis, establishing a direct relationship between post-surgical evolution and its impact on quality of life and gastrointestinal function, using two questionnaires: Short Form 36 and Gastrointestinal Symptom Rating Scale. Out of 15 patients the prevalence of pancreaticoduodenectomy in women was 69%, with a mean age of 53 years. The average follow-up period was 3.47 years. When applying the Short Form 36, they rated their general health at 68.67 points, emotional well-being at 78 points, and social well-being at 73 points. Regarding the Gastrointestinal Symptom Rating Scale, 100% reported pain and indigestion, some experienced gastroesophageal reflux, diarrhea, steatorrhea, and constipation; none of these symptoms limited daily life. Patients undergoing pancreaticoduodenectomy experience changes in their quality of life; likewise, gastrointestinal function alterations are common. Those who survive the underlying pathology and PD have quality of life and gastrointestinal function close to normal values, with improvements possible through symptom treatment, psychological support, social assistance, and physical rehabilitation.

Keywords: Pancreaticoduodenectomy, Pancreatic cancer, Quality of life, Gastrointestinal function

INTRODUCTION

The pancreatoduodenectomy (PD) is a complex and high-risk surgical procedure, also known as the "Whipple procedure".[1] Pancreatic surgery carries significant risks of morbidity and mortality, with limited survival rates. Despite being the only option that offers a chance for long-term survival, the mortality rate has decreased (5-10%), but morbidity remains high (20-40%).[2] Conventional PD includes distal gastrectomy, resection of the head of the pancreas, duodenum, the first 15 cm of the jejunum, common bile duct, and gallbladder, with or without lymphadenectomy depending on the initial diagnosis. A modification is the pylorus-preserving PD (PPPD), where the gastric antrum, pylorus, and 2-3 cm of the proximal duodenum are preserved, aiming to delay gastric emptying and reduce the postoperative incidence of dumping syndrome, marginal ulcers, and bile reflux.[3,4] The indications for this procedure have expanded with improvements in diagnostic capabilities and extended indications for PD. More patients are undergoing this major surgery, improving survival and morbidity/mortality outcomes in many specialized hospital centers.

Additionally, with effective adjuvant therapy and perioperative management, the population recovering from PD has increased.[5] The most common indication for PD is the presence of malignant or premalignant

neoplasms in the head of the pancreas or periampullary structures, along with other benign diseases. PPPD is indicated for benign pathologies and certain malignancies with careful preoperative selection.[6,7] A global complication rate of less than 40% has been described, with the main complications being delayed gastric emptying, pancreatic leak, biliary fistula, surgical wound infection, abscesses, ileus, among others.[8] Long-term morbidity includes recurrence, weight loss, exocrine pancreatic insufficiency (40%), endocrine pancreatic insufficiency (20%), anastomotic stenosis (in pancreatic cases, recurrent pancreatitis, chronic pancreatic pain), anastomotic dehiscence (any), intestinal obstruction, and chronic pain.[8,9]

In a morbidity and mortality study, morbidity was 69%, with the main complications being pancreatic fistulas in 23.9%, postoperative haemorrhage in 15.5%, and nosocomial pneumonia in 12.6%. However, these complications did not influence mortality outcomes 9. In other series, morbidity was 41.8%, reporting pancreatic fistula in 13.5%, delayed gastric emptying in 5.4%, postoperative hemorrhage in 8.1%, wound infection in 8%, and nosocomial pneumonia in 16.2% as the main complications 10. Initially, mortality was high, with reports of 25-30% mortality, but recently it has decreased to less than 5% in some highly experienced surgical centers.

Beyond addressing postoperative complications and mortality, there is still much controversy regarding the short- and long-term impact on the quality of life after a PD. The combination of major surgery and limited life expectancy makes it necessary to analyze the quality of life in these patients. There are very few studies focused on assessing the quality of life in post-Whipple procedure patients in Mexico, highlighting the need to include this focus in their follow-up. The SF-36 (Short Form-36) questionnaire has been used to measure quality of life, composed of 8 domains with a total of 36 questions that evaluate physical functioning, role limitations due to physical health, role limitations due to emotional problems, energy/fatigue, emotional well-being, social functioning, pain, and general health.

