

Original Research Article

Frey's procedure - does it improve quality of life? A single centre experience of long term outcome following Frey's procedure

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ABSTRACT

Background: The objective of the study was to find out long term outcome of patients who underwent Frey's procedure for chronic calcific pancreatitis.

Methods: This is a prospective observational study from retrospectively collected data of all patients who underwent Frey's procedure for chronic calcific pancreatitis in Institute of Surgical Gastroenterology, Rajiv Gandhi Government General Hospital, Chennai from January 2012 to December 2014. All patients who have completed at least 48 months after surgery were followed up and their long-term postoperative quality of life were analyzed.

Results: Totally 48 patients underwent Frey's procedure during this period. Eight patients lost follow up. Preoperatively all patients had pain score above six in numerical rating scale but after surgery only two patients in the long term required stronger opioids for pain relief. Exocrine deficiency was present in 24 (60%) patients preoperatively, out of which seven patients showed improvement, eight patients had worsened exocrine deficiency and weight loss. Post operatively there were six patients who developed exocrine deficiency. Endocrine deficiency was seen in 23 (57.5%) patients preoperatively and during follow up none showed improvement, with two (5%) patients developed endocrine deficiency. Seven patients showed worsened endocrine deficiency as documented by increasing insulin requirement. Quality of life analysis using SF 36 showed poor quality of life in patients with worsened exocrine deficiency.

Conclusions: Frey's procedure although in long term showed improved outcome in terms of pain free survival and overall quality of life, exocrine and endocrine deficiency persisted in most and worsened in some patients.

Keywords: Chronic calcific pancreatitis, Exocrine endocrine deficiency, Frey's, Head coring, Quality of life

INTRODUCTION

Chronic calcific pancreatitis (CCP) due to any cause is a progressive disease affecting the glandular function of pancreas and also causes severe pancreatic pain by variety of pathogenesis.¹ Different modalities of treatment has been defined for management of CCP but none of them are curative.² In fact the vast armamentarium of management available for CCP itself gives a clue that none superior to the other. Other than

pain medications, pancreatic enzyme supplementation, celiac plexus block for pain and variety of surgical procedures are also defined for this disease.² Most common indication for surgery in CCP is intractable pain.³ Most defined procedure and the one which is considered to be most effective is Frey's procedure which is pancreatic head coring with lateral pancreaticojejunostomy.⁴ Although there are lots of literature which states that Frey's procedure is effective in controlling pain, there are only limited studies which analyze Frey's

procedure in terms of pancreatic glandular function and quality of life of these patients in long term.⁵⁻⁷ This study analyze the long term quality of life and exocrine/endocrine deficiency along with pain free survival following Frey’s procedure.

METHODS

This is a prospective observational study from retrospectively collected data of all patients who underwent Frey’s procedure for chronic calcific pancreatitis with postoperative pathological biopsy as pancreatitis from January 2012 to December 2014.⁸ All patients who have completed at least 48 months after surgery were followed up and their preoperative and long term postoperative pain free survival, analgesic use, exocrine/endocrine deficiency and quality of life was analyzed. Pain was defined and scored using numeric pain rating scale- NRS.⁹ Analgesic use for pain was based on WHO ladder for pain management.¹⁰ Exocrine deficiency was defined by history of passing foul smelling oily loose stools with frequency more than thrice per day. Endocrine deficiency was defined based on American diabetes association.¹¹ Long term quality of life was assessed using short form (SF) 36 survey.¹² The statistical analysis was carried out by using Statistical Package for Social Sciences (SPSS IBM for Windows).

RESULTS

A total of 48 patients underwent Frey’s procedure during this period. Eight patients lost follow up. Out of remaining 40 patients 30 were males and 10 females (Table 1). Ethanol was the most common cause of calcific pancreatitis in this study group. Most common indication for surgery was intractable pain, with almost all patients preoperatively requiring stronger opioids. All patients had undergone pre-operative work up and evaluation as per protocol. All patients underwent original Frey’s procedure (Figure 1) as defined. There was no mortality in the perioperative period.

Table 1: Perioperative parameters.

