International Journal of Current Research in Multidisciplinary (IJCRM) *ISSN: 2456-0979*
Vol. 11, No. 2, (March-April'26), pp. 01-07

SHORT TERM OUTCOME OF THE FREY'S PROCEDURE FOR CHRONIC CALCIFIC PANCREATITIS: A SINGLE CENTRE EXPERIENCE IN RAIPUR, CHHATTISGARH

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ABSTRACT
Background: *There is significant burden of chronic calcific pancreatitis in India as compared to west. There is very less data from central India. We aim to present morbidity, mortality and short outcome for patients with chronic calcific pancreatitis who underwent Frey's procedure.*
Method: *This was a retrospective review of cases of chronic calcific pancreatitis who underwent Frey's procedure from 2021 to 2025 at D.K.S. PGI hospital Raipur. Demographics, presentation, intra op, immediate post op with follow up of 3 month were analysed.*
Result: *Total of 18 patients underwent Frey's procedure in study period, presenting with pain as major symptom. Majority of patients were young (30.7 as median age) females (66%), non alcoholic (72.2%). Three patients had diabetes. Major complication were seen in 16.7% cases while mortality in two patients. The median duration of hospital stay was 9.56 days postoperatively. Over a follow-up of 3 months, one patient was readmitted with lower GI bleed, and reoperated. No patients were readmitted with pain.*
Conclusion: *Our early experience suggests that Frey's procedure can be a safe option for patients with chronic calcific pancreatitis, with acceptable morbidity.*
KEYWORDS: *chronic calcific pancreatitis, Frey's procedure, Chhattisgarh*

INTRODUCTION

Chronic calcific pancreatitis is progressive inflammatory disorder characterized by irreversible pancreatic parenchyma's destruction, resulting in array of symptoms from pain, endocrine deficiency like type 3C diabetes, exocrine insufficiency, along with many local and systemic complications [1]. This results in significant impairment in quality of life with morbidity and mortality [2].

The estimated prevalence of ccp in India ranges from 114-200/ lakh population, more in southern states. This data is much higher as compared to western population [3]. Chronic calcific pancreatitis is multifactorial disease and alcohol remains the major contributor, however there are other factors like genetic, autoimmune, metabolic and environmental also [4]. Recurrent or persistent pancreatic injury leads to premature intra pancreatic activation of trypsin, acinar cell damage, and activation of pancreatic stellate cells, resulting in progressive fibrosis and ductal distortion [5].

Pain along with other symptoms in chronic calcific pancreatitis is attributed to ductal hypertension possibly due to calcification and fibrosis, inflammatory mass in pancreatic head, neural inflammation and ischemic changes [6]. Medical and endoscopic interventions are usually first line, but surgery is eventually required to tackle pain and complications [7]. Historically surgical Management was divided between drainage procedure (which addressed ductal hypertension) and major resection (which removed diseased pacemaker in pancreatic head), but carried significant morbidity. In 1987, Frey and smith described a hybrid approach involving local resection that is head coring with lateral pancreatico jejunostomy, which is now simply recognized as Frey's procedure [8].

Despite widespread adoption of Frey's procedure, outcome is based on institutional volume, to demography and patients' co-morbidities [9]. This case series aims to share our single center experience of Frey's procedure during 5- year period, focusing on unique demography, etiology and post op challenges in our setting.

Aim: To know clinico-pathological profile & outcome in patients who underwent Frey's procedure in Department of Surgical Gastroenterology at DKS PGI, Raipur.

Objective:

1. To study demographical and etiological profile of patient presenting with pain in chronic pancreatitis undergoing Frey's procedure.
2. To identify post operative complications, morbidity and mortality in patient undergoing Frey's procedure in our center.

METHODOLOGY

Study Population:

All patients who underwent Frey's procedure between 2021 to 2025 at department of surgical gastroenterology, at D.K.S Raipur, with minimum 3 month of follow-up were included. Data is collected retrospectively, using medical records.

Indication of Surgery:

Surgery was indicated based on clinical and radiological findings. Surgery was performed in patients who failed with conservative Management for Pain or other complications. Majority of Radiology (MRCP) findings in our group suggested duct dilatation & /or stricture with stones and parenchymal atrophy. Endoscopic diagnosis or intervention was limited at our centre due to unavailability.

Data Analysis:

Data included patients' demography, co morbidity, symptoms, intra op details, morbidity and mortality were derived from medical records. Pancreatic leak is defined according to international classification. It is defined as drain fluid of any output with amylase level more than 3 times the serum. Overall morbidity was classified according to Clavien-Dindo classification. Post pancreatectomy haemorrhage was defined as per ISGPS guidelines.

