

Outcomes of Resection Versus Drainage Procedures in Chronic Pancreatitis: A Prospective Cohort Analysis

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Abstract:

Background: Chronic pancreatitis is marked by intractable pain and progressive exocrine and endocrine insufficiency. When conservative measures fail, surgical intervention—either resectional (e.g., Frey's procedure or distal pancreatectomy) or drainage (e.g., lateral pancreaticojejunostomy)—is indicated, but comparative data are limited.

Objectives: To compare pain relief, quality of life, and perioperative outcomes between resectional and drainage procedures in chronic pancreatitis.

Methods: In this prospective cohort study, 100 patients with chronic pancreatitis refractory to medical therapy were enrolled Surgery from Jan 2021 to December 2021 and allocated to resectional surgery (n = 50) or drainage surgery (n = 50) according to ductal anatomy and surgeon assessment. Pain was measured preoperatively and at 12 months using the Izbicki pain score (0–100; higher = worse). Quality of life was assessed at 12 months with the EORTC QLQ-PAN26 (0–100; higher = better). Secondary outcomes included operative time (minutes), intraoperative blood loss (mL), length of hospital stay (days), and overall complication rate. Continuous variables were compared by independent-samples t-test and categorical variables by chi-square test; $p \leq 0.05$ was significant.

Results: Baseline Izbicki scores were similar (resection 72.3 ± 9.8 vs. drainage 71.1 ± 10.5 ; $p = 0.62$). At 12 months, resectional patients achieved greater pain reduction (mean score 18.5 ± 12.2) than drainage patients (27.8 ± 15.4 ; $p = 0.003$). Mean QLQ-PAN26 scores favored resection (82.1 ± 7.4 vs. 75.6 ± 9.1 ; $p = 0.001$). Operative time was longer for resection (210 ± 35 min) versus drainage (150 ± 28 min; $p < 0.001$), with higher blood loss (320 ± 85 mL vs. 180 ± 60 mL; $p < 0.001$). Length of stay did not differ significantly (resection 8.2 ± 2.1 days vs. drainage 7.6 ± 1.9 days; $p = 0.12$). Overall complication rates were comparable (resection 18% vs. drainage 14%; $p = 0.54$).

Conclusion: Resectional surgery provided superior long-term pain relief and quality-of-life improvement compared with drainage procedures, albeit with longer operative times and greater blood loss. Both approaches demonstrated acceptable safety profiles. Patient selection based on ductal anatomy and surgical risk remains essential.

Keywords: Chronic pancreatitis; Resectional surgery; Drainage surgery; Izbicki pain score; EORTC QLQ-PAN26.

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Introduction

Chronic pancreatitis is a debilitating disease characterized by ongoing inflammation, fibrosis, and progressive loss of both exocrine and endocrine pancreatic function. Patients typically present with refractory abdominal pain, malnutrition due to malabsorption, and diabetes mellitus in advanced stages [1]. Medical management including enzyme supplementation, analgesics, and endoscopic interventions provides relief for many, but a

substantial subset continues to suffer severe pain and recurrent hospitalizations, necessitating surgical intervention [2].

Surgical approaches to chronic pancreatitis broadly fall into two categories: resectional procedures and drainage procedures. Resectional surgeries, such as the Frey procedure (local resection of the pancreatic head combined with longitudinal

pancreaticojejunostomy) or distal pancreatectomy, aim to remove the fibrotic, hypertrophied pancreatic tissue that is the source of pain and inflammation [3]. These procedures can offer durable pain relief by eradicating the “head-dominant” disease and decompressing obstructed ducts, but they require extensive dissection and carry risks of significant blood loss and longer operative times [4].

In contrast, drainage procedures most commonly lateral pancreaticojejunostomy focus on decompressing a dilated pancreatic duct by creating a side-to-side anastomosis between the duct and a jejunal limb [5]. This technique is less invasive, preserves more pancreatic parenchyma, and typically involves shorter operative time and lower intraoperative blood loss. Drainage can be highly effective in patients whose disease is characterized by diffuse ductal dilatation without a dominant inflammatory head mass, but its efficacy may be limited in the presence of substantial head fibrosis [6].

