International Journal of Science and Research (IJSR)
ISSN: 2319-7064
SJIF (2022): 7.942

Outcome of Freys Procedure for Chronic Pancreatitis

Dr. Hardik Nayak[1], Dr. Mrs. R. Mukhiya[2], Dr. S. P. Mukhiya[3], Dr Prashik Meshram[4]

Department of General Surgery, R. D. Gardi Medical College, Ujjain, Madhya Pradesh, India

[1]Junior Resident, Department of General Surgery, R. D. Gardi Medical College, Ujjain, Madhya Pradesh, India

[2]Professor, Department of General Surgery, R. D. Gardi Medical College, Ujjain, Madhya Pradesh, India

[3]Professor, Department of General Surgery, R. D. Gardi Medical College, Ujjain, Madhya Pradesh, India

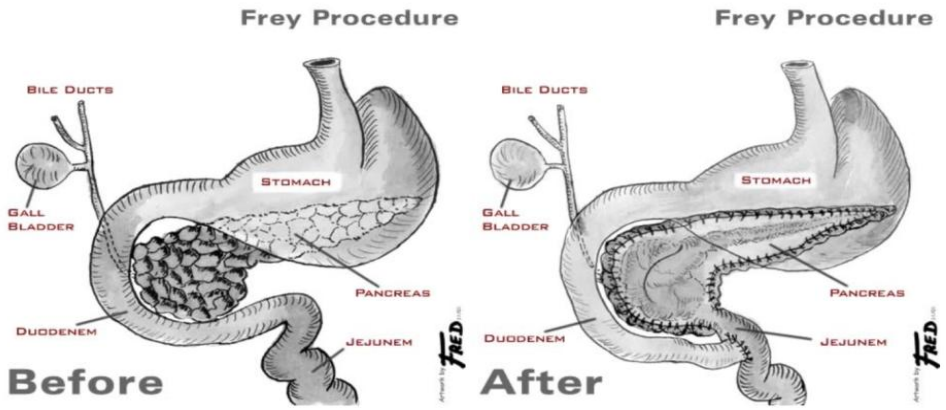
[4]Junior Resident, Department of General Surgery, R. D. Gardi Medical College, Ujjain, Madhya Pradesh, India

Abstract: ***Background: Chronic pancreatitis is a progressive inflammatory disorder characterized by irreversible destruction of pancreatic parenchyma and may be associated with disabling chronic pain and permanent loss of endocrine and exocrine function. Abdominal pain is the most debilitating feature and is often refractory to treatment. Main indication for surgery is intractable abdominal pain and choosing the best technique to be used for a patient remains a challenge. The objective of this study was to analyze surgical safety along with short-and long-term outcomes of Frey's procedure for patients suffering from chronic pancreatitis. Objective: To analyze surgical safety along with short-and long-term outcomes of Frey's procedure for patients suffering from chronic pancreatitis. Material & Methods: A total of 18 patients with intractable abdominal pain underwent Frey's Procedure over a period of one year. Demographics, intraoperative findings, perioperative outcomes, and short-and long-time outcomes were analyzed. Results: Total of 18 patients (age ranged 20-40, male-12, female-6) underwent Frey's procedure in the study period. Out of this, 4 were alcoholic while (14), (77.8%) were nonalcoholic. Intractable pain was present in all cases along with pseudocyst in three and pseudoaneurysm in one case. The mean preoperative Izbicki scores were 53.4 ± 17.6. Six patients had diabetes and two patients had steatorrhea. Major complications were seen in (3) 16.6% of cases while mortality was in one patient. The median duration of the hospital stay was seven days. Over a median follow up of 3 months there were significantly lower pain scores postoperatively and 92% were pain-free. Only one new case of diabetes developed postoperatively. Conclusion: Frey's procedure was a safe and effective therapeutic option for the surgical treatment of patients with intractable pain caused by chronic pancreatitis.***