Parameters	Mean
Mean age in years	35.45
M: F	3:1
Average duration of disease in months	25.8
Pancreatic duct stenting or endotherapy	6 patients (15%)
Pancreatic duct diameter in mm	8.38±2.2
Average blood loss ml	255±145
Mean duration of surgery hours	3.30±0.56
Pancreatic fistula grade B	2 patients
Surgical site infection	21 patients
Perioperative mortality	Nil
Median follow up duration in months	57.5



Figure 1: Frey’s procedure after coring.

Three patients underwent cholecystectomy along with Frey’s procedure due to associated gall stones, one patient underwent splenectomy along with Frey’s due to splenic vein thrombosis and left sided portal hypertension (Table 2).

Table 2: Procedures done.

Procedure	Number of patients
Frey’s only	36
Frey’s with cholecystectomy	3
Frey’s with splenectomy	1

Preoperatively all patients got pain score above six in numerical rating scale which means severe pain but after surgery 38 patients have got pain score four and below four which means mild to moderate pain and only two patients in the long term required stronger opioids for pain relief. Mean pain score before surgery was 8.40±0.74 which improved to 2.88±1.45 during follow up (p<0.001).

Exocrine deficiency was present in 24 (60%) patients preoperatively, out of which after 4 years seven patients showed improvement. Out of the remaining 17 patients worsened exocrine deficiency was found in eight patients with weight loss. Post operatively six patients developed exocrine deficiency during follow up. Analysis showed overall worsened exocrine deficiency in long term following Frey’s procedure.

Endocrine deficiency was seen in 23 (57.5%) patients preoperatively all patients requiring insulin for blood sugar control, four years postoperatively no patients showed improvement, with two (5%) patients developing new endocrine deficiency. Seven patients showed worsened endocrine deficiency as documented by their increasing insulin requirement. Endocrine deficiency was also noted to be worsening in long term following Frey’s procedure.

Quality of life analysis using SF 36 showed overall improved quality of life in the entire study group.

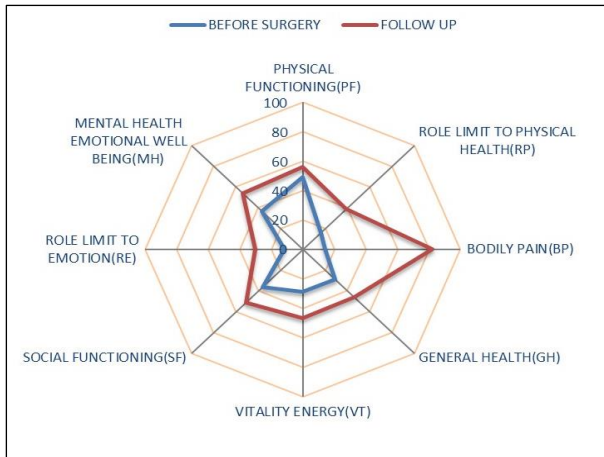


Figure 2: Overall quality of life SF 36 before surgery (blue) and during follow up (red).

Mean Physical and mental component score (PCS and MCS) were 27.3±8.67 and 28.28±9.94 before surgery which improved to 55.78±15.56 and 45.30±21.82 with p value 0.001 (Table 3). Although the overall quality of life has improved (Figure 2), it was also noted that those patients with worsening and new onset glandular

dysfunction had a poor quality of life (Figure 3) in long term. Also, patients with worsened endocrine deficiency were having a poorer quality of life.

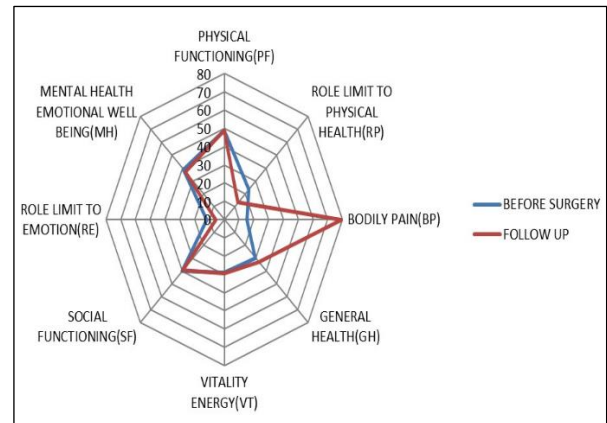


Figure 3: Quality of life in patients with new onset/worsening exocrine deficiency before surgery (blue) and during follow up (red).