Choosing the optimal surgical strategy requires careful evaluation of ductal anatomy, the extent and localization of fibrosis, and patient factors such as nutritional status and comorbidities [7]. While drainage procedures are associated with lower immediate surgical morbidity, resectional techniques may provide superior long-term pain control and quality-of-life benefits by directly addressing the fibrotic head lesion that often drives disease progression [8].

Despite decades of experience, high-quality comparative data remain limited. Small cohort studies and retrospective series suggest that both approaches can yield substantial pain relief, but differences in operative metrics, complication profiles, and functional outcomes are variably reported [9]. In particular, few prospective studies have directly contrasted patient-reported pain scores and validated quality-of-life instruments between resectional and drainage cohorts within the same healthcare setting [10].

In the resource-constrained environment of many tertiary-care centers in India, understanding these trade-offs is crucial. Surgical teams must balance the potential for superior long-term outcomes against the demands of more extensive resectional operations, including operative time, blood loss, and perioperative care capacity. This study therefore undertakes a prospective comparison of resectional versus drainage procedures for chronic pancreatitis at a high-volume center, evaluating pain relief, health-related quality of life, and perioperative outcomes to inform evidence-based surgical decision-making.

Aim and Objectives

Aim: To compare the effectiveness and safety of resectional versus drainage surgical procedures in patients with chronic pancreatitis.

Objectives

1. To evaluate and compare pain relief at 12 months post-surgery using the Izicki pain score in resectional and drainage groups.
2. To assess health-related quality of life at 12 months using the EORTC QLQ-PAN26 questionnaire.
3. To compare perioperative metrics including operative time, intraoperative blood loss, and length of hospital stay between the two surgical approaches.
4. To determine and contrast the overall complication rates and need for reintervention in each group.
5. To analyze factors influencing outcomes, such as ductal anatomy and baseline nutritional status.

Methods

Study Design and Setting: This prospective cohort study was conducted from Jan 2021 to December 2021 in the Department of General Surgery at Patna Medical College and Hospital, Patna, Bihar, India.

Patient Selection and Sample Size: A total of 100 adult patients with chronic pancreatitis refractory to optimal medical and endoscopic management were enrolled consecutively. Based on preoperative imaging and ductal anatomy, patients were allocated to:

- **Resectional group (n = 50):** Underwent Frey’s procedure or distal pancreatectomy, as indicated.
- **Drainage group (n = 50):** Underwent lateral pancreaticojejunostomy.

Inclusion Criteria

- Age 18–70 years
- Documented chronic pancreatitis with ductal dilatation ≥ 7 mm or inflammatory head mass
- Persistent pain despite ≥ 6 months of medical/endoscopic therapy

Exclusion Criteria

- Previous pancreatic surgery
- Pancreatic cancer or suspicion thereof
- Severe comorbidities precluding major surgery (e.g., decompensated cardiac or pulmonary disease)

Surgical Techniques

- **Frey’s Procedure:** Local coring of the pancreatic head with longitudinal pancreaticojejunostomy.

- **Distal Pancreatectomy:** Resection of the body/tail with pancreaticojejunostomy or over sewing of the stump.
- **Lateral Pancreaticojejunostomy:** Side-to-side anastomosis between the main pancreatic duct and a Roux-en-Y jejunal limb.

Data Collection: Baseline demographics, etiology of pancreatitis, nutritional status (BMI, serum albumin), and ductal anatomy were recorded. Intraoperative details included operative time and blood loss. Postoperative data encompassed length of stay, complications (graded by Clavien–Dindo), and any reinterventions.

Outcomes

- **Primary:** Pain relief at 12 months (Izbicki score) and quality of life (EORTC QLQ-PAN26 total score).
- **Secondary:** Operative time (minutes), blood loss (mL), hospital stay (days), overall complication rate (%), and reintervention rate (%).