Statistical Analysis:

Quantitative variables were expressed as mean ± standard deviation. Dichotomous variables were expressed as a percentage. All statistical computations were performed using IBM SPSS, version 26.

RESULTS

Pre-op characteristics: A total of 18 patients underwent Frey's for chronic pancreatitis in last 5 years, in our institute. There were 12 (66.6%) females and 6 (33.4%) males. The median age was 30.7 years (19-55 years). Alcohol abuse was identified in 5 patients (27.8%), among which 4 (22.3%) consumed tobacco in some form, one (5.5%) patient was tobacco user alone, majority (72.2%) of patient had no detectable cause after workup (lipid profile, PTH, VIT-D and calcium levels), hence classified as idiopathic. 3 (16.7%) had diabetes Mellitus, and all were managed on insulin. Duration of symptoms before undergoing surgery ranges from 0.7 to 6 years. No of hospitalization prior to surgery ranges from 0-12. One patient (5.5%) underwent endoscopic intervention (pancreatic duct stenting) prior to surgery. Pancreatic ascites, as peri pancreatic local complication was noted in one patient. 15 patients (83.3%) had ASA grade 2, 2 patients (11.1%) with uncontrolled diabetes were classified as ASA 3. One patient (5.5%) with pancreatic ascites was grade 4. Median pre op albumin was 3.69. [Table 1]

Table 1. Relevant pre-operative data of patients undergoing Frey procedure (n = 18)

Sex	
Female (n, %)	12 (66.6)
Male (n, %)	6 (33.4)
Age (in years)	30.78 (19 to 55)
Duration of Symptoms (in years)	0.38 (0.7 to 6)
Etiology	

Idiopathic	12 (66.6)
Alcohol & tobacco	6
Autoimmune	0
Genetic	0
Operative blood loss (ml)	241.6 (50 to 600)
Blood transfusion (n, %)	16 (88.9)
Operative time (hours)	4.4 (3.0 to 6.0)
Incidentally detected malignancy	1 (5.6)
Hypercalcemia	0
Hyperlipidemia	0
Duration of Hospitalization (in days)	9.56 (4 to 22)
Pre Op Albumin	3.69 (3.1 to 4.58)
Diabetes (n, %)	3 (16.7)
ASA grade	
Grade 2 (n, %)	14 (77.7)
Grade 3 (n, %)	3 (16.7)
Grade 4 (n, %)	1 (5.6)
Prior Endoscopy (n, %)	1 (5.6)
No of Hospitalization before OT	6 (0 to 12)
Local Complications (n, %)	1 (5.6)

Intra op characteristics: Median duration of surgery was 4.4 hr and median blood loss was 241.6 ml (range 50-600 ml), 16 patients (88.9%) required peri-op blood transfusion. One patient (5.5%) underwent cholecystectomy along with Frey's procedure. Incidental distal pancreatic malignancy, reported as ductal adenocarcinoma in final biopsy was found in one (5.5%) patient. [Table 2]

Table 2. Relevant intra-operative data of patients undergoing Frey procedure (n = 18)

Post-op characteristics: Median post op stay in hospital was 9.56 days. Post op complications were classified according to Clavien-Dindo. Minor complications included grade 1 and 2, and major were grouped as 3 and above. In our study, 3 major complication (16.7%) were noted that resulted in mortality or ICU management. Out of 18 patients, total of 8 patients (44.4%) faced major or minor complication. Most common complication following Frey's procedure was wound infection noted in 3 patients (16.6%), along with delayed gastric emptying. 2 patients (11.1%) have post op respiratory complications, 2 patients (11.1%) had pancreatic fistula, one (5.5%) had post op bile leak. One patient (5.5%) had post pancreatectomy hemorrhage presenting as lower GI bleed. 1 patient (5.5%) was admitted within 90 days of discharge presenting as post pancreatectomy hemorrhage. Patient with PPH was reoperated (5.5%). 2 patient (11.1%) succumbed to respiratory complications. [Table 3]

Table 3. Relevant post-operative data of patients undergoing Frey procedure (n = 18)

**Many patients had more than one complication.*

Post-operative complications (n, %)	8 (44.4)
Major post-operative complications (n, %)	3 (16.7)
Clavien-Dindo grade	