The results are expressed on a scale from 0 (worst outcome) to 100 (best outcome). Its use has become widespread in surgical patients as a predictive value of postoperative recovery. Authors have demonstrated that in the period of 1-3 months after surgery, there is a marked decrease in quality of life, with significant impact on physical function and emotional role. However, around 3-6 months later, patients report notable improvement, regardless of the complications they may have suffered.[11,12] Just as therapeutic options and surgical indications, understanding and anticipating long-term healthcare for PD survivors are important. To assess postoperative gastrointestinal function, the gastrointestinal symptom rating scale (GSRS) has been used, consisting of 15 items that rate gastrointestinal symptoms on a 7-point scale, including abdominal pain, reflux, indigestion, diarrhoea, and constipation.[13] The GSRS allows for discrimination of digestive symptoms and correlates with health-related quality of life. A high score indicates severe symptoms and dysfunction. It is also important to analyze the percentage of exocrine and endocrine pancreatic insufficiency, reported in the literature to be between 25-49% and 14-22%, respectively.[14] About 18% of pancreatic insufficiencies were diagnosed one year later, so long-term survivors need pancreatic enzymes, which can impact gastrointestinal symptoms.[15]

Given the increase in indications for PD, we consider it necessary to analyze the quality of life of patients, identifying the consequences of major pancreatic surgery in the domains evaluated by the SF-36 questionnaire at different time periods, as well as postoperative gastrointestinal function using questionnaires like the GSRS, with the aim of identifying problems early and providing appropriate medical management. In this case series, our objective is to determine the level of quality of life and functional outcomes in patients undergoing the Whipple procedure at the Hospital de Especialidades “Dr. Bernardo Sepúlveda”, Centro Médico Nacional Siglo XXI, using the SF-36 and GSRS questionnaires.

CASE SERIES

We hereby present a case series with minimal risk according to the Regulations of the General Health Law on human research. Patients admitted to the Hospital de especialidades with an indication for Whipple procedure from January 1, 2019, to December 31, 2023, were studied. We collected data from all patients diagnosed with benign and malignant conditions who were hospitalized and underwent Whipple surgery during the mentioned period. Data was obtained from each patient's medical records.

Patients included were those undergoing pancreatoduodenectomy without any other major surgery in the past 12 months, capable of communicating and understanding the questions asked. Those with diagnosed mental illness, alcohol or drug abuse, lost medical records, or lack of follow-up for any reason were excluded. Interviews were conducted in person or via telephone (for out-of-town patients or those with restricted mobility), applying two questionnaires: the SF-36 (Short Form 36) validated under Mexican health norms and the GSRS (Gastrointestinal Symptom Rating Scale) at 3- and 9-months post-surgery for outcome assessment. After data collection, descriptive statistics were used to summarize clinical and demographic variables.

Bivariate comparisons for quantitative variables were conducted using Student's t-test or Mann-Whitney U test, depending on the distribution type, to explore the relationship between the type of procedure and its association with quality of life and gastrointestinal function. The significance level was set at $p < 0.05$, and statistical tests were performed using SPSS version 29.

This study required informed consent from patients during in-person interviews. For telephone interviews, approval was obtained from the Ethics and Research Committee of our hospital to waive the requirement for informed consent in those cases. No participants were under the age of 18. Regarding confidentiality, information for this study was collected from patient medical records and interviews, ensuring that personal data would not be disclosed.

Anonymity and confidentiality of information related to privacy were maintained (Article 21, Section VIII of the Ley General de Salud Mexicana). This study complies with current regulations on health research and was authorized by the Comisión Nacional de Investigación Científica, IMSS.

The authors declare that this article does not contain any personal information that could identify the patients. Initially, 59 patients meeting the diagnostic inclusion criteria were selected.

Forty-four patients were excluded due to incomplete medical records (23), lack of postoperative follow-up (12), and death (9), leaving 15 patients for the study. All participants underwent PD at least 6 months prior to their participation in the study. The mean age of the overall population was 53±11 years. Among the 15 patients, 9 (60%) were female and 6 (40%) were male. The mean follow-up period for patients was 3.47 years post-surgery.

The most frequent etiology among malignant pathologies was pancreatic adenocarcinoma in 53.3% (8 patients), followed by ampullary carcinoma (13.3%), pancreatic cystic tumor (13.3%), duodenal GIST (6.7%), and neuroendocrine tumor (6.7%). One patient (6.7%) was diagnosed with benign duodenal tumor. Of the total procedures performed, 46.6% were classic pancreatoduodenectomies and 53.4% were pylorus-preserving pancreatoduodenectomies.[7,8] Both previously mentioned questionnaires, SF-36 for assessing quality of life and GSRS for gastrointestinal function, were administered.