Statistical Analysis: Continuous variables are expressed as mean \pm SD and compared by independent-samples t-test. Categorical variables are presented as counts (%) and compared using chi-square or Fisher's exact test. Multivariate linear regression identified independent predictors of pain relief and quality-of-life scores. A p-value \leq 0.05 was considered statistically significant.

Results

An overview of key outcomes is presented below, followed by ten detailed tables with individual explanations. Of 100 patients (50 resectional, 50 drainage), mean age was 40.2 ± 8.7 years, 62% were male, and mean BMI was 22.6 ± 3.3 kg/m². Alcoholic etiology predominated (58%), and baseline nutritional status (mean serum albumin 3.4 ± 0.5 g/dL) was similar. Preoperative Izbicki pain scores averaged 71.7 ± 10.1 in both groups. At 12 months, resectional surgery yielded greater pain relief and higher quality-of-life scores but required longer operative time and incurred greater blood loss. Length of stay, overall complication, and reintervention rates were comparable.

Table 1: Baseline Demographics and Etiology

Characteristic	Resection (n=50)	Drainage (n=50)	p-value
Age, years (mean \pm SD)	39.8 ± 9.1	40.6 ± 8.3	0.68
Male, n (%)	32 (64%)	30 (60%)	0.67
BMI, kg/m ² (mean \pm SD)	22.4 ± 3.2	22.8 ± 3.5	0.57
Etiology – Alcoholic, n (%)	30 (60%)	28 (56%)	0.68
Etiology – Idiopathic, n (%)	12 (24%)	14 (28%)	0.65
Etiology – Other (e.g., tropical), n (%)	8 (16%)	8 (16%)	1.00

Table 2: Baseline Nutritional Status

Parameter	Resection (n=50)	Drainage (n=50)	p-value
Serum albumin, g/dL (mean \pm SD)	3.5 ± 0.5	3.4 ± 0.4	0.42
Preop Nutritional Risk Score	3.1 ± 0.9	3.0 ± 0.8	0.55

Table 3: Preoperative Pain Severity

Group	Izbicki Pain Score (mean \pm SD)	p-value
Resection (n=50)	72.3 ± 9.8	
Drainage (n=50)	71.1 ± 10.5	0.62

Table 4: Pain Outcomes at 12 Months

Group	Izbicki Pain Score (mean \pm SD)	p-value
Resection (n=50)	18.5 ± 12.2	
Drainage (n=50)	27.8 ± 15.4	0.003

Table 5: Quality of Life at 12 Months (EORTC QLQ-PAN26)

Group	QLQ-PAN26 Score (mean \pm SD)	p-value
Resection (n=50)	82.1 ± 7.4	
Drainage (n=50)	75.6 ± 9.1	0.001

Table 6: Operative Metrics

Parameter	Resection (n=50)	Drainage (n=50)	p-value
Operative time, min (mean \pm SD)	210 ± 35	150 ± 28	< 0.001
Blood loss, mL (mean \pm SD)	320 ± 85	180 ± 60	< 0.001

Table 7: Postoperative Hospital Stay

Parameter	Resection (n=50)	Drainage (n=50)	p-value
Length of stay, days (mean ± SD)	8.2 ± 2.1	7.6 ± 1.9	0.12
ICU admission, n (%)	6 (12%)	5 (10%)	0.75

Table 8: Overall Complication Rates

Group	Any Complication, n (%)	p-value
Resection (n=50)	9 (18%)	
Drainage (n=50)	7 (14%)	0.54

Table 9: Complication Severity (Clavien–Dindo Classification)

Grade	Resection (n=50)	Drainage (n=50)	p-value
I–II, n (%)	7 (14%)	6 (12%)	0.76
III–IV, n (%)	2 (4%)	1 (2%)	0.56

Table 10: Reintervention Rates

Group	Reintervention Required, n (%)	p-value
Resection (n=50)	3 (6%)	
Drainage (n=50)	5 (10%)	0.50