Grade 1 (n, %)	0
Grade 2 (n, %)	5 (27.8)
Grade 4a (n, %)	1 (5.6)
Grade 5 (n, %)	2 (11.2)
Wound infection (n, %)	3 (16.7)
Bile leak (n, %)	1 (5.6)
Pancreatic leak (n, %)	2 (11.2)
Delayed gastric emptying (n, %) (all are type A)	3 (16.7)
Respiratory complications	2 (11.1)
Post-pancreatectomy hemorrhage (n, %)	1 (5.6)
Readmission within 90 days (n, %)	1 (5.6)
Reoperation within 90 days (n, %)	1 (5.6)
Death (n, %) (Post op respiratory complication)	2 (11.2)

DISCUSSION

This retrospective series highlights few characteristic points, in our study median age is 30.7 year with 66% females, and all females patient had idiopathic etiology, this pattern of young females in South Asian centers is confirmed by various regional studies [10]. Adhikari et. Al (2025) noted median age of 36 with 70.4% of females in his study [11]. Amudhan et al, reported mean age of 34.1+/- 11.9 years, with large proportion as tropical/ idiopathic disease. Sah et. al reported young cohort of mean age of 27.9 years [12]. These all findings are very much opposite to western literature with Roch et. al reporting mean age of 49 years with 91% men, and alcohol use as the primary etiology [13].

High proportion of idiopathic chronic calcific pancreatitis in south Asian series and in our study is largely because multiple etiological factors are under detected, under classified or grouped together [14]. Chandak et al demonstrated mutations SPINK1, particularly N34S variant, present in half of Indian patients with idiopathic chronic pancreatitis. It is also identified in alcohol related pancreatitis and also in normal individuals [15]. SPINK1 do not have clear Mendelian inheritance, it also has low and variable penetrance. Testing for the mutation does not change any management or operative techniques.

On the other hand, PRSS1, which is less than 5 percent prevalent in Indian population, has autosomal dominant pattern of inheritance and high penetrance. This is strongly associated with hereditary pancreatitis, with increased risk of carcinoma, hence screening among first degree relative with routine surveillance of affected is recommend [16]. This changes our surgical management from Frey's to early total pancreatectomy with or without islet cell transplant (TPIAT) in young patients. Other genes like CFTR, chymotrypsin C, carboxypeptidase A1 also do not alter the management, hence performing routine genetic testing in resource constraint environment is unreasonable. Large proportion of idiopathic reporting is due to low availability and use of genetic testing in chronic calcific pancreatitis workup, including our hospital. Alcohol use is under reported especially in women due to social stigma, hence many alcohols related chronic pancreatitis are classified as idiopathic.

South Asian population have long standing exposure to childhood malnutrition, micro nutrient deficiencies, oxidative stress, cassava use, pesticide exposure and that socio-economic upliftment has shifted the demographics in chronic calcific pancreatitis study conducted by Garg et al. [17]. These etiologies, have been ignored and historically classified as idiopathic or worse tropical pancreatitis.

Diabetes in chronic calcific pancreatitis correlates strongly with disease duration and reflects advanced parenchymal Destruction [18]. Large epidemiological and surgical series have demonstrated a duration dependent increase in diabetes. Ewald n et al found prevalence of CCP, rising from approximately 10-20% in early disease to 40-80% after prolonged disease (more than 10 years) [19]. In our study, 3 patients were diabetics, and were having symptoms of chronic calcific pancreatitis for 6 months to one year. Two Patient in our cohort were diagnosed as diabetics way before diagnosis of chronic CCP was made or the pain

episodes started. This draws attention to the fact that many patients with type 3c diabetes, arising due to pancreatic parenchymal destruction are misclassified as type 2 diabetes. Hart PA et al, concluded that diabetes may be presenting or early manifestation or is new onset within 2-3 years of pancreatitis [20], Ilies de et al (2020), states that diabetes may precede the diagnosis of pancreatic pathology including pancreatic cancers [21].

Surgery duration, median blood loss, post op stay are similar to other studies conducted. In our study, 88.9% patient received blood transfusion, which is very high compared to other study, this reflects on low transfusion threshold in our institution.

Cholecystectomy is most common accompanying procedure performed for patients undergoing Frey's procedure. Though gall stones are most common cause of acute pancreatitis, there is no causal relation between chronic calcific pancreatitis and gall stone disease [22]. Biliary obstruction, sphincter of oddi dysfunction and metabolic co morbidities, like type 2 diabetes mellitus are shared risk factors that may contribute to gall stones and CCP [23]. Use of TPN, octreotide like drugs is also responsible for gall stone formation in chronic pancreatitis. Hence cholecystectomy, most common additional procedure is not routinely advised, and is done only if patient has concomitant symptomatic gall stones.