Keywords: Chronic Pancreatitis, Frey's Procedure

1. Introduction

Chronic pancreatitis (CP) is a progressive inflammatory disorder characterized by irreversible destruction of pancreatic parenchyma, associated with disabling chronic pain and permanent loss of exocrine and endocrine function. (1)Classical triad of CP includes abdominal pain, exocrine pancreatic insufficiency (steatorrhea, weight loss, deficiency of fat-soluble vitamins,) and diabetes. Abdominal pain is the most frequent and debilitating symptom with a variable pattern [2]. Abdominal pain is the most frequent and debilitating symptom with a variable pattern. Alcohol intake is a major risk factor for their development, and its action is dependent of dose and time. Smoking also plays important role and is an independent risk factor (3). Chronic pancreatitis carries a high burden of morbidity because of its long duration and recurrent attacks. Currently, the main treatment methods for chronic pancreatitis are focused on pain management, the management of complications (i.e., pseudocyst), and the correction of pancreatic insufficiency. Intractable abdominal pain is the main surgical indication for chronic pancreatitis. Pancreatic hyperplasia is also a potential carcinogen. The management of patients with chronic pancreatitis remains a challenge because of the limited understanding of the pathophysiological process of the disease, the unpredictability of clinical evolution and the controversies between diagnostic criteria and therapeutic options. Worldwide the main aetiological factor is alcohol abuse, and the most common symptom is relentless chronic abdominal pain. After optimization of symptoms with analgesics and enzyme supplementation, patients with persistent symptoms are candidates for invasive treatments. Previous studies have shown that surgical treatment of chronic pancreatitis reduces pain and subsequent complications, so that patients return to their prior work activities as well as improved quality of life. The management of CP requires multidisciplinary approach involving pain management specialists, gastroenterologist, radiologist, surgeons, dietitian and psychiatrists. Gastroenterologists usually opt for endoscopic treatment before considering surgical treatment as it is less invasive and without major complications. Endoscopic treatment is warranted in patients with CP who have intraductal stones in the region of the pancreatic head, main pancreatic duct (MPD) stricture, and symptomatic pseudocyst. As endoscopic treatment requires frequent hospital admissions, inadequate pain relief, increasing the risk opioids dependence and most importantly rural located populations, surgical option was preferred more often as compared to repeated endoscopic therapy. Surgical treatment can improve the quality of life of patients not only by relieving pain and retaining the internal and external secretion of pancreatic function but also by effectively removing the risk factors for cancer.



Aim

To study early and late outcome in patients of chronic pancreatitis undergoing frey's procedure in our institute.

2. Methodology

Prospective observational study conducted in our institute. The diagnosis of chronic pancreatitis was based on the findings of clinical history, physical examination and radiological investigation. Radiological investigation consisted of a combination of ultrasonography (US), computed tomography (CT) and MRCP. Surgically treated cases of Chronic Pancreatitis who underwent Frey's procedure and had minimum 3 months of follow up were included in the study. A total number of 18 patients were studied over a period of one year. Study work was started after the approval from Institutional Research and Ethics committee. Surgery is indicated in patients who have not been benefitted from medical therapy and have either Intractable pain or Intractable pain with pseudocyst or pseudoaneurysm, Dilatation of main pancreatic duct in CT scan. Choice of Frey procedure was based on MPD > 7 mm along with pancreatic head diameter > 4 cm (5). Izbicki pain score is a validated pain score specifically designed for chronic pancreatitis [6, 7]. It consists of four questions regarding frequency of pain, the intensity of the pain (VAS score), use of analgesics, and disease-related inability to work and a pain score can be calculated ranging from 0 (no pain) to 100 (severe, debilitating pain). The exocrine pancreatic function was evaluated with the presence of steatorrhea which had been defined as more than three stools per day with a nauseating smell and greasy and pale appearance (8). Diabetes mellitus was defined as blood glucose level more than 200 mg/dL two hours after an oral glucose load of 75 grams.