Overall improved quality of life in the entire group is due to improvement in bodily pain in these patients.

Table 3: Parameters before surgery and during follow up.

Parameters	Before surgery	Follow up	P value
Mean NRS - pain	8.40±0.74	2.88±1.45	
Analgesic use	No analgesics	0	<0.001
	Nonopioids	0	
	Weak opioids	2	
	Strong opioids	38	
Exocrine deficiency	24 (60%)	23 (57.5%)	<0.001
	No exocrine deficiency - 16	No exocrine deficiency - 10	
		New onset - 6	
		Improved - 7	
	With exocrine deficiency - 24	Persisting - 9	
		Worsening - 8	
Endocrine deficiency	23 (57.5%)	25 (62.5%)	<0.001
	No endocrine dysfunction - 17	No endocrine deficiency - 15	
		New onset - 2	
		Improved - nil	
	With endocrine deficiency - 23	Persisting - 16	
		Worsening - 7	
QOL - PCS mean	27.3±8.67	55.78±15.56	0.001
QOL - MCS mean	28.28±9.94	45.30±21.82	0.001
BMI	24.03±1.62	23.63±2.00	0.318

NRS - Numerical rating scale, QOL - Quality of life, PCS - Physical component scoring, MCS - Mental component scoring, BMI - Body mass index

DISCUSSION

Chronic pancreatitis is a progressive parenchymal disease with varied etiology. The disease is characterized by pancreatic calcifications, pancreatic insufficiency, local and systemic complications and above all pancreatic pain.

Management option includes medical, endo-therapy and surgical.¹³ Medical management includes analgesics for pain control, enzyme supplementation, antioxidants and removal of causative factors. But medical management is not definitive. Patients with local complications and those with failed medical management require endo-therapy or

surgical treatment. Endo-therapy includes stent placement, sphincterotomy, extracorporeal shock wave lithotripsy, stricture dilatation etc. Surgery includes drainage, resection, resection with drainage.

This wide array of management modalities itself signifies that the disease process is much complicated and there is no single definite treatment which cures and improves pancreatic glandular function in a case of chronic calcific pancreatitis. Although Frey's procedure improves pain it affects the endocrine and exocrine function of the pancreas. Some studies states that duct decompression prevents deterioration of pancreatic glandular function.^{14,15} But Frey's procedure as it involves coring of pancreatic tissue, in long term the lost tissue may add up to the burnt-out pancreas and worsens the exocrine and endocrine deficiency. This worsening of pancreatic glandular function whether it affects the overall quality of life needs long term follow up of these patients. Some studies have questioned that whether any surgical procedure is really needed in chronic calcific pancreatitis, since the disease process itself causes loss of pancreatic tissue and at last burnt out pancreas.

In a review by Roch et al, they concluded that the short- and long-term outcome following Frey's procedure was better than any other procedure performed for chronic calcific pancreatitis.¹⁶ Their main discussion was on pain rather than on exocrine and endocrine deficiency.

In another study by Gestic et al, which is a retrospective analysis of 73 patients who underwent Frey's procedure between 1991 to 2007 and had at least 1 year of follow up the median pre-operative body mass index (BMI) was 19.1 kg/m².¹⁷ All patients had abdominal pain, 34 (46.6%) of them daily and 13 (17.8%) weekly, with moderate or severe intensity in 98.6% (n=72). The surgical morbidity rate was 28.7%; there were no deaths. Median post-operative follow-up was 77.0 months; 64 patients (91.4%) had complete pain relief and post-operative BMI was 22.4 kg/m² (p<0.001). They concluded that Frey's procedure was a safe and effective therapeutic option for the surgical treatment of patients with intractable pain caused by chronic pancreatitis. In this study although pain relief was better which is reflected by overall better quality of life, exocrine deficiency was persisting and also worsened in some patients affecting the quality of life in those patients. Although there was no significant difference in BMI there was significant weight loss in those with worsened exocrine deficiency.