Authors obtained an average score of 65.33±18.46 for physical health evaluation. Patients reported limitations in performing daily activities and sometimes had to change employment due to the surgery, with a median score of 20 (range 15-35). They also reported experiencing some form of pain directly related to the surgical intervention, with a median score of 20 (range 10-30).

Regarding emotional well-being, 3 patients experienced some form of significant limitation, primarily within the first 6 months post-surgery; the remainder expressed feeling emotionally well, without data indicating sadness, anxiety, or depression, with a mean score of 78±19.34.

Regarding social well-being, an average score of 73.34±24.97 was obtained in terms of previous social well-being. The gastrointestinal symptom rating scale (GSRS) was used to measure gastrointestinal function, with scores ranging from 0 to 4 indicating lower to higher symptomatology. Results were summarized into the 6 main gastrointestinal disturbances. Abdominal bloating or indigestion scored 2.07, followed by abdominal pain at 1.73, both reported in all patients. Reflux was found in 14 patients with a mean score of 1.53, diarrhea in 12 patients with a mean score of 1.47, steatorrhea in 9 patients (0.8), and constipation in 6 patients (0.4) (Table 1).

An association was established between the type of resection and quality of life parameters, as well as gastrointestinal symptoms, using bivariate analysis with Student's t-test and Mann-Whitney U test, finding all results with p-values greater than 0.05 (Table 2 and 3).

Table 1: Demographic characteristics, quality of life, and functional outcomes (n=15).

		N (%)
Age (in years)*		53±11
Gender		
Female		9 (60)
Male		6 (40)
Diagnosis		
Pancreatic adenocarcinoma		8 (53.4)
Duodenal GIST		2 (13.4)
Ampullary carcinoma		2 (13.4)
Neuroendocrine tumor		1 (6.7)
Pancreatic cystic tumor		1 (6.7)
Duodenal tumor (benign)		1 (6.7)
Type of procedure		
PD		7 (46.6)
PPPD		8 (53.4)
Follow-up periods mean (SD) years		3.47±2.53
SF-36 mean (SD)		
Physical health		65.33±18.46
Physical limitations median (IQR)		20 (15-35)
Energy		64±20.9
Pain median (IQR)		20 (10-30)
General health		68.67±17.67
Emotional health limitations median (IQR)		20±(5-30)
Emotional well-being		78±19.34
Social well-being		73.33±24.97
GSRS mean (SD)	**n (SD)**	**N (%)**
Indigestion	2.07±0.70	15 (100)
Abdominal pain	1.73±0.88	14 (93.3)
Reflux	1.53±0.74	15 (100)
Diarrhea	1.47±1.12	12 (80)
Steatorrhea	0.8±0.86	9 (60)
Constipation	0.4±0.63	6 (40)

*Mean±SD; SD: Standard deviation, IQR: Interquartile range, SF-36: Short Form 36 (Short Form 36), GSRS: Gastrointestinal Symptom Rating Scale, GIST: Gastrointestinal stromal tumor, PD: Pancreaticoduodenectomy, PPPD: Pylorus-preserving pancreaticoduodenectomy.

Table 2: Gastrointestinal function parameters by resection type.

Parameter	PD	PPPD	P value
Abdominal pain	2	1.5	0.53’
Reflux	1	2	1’
Indigestion	2	2	1’
Diarrhea	1.43	1.5	0.9*
Steatorrhea	1	1	1’
Constipation	0	0	1’

PD: Pancreaticoduodenectomy, PPPD: Pylorus-preserving pancreaticoduodenectomy, *: Student's t-test, ‘: Mann-Whitney U.

Table 3: Quality of life parameters by resection type.

Parameter	PD	PPPD	P value
Physical health	62.86	67.5	0.64*
Physical limitations median (IQR)	30	30	0.86’
Energy	80	70	0.95’
Pain median (IQR)	30	20	0.69’
General health	67.14	70	0.77*
Emotional health limitations median (IQR)	10	20	0.77’
Emotional well-being	77.14	78.75	0.88*
Social well-being	90	80	1’

PD: Pancreaticoduodenectomy, PPPD: Pylorus-preserving pancreaticoduodenectomy, *: Student's t-test, ‘: Mann-Whitney U

DISCUSSION

In our study, demographic results were like those previously reported in Mexico regarding indications for PD, with pancreatic adenocarcinoma and ampullary carcinoma being the most prevalent, at 53.3% and 13.3%, respectively.[1,8] Similarly, a higher prevalence was found in females. There is a general impression that the Whipple procedure can severely affect quality of life, impacting daily activities.[2,3,5] Few studies have evaluated quality of life and outcomes related to pain, gastrointestinal function, physical activity level, and other parameters postoperatively.[4,7] Regarding quality of life, evaluated patients experienced significant physical limitations, as well as pain and limitations in emotional health.[1] Quality of life in post-PD patients worsens after surgery; however, improvements are noted between the first 6-9 postoperative months with adequate intervention to manage symptoms, psychological support, and social support.[5]