In a comparison of resectional versus drainage procedures, Table 1 shows that both groups were well matched at baseline for age, sex, BMI, and etiology; Table 2 demonstrates equivalent preoperative nutritional status with similar serum albumin and risk scores; Table 3 confirms identical baseline Izbicki pain scores; Table 4 reveals significantly greater pain reduction at 12 months in the resectional cohort; Table 5 illustrates higher health-related quality-of-life scores (EORTC QLQ-PAN26) following resection; Table 6 highlights that resectional surgery incurs longer operative time and greater blood loss; Table 7 indicates no difference in hospital stay or ICU admissions; Table 8 reports comparable overall complication rates between the two approaches; Table 9 shows most complications were minor (Clavien–Dindo I–II) with no significant difference in severe events; and Table 10 demonstrates similarly low reintervention rates in both groups.

Discussion

This prospective cohort study demonstrated that resectional surgery provides superior long-term pain relief and quality-of-life benefits compared with drainage procedures in chronic pancreatitis, despite increased operative extent [11]. At one year, patients undergoing resection had a mean Izbicki pain score nearly 10 points lower than those receiving drainage, suggesting that directly removing the fibrotic pancreatic head addresses the primary pain generator more effectively than ductal decompression alone [12]. Higher EORTC QLQ-PAN26 scores in the resectional group further underscore the broader functional advantages of more definitive surgery on daily activities and symptom burden [13].

However, resectional techniques required significantly longer operative times and resulted in

greater intraoperative blood loss, reflecting the more extensive dissection and tissue removal involved [14]. These trade-offs did not translate into prolonged hospitalization or increased ICU admissions indicating that, in experienced hands and with appropriate perioperative care, the immediate recovery burden remains acceptable [15]. Comparable overall complication rates and low, similar reintervention frequencies further support the safety of both strategies when applied to well-selected patients [16].

The minor nature of most adverse events suggests that both procedures carry manageable risks. Our findings align with prior studies reporting better pain control but higher surgical demands with Frey's procedure versus lateral pancreaticojejunostomy [17]. They also extend the evidence base by incorporating validated quality-of-life metrics and standardized complication grading within the same patient population and healthcare setting [18].

Patient selection emerges as a critical determinant of optimal outcomes. Those with prominent head-dominant disease and significant ductal obstruction are likely to benefit more from resectional approaches, whereas patients with diffuse dilation but minimal head mass may achieve adequate relief with drainage and avoid the added operative burden [19]. Baseline nutritional status did not differ between groups, yet poor nutrition remains a known risk for complications; optimizing preoperative albumin and BMI may further mitigate surgical risks [20].

Limitations include the non-randomized allocation based on ductal anatomy and surgeon discretion, which may introduce selection bias [21]. Although multivariate analyses adjusted for key confounders, unmeasured factors such as detailed fibrosis grading or pancreatic exocrine function could influence

results [22]. The single-center design may limit generalizability to other institutions with different surgical expertise or resource constraints. Finally, follow-up beyond 12 months is necessary to assess durability of pain relief and development of long-term sequelae such as diabetes or exocrine insufficiency [23].

In conclusion, resectional surgery should be strongly considered for patients with head-dominant chronic pancreatitis needing definitive pain control and who can tolerate a more extensive operation. Drainage remains an effective, less invasive alternative for appropriately selected cases. These data can inform multidisciplinary discussions and shared decision-making, balancing the intensity of intervention against anticipated symptomatic and functional gains.

Conclusion

Resectional surgery offers superior pain relief and quality-of-life improvements at one year compared with drainage procedures for chronic pancreatitis, albeit with longer operative time and greater blood loss. Both approaches demonstrate acceptable safety profiles and low reintervention rates when applied to appropriately selected patients. Tailoring surgical choice to ductal anatomy and patient fitness can optimize outcomes, with resection favored for head-dominant disease and drainage reserved for diffuse ductal dilation without significant head fibrosis.

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