Aimoto et al, analyzed the short-term and long-term outcomes of Frey's procedure in comparison with pylorus preserving pancreaticoduodenectomy (PPPD) and to evaluate the efficacy of Frey's procedure against preoperative locoregional complications.¹⁸ The mean follow-up times were 70.8 months (Frey's procedure) and 119.8 months (PPPD). Pain intensity was assessed with a pain scoring system. Quality of life (QOL) was assessed

with the European Organization for Research and Treatment of Cancer Quality of-Life Questionnaire-Core 30. Exocrine and endocrine pancreatic function was measured during follow-up. Significant reductions in total pain scores and all QOL scale scores were observed immediately after surgery in all patients (p<0.05). Frey's procedure was superior to PPPD with regard to physical status 7 years after surgery (p<0.05). One patient in the Frey group had a grade B pancreatic fistula, and 2 patients in the PPPD group had intra-abdominal bleeding and delayed gastric emptying. There were no re-operations or surgery-related deaths in either group. Diabetes developed postoperatively in 2 patients in the PPPD group. No patients with preoperative duodenal or biliary stricture or both had a relapse. Three patients in the PPPD group died during follow-up of diseases unrelated to chronic pancreatitis. Frey's procedure is safe and effective with regard to pain relief, preservation of pancreatic function, and improvement of QOL over the long term. In this study the median follows up period was 55.5 months following Frey's procedure. Pain scoring and overall quality of life was better in the follow up period. Even though the exocrine and endocrine deficiency worsened overall in the follow up period, the improvement in the overall quality of life is due to better pain control.

In a study by Fanconi et al, which was a prospective study of 40 patients affected by chronic pancreatitis were subjected to Frey's procedure.¹⁹ Preoperative selection criteria included confirmed diagnosis of chronic pancreatitis, dilation of Wirsung's duct to a diameter greater than 6 mm, and the absence of obstructive chronic pancreatitis secondary to fibrotic stenosis at the pancreatic body or tail. Preoperative pain was present in 38 cases (95%), and follow-up was performed in all patients at least once yearly up to 2003 (median 60 months, inter percentile range 20.1-79.6). Postoperative morbidity occurred in three cases (7.5%). The percentage of pain-free patients was 94.7%, 93.7%, 87.5%, and 90% at 1, 2, 3, and 4/5 years after surgery respectively. After surgery, three patients developed diabetes. Both the body mass index and quality of life showed statistically significant improvements at all follow-up intervals. Whenever surgery is indicated, the short-term and long-term outcomes confirm that Frey's procedure is an appropriate means of management for patients with chronic pancreatitis in the absence of doubts of neoplasia and/or distal ductal obstruction. As in this study although pain control was better in this study, body mass index did not improve, in fact there was significant loss of weight in those patients with worsened parenchymal dysfunction.

In a review article Ho et al, analyzed and stated that the operation selected for chronic pancreatitis should correct or deal with all structural abnormalities, provide long-term pain relief, have a low mortality and morbidity rate, minimize subsequent exocrine and endocrine insufficiency, and have results independent of abstinence from alcohol.²⁰ No single

operation can provide an optimal solution to the management of pain or these diverse complications of chronic pancreatitis. The operation chosen must be individualized to treat the patient's needs. But Frey's procedure since it involves coring of pancreatic parenchyma in an already burnt out pancreatic tissue endocrine and exocrine insufficiency should worsen after the procedure, even though a lot of other studies has stated that parenchymal dysfunction improves after Frey's procedure. This study shows that Frey's procedure worsens exocrine and endocrine deficiency earlier than usual, and those patients with worsened parenchymal function is having poor quality of life.

CONCLUSION

Frey's procedure is best in terms of pain free survival in long term, but exocrine and endocrine deficiency worsens in long term. There was no significant improvement in Body mass index following Frey's procedure, with significant weight loss in those patients with worsening parenchymal function. Although the overall quality of life is improved, improvement in quality of life is due to better pain control and quality of life is poor in those with worsened pancreatic glandular function.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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