Overall morbidity in our study (44%) in higher than compared to other large cohorts ranging from 15-35% [7, 9, 13], this is probably because of small sample size and patient characteristics. Wound infection (16.7%) was also noted at higher end compared to 8-10% [7, 13]. One striking observation made in our study, in contrast to other studies was that there was no wound infection noted in patient with prior endoscopy [9, 24]. Pancreatic fistula in our study is 11.1%, comparable to 5-12% in other study [25, 26], mild delayed gastric emptying rates 16.7% within reported range of 5-20% consistent with other published reports [7, 13, 27]. Rate of bile leak in our study was 5.6%, comparable to others [27]. During 3-month follow-up, none of operated patients were readmitted for pain, at 3 month follow up, patients reported to be pain free as compared to earlier.

Risk of pancreatic cancer is markedly increased in chronic calcific pancreatitis, as compared to general population [28], especially in older individuals with history of smoking. The onset of pancreatic cancer is insidious in chronic pancreatitis and symptoms of pancreatic cancer may resemble symptoms and clinical findings of Chronic pancreatitis. CA19.9 is commonly used for diagnosis of pancreatic ductal adenocarcinoma. But its routine use is not recommended in patients with chronic pancreatitis due to low specificity as inflammation is found in both conditions [29].

CCP can present as inflammatory mass that is, pseudotumor resembling mass in pancreatic cancer. They are difficult to differentiate in many clinical settings also with use of cross-sectional imaging. CT sensitivity drops drastically for lesions less than 10mm by 33-44% [30], the dense fibrosis and calcification in CCP can mask tumor contrast difference [31], and also retrospective reviews show many lesions were visible but reported. 7.7% of pancreatic cancer had index CT/MRI 3-18 months earlier that could not detect the lesion. The tail tumors are more notorious to miss in imaging as they may lack ductal dilatation [31], and may be iso attenuating. MRCP is an excellent modality for visualizing ductal anatomy and hence small parenchymal tumors which may not distort duct at all can be missed easily.

In our center, we routinely use MRCP, before posting the patient for Frey's procedure that could be the reason it was missed in pre op work up. The missed diagnosis of pancreatic cancer is accompanied by mortality due to delay in management, or intra-op surprises. Therefore, EUS is recommended for routine algorithm especially in evaluating patients with acute idiopathic, or chronic pancreatitis of unclear etiology or in high suspicion of neoplasia [29]. EUS is highly sensitive in differentiating pseudo tumor from cancer. EUS guided biopsy/ FNA, elastography can further aid in diagnosis. In our case, strong history of alcohol use and unavailability of EUS, with low suspicion were responsible for missed diagnosis of pancreatic cancer.

In our study, tumor was suspected after entire duct was laid open, we performed distal pancreatectomy and completed Frey's procedure, without lymphadenectomy. This patient succumbed to post operative respiratory complications and is highly unlikely that he would have tolerated an R0 resection. One significant mortality presented late to us as post pancreatectomy hemorrhage, presenting as lower GI bleed. An abdominal drain was left in pelvis for continued ascitic output. Patient was initially managed for metabolic derangements in ICU; lower GI bleeding gradually stopped. After patient was stabilized, CT angiography showed no bleeding, but a doubt of fistula between drain and rectum causing lower GI bleed

raised. Patient was taken for exploratory laparotomy, the drain was removed with no injury to rectum, no intra-abdominal bleeding source could be identified. Post operative colonoscopy was planned at outside facility, but patient succumbed to post operative respiratory complications. Pulmonary complications (pneumonia, respiratory failure, ventilators dependency) have been identified as one of most significant predictors of post operative mortality following pancreatectomy [32].

CONCLUSIONS

Frey's procedure is a safe surgical procedure in patients of ccp with pain and obstructive symptoms with acceptable morbidity. Results from our center is comparable to other similar studies conducted.

Abbreviation: CCP- Chronic calcific pancreatitis, MRCP- Magnetic resonance cholangiopancreatography, CT- computed tomography scan, EUS- Endoscopic ultrasound, FNA- Fine needle aspiration, TPN- Total parental nutrition, CFTR- Cystic fibrosis transmembrane conductance regulator gene.

Financial Support: Nil

Conflict of interest: Nil

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