Frey's procedure is a surgical technique used in the treatment of chronic pancreatitis in which the diseased portions of the pancreas head are cored out. A lateral pancreaticojejunostomy (9) (LRLPJ) is then performed in which a loop of the jejunum is then mobilized and attached over the exposed pancreatic duct to allow better drainage of the pancreas, including its head. Frey's procedure was first described by Frey and Smith in 1987 which is a hybrid procedure that includes resection of the head of the pancreas anterior aspect (coring) combined with drainage of the MPD using longitudinal pancreatojejunostomy. Surgical procedure entails midline laparotomy with a careful assessment followed by ligation of right gastroepiploic vessels and full exposure of the anterior surface of the pancreas from head to tail. After confirming the dilated MPD by fineneedle puncture or occasionally by ultrasonography. MPD is fully incised from anterior aspect approaching from tail up to head. Anterior branch of the gastroduodenal artery is ligated and hemostatic suture placed over, maximum coring (excision) of pancreatic parenchyma in the head & uncinate region is done leaving a thin rim of tissue around duodenum. Stones cleared from duct and parenchyma in the head region along with all parenchymal calcifications.

All patients had been followed up for a minimum of 3 months. Long term follow-up for a minimum of 12 months was available in 11 patients. None of the patients was lost to follow up. Though follow up interval is not uniform as many patients belong to rural distant areas and they intended to follow up depending on suitability, information regarding postoperative status was possible on phone calls. Pain intensity along with analgesic requirement was evaluated again with VAS score and Izibcki score on each follow-up along with the development of new-onset DM or steatorrhea. Any readmission or interventions needed in the postoperative period were also noted and occurrence of any postoperative events was managed as per institutional practice.

3. Statistical Analysis

Statistical analyses were performed using Statistical Package for the Social Sciences (SPSS) version 24.0 software (SPSS Company, Chicago, IL, USA). Quantitative data were expressed as mean ± standard deviation or median (whenever applicable) and range. Statistical difference between preoperative and postoperative pain scores was examined using the paired t-test. The Chi-square test or Fisher's exact test were used to compare categorical variables, as appropriate. P values of < 0.05 were considered statistically significant.

4. Results

Table 1: Intraoperative Details

MPD diameter	>7 mm
Ductal stone (multiple)	15
Parenchymal calcification	16
Bulky head	12
Operation time	242
Operative blood loss	196

All relevant intraoperative details are shown in below. All patients had MPD diameter more than 7 mm with an average of 9.0 ± 2.5 (range, 7-16). All patients had a bulky head. Multiple ductal stones were found in 15 cases (83.3%) and parenchymal calcification was evident in 16 cases (88.8%). Three patients received a blood transfusion in the postoperative period.

Table 2: Intraoperative complications

Complications	Number of patients	Management
Transection of intrapancreatic common bile duct	9	Pancreatocholedochostomy and proximal biliary bypass
Splenic injury	2	splenectomy
Duodenal injury	1	Suture
Portal vein injury	1	Suture
Colon injury	1	Suture

Patients who suffered intra-operative complications were more likely to suffer a post-operative infectious complication than those that did not (7/18 patients with intra-operative complication vs. 5/18 patients with no intra-operative complication; P = 0.03). In those who underwent biliary bypass there was no significant increase in post operative complications (4/18 patients with biliary bypass vs. 16/60 patients without biliary bypass; P = 0.51) or post-operative infections (3/18 patients with biliary bypass vs. 10/60 patients with no biliary bypass; P = 0.83).