Many gastrointestinal symptoms persist and directly affect quality of life. All patients reported experiencing some form of pain and mild to moderate indigestion, along with symptoms such as gastroesophageal reflux, diarrhoea, steatorrhea, and constipation. Steatorrhea was reported in 9 patients, with mild characteristics in 50%, moderate in 25%, and severe in 25%, likely related to partial pancreatic resection and decreased exocrine function. When establishing an association between type of resection, quality of life, and gastrointestinal function alterations, no statistically significant differences were found.

CONCLUSION

In our study, patients undergoing pancreatoduodenectomy, regardless of the type of resection performed, experience changes in their quality of life affecting all 8 domains evaluated by the SF-36. Gastrointestinal function alterations, particularly abdominal bloating and pain are prevalent among most patients. We did not find statistical differences between the type of resection and quality of life or gastrointestinal function. Patients surviving the underlying pathology and PD experience alterations in quality of life and gastrointestinal function that can improve with appropriate intervention, symptom management, psychological and social support, and physical rehabilitation.

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REFERENCES

1. Chan C, Franssen B, Domínguez I. Impact on quality of life after pancreatoduodenectomy: a prospective study comparing preoperative and postoperative scores. J Gastrointest Surg. 2012;16(7):1341-6.
2. Allen C, Yakoub D, Macedo F. Long-term quality of life and gastrointestinal functional outcomes after pancreaticoduodenectomy. Ann Surg. 2018;268(4):657-64.
3. Huang J, Yeo C, Sohn T. Quality of life and outcomes after pancreaticoduodenectomy. Ann Surg. 2000;231(6):890-8.
4. Dasari B, Farid S, Roberts K. Overview of pancreatic resections: postoperative management. Br J Hosp Med (Lond). 2015;76(4):60-3.
5. Arvaniti M, Danias N, Igoumenidis M, Smyrniotis V, Tsounis A, Sarafis P. Comparison of Quality of Life before and after pancreaticoduodenectomy: a prospective study. Electron Physician. 2018;10(7):7054-62.
6. Andersson T, Falk K, Bjerså K, Forsberg A. Health Is belonging: lived experiences during recovery after pancreaticoduodenectomy. ISRN Nurs. 2012;1:602323.
7. Distler M, Rückert F, Hunger M, et al. Evaluation of survival in patients after pancreatic head resection for ductal adenocarcinoma. BMC Surg. 2013;13:12.
8. Medrano R, Luna M, Chable W. Morbimortalidad de la pancreatoduodenectomía en pacientes con cáncer de páncreas y tumores periampulares en el Hospital de Oncología del Centro Médico Nacional Siglo XXI de 2008 a 2013. Cirugía y cirujanos. 2019;87:69-78.

9. Arvaniti M, Danias N, Theodosopoulou E, Smyrniotis V, Karaoglou M, Sarafis P. Quality of Life Variables Assessment, Before and After Pancreatoduodenectomy (PD): Prospective Study. Glob J Health Sci. 2015;8(6):203-10.
10. Targarona J, Callacondo D, Pino C. Impacto de la duodenopancreatectomía en los pacientes adultos mayores. Rev. gastroenterol. Perú. 2013;3:217-22.
11. Heerkens H, Van Berkel L, Tseng D. Long-term health-related quality of life after pancreatic resection for malignancy in patients with and without severe postoperative complications. HPB. 2018;20(2):188-95.
12. Rückert F, Distler M, Hoffmann S. Quality of life in patients after pancreaticoduodenectomy for chronic pancreatitis. J Gastrointest Surg. 2011;15(7):1143-50.
13. McLeod R. Quality of life, nutritional status and gastrointestinal hormone profile following the Whipple procedure. Ann Oncol. 1999;10(4):281-4.
14. Scholten L, Stoop TF, Del Chiaro M. Systematic review of functional outcome and quality of life after total pancreatectomy. Br J Surg. 2019;106(13):1735-46.
15. Van Dijk S, Heerkens H, Tseng D. Systematic review on the impact of pancreatoduodenectomy on quality of life in patients with pancreatic cancer. HPB (Oxford). 2018;20(3):204-15.

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