Table 3: Postoperative Complications

Complications	No of patients
Pancreatic leak	3
Infectious:	6
Pneumonia	3
Wound	2
Venous central catheter	1
Pulmonary	1
Hepatic insufficiency	1
Reoperation	1
Bleeding	1
Gall Bladder Perforation	1

Table 4: Comparison of pain and pancreatic function before and after surgery

	preoperative	postoperative	P value
Pancreatic function	6/25 (24%)	7/25 (26%)	0.327
Steatorohea	2/25 (8%)		1
Pain score			
Vas score (25)	70+-15.8	24.4+_14.17	<0.01
Izbicki pain score 3 months	53.4+-18	10.7+_11.36	<0.01
Izbicki pain score 12 months	53.4+-18	54.7+_19.33	<0.01

Pain intensity scores (VAS score, Izbicki score at 3 months and Izbicki score at 12 months) were significantly decreased in postoperative as compared to preoperative (p-value < 0.01). Also there was no significant worsening of endocrine (DM) or exocrine (steatorrhea) function.

5. Discussion

Unpredictable natural history and heterogeneity of patient population across the world have made comparison of different studies difficult. The study population in this series is different compared to that of western series in terms of etiology, age of presentation and morphology of pancreas and outcome of intervention. The aim of surgical treatment of chronic pancreatitis is control of pain and preservation of exocrine and endocrine function. Following Frey procedure, 70-80% of the patients with varying follow-up had good pain control The cause of poor pain outcome following surgery for chronic pancreatitis are multifactorial and include inadequate drainage of head, neuropathic changes and unrecognized cancer [10]. Frey involves local resection of the head of the pancreas so it prevents the inadequate decompression of the pancreatic ducts in the head of the pancreas unlike the Partington-Rochelle pancreatojejunostomy. About 90% long term pain relief has been reported after the Frey's procedure [11, 12]. Also Frey's is less morbid as compared to more extensive resections like Beger and pancreatoduodenectomy. But one disadvantage of Frey's is that a rim of pancreatic tissue of the pancreatic head with active disease is left in place so that might cause recurrence of pain. However, in patients with CP without diffuse dilation of the MPD and a possibility of malignancy, Frey's procedure should be avoided. For such patients, pancreatic head resection such as PD should be performed. The addition of an LPJ to a resectional procedure in this context has not been considered previously but is well established as a treatment option for patients with CP and a dilated pancreatic duct secondary to etiologies other than PD and adequately addresses the critical issue of duct drainage, which is central to the disease process in PD. The combination approach afforded by the Frey procedure addresses the 2 major pathologies present in patients with PD; namely, it removes the fibrotic focus of CP present in the head while simultaneously decompressing the obstructed pancreatic duct. Success in the Frey's procedure with complete decompression of the pancreatic ducts depends on maximal excision of the parenchyma in the pancreatic head. This may be the reason why the original Frey's procedure achieved better pain relief in our study. Preservation of pancreatic function is another important result of Frey's procedure. We found equal exocrine and endocrine insufficiency between the two Frey's procedures. Patients with the original Frey's procedure had better QoL on the emotional scale and fewer fatigue symptoms. We suggest that the better decompression with the original Frey's procedure relieves pancreatic inflammation. Feeling relaxed would give greater confidence to patients for the original Freys procedure. So Frey's procedure could be the standard operation for CP patients with dense calcification or stones in the head of that pancreas and dilation of the MPD and can be performed for almost all patients with CP and dilation of the MPD without suspicious of malignancy. The Frey's procedure is safe and pancreatic endocrine function is preserved. However, a proper selection of patients is the most integral part of achieving good results.

6. Limitations

The study includes only the patients who were operated, however the patients who received medical line of management were not studied. There was no comparison of Frey's procedure with any other surgical or endoscopic procedures. Though follow-up was available in all cases, fix interval of follow-up were not possible. Also, long term

follow-up of approx 5 years median with large sample size is needed to conclude the best surgical procedure.

7. Conclusion

As per our study Frey's procedure is a good option for patients with chronic pancreatitis providing adequate relief from pain with minimal morbidity and without affecting the endocrine and exocrine function of pancreas. However, further prospective controlled studies with long-term follow-up are needed to make definitive conclusion.

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