

A Comparative Study of Drainage Procedures in Chronic Pancreatitis

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Abstract

Background: Chronic pancreatitis is a progressive inflammatory disorder characterized by irreversible destruction of pancreatic parenchyma. Main indication for surgery is intractable abdominal pain .

Objectives: The study is intended to know the etiology, incidence, pathogenesis, clinical manifestation and the outcome of the following three methods of surgical management chronic pancreatitis namely,

- 1.frey's procedure,
- 2.puestow gillesby procedure &
- 3.izbicke's procedure.

Also to study complications of these procedures and recurrences if any

Method: This is a prospective cross sectional study, where 32 patients admitted to our hospital with chronic calcifying pancreatitis, who met with the inclusion and exclusion criteria, were subjected to clinical examination and relevant investigations. The treatment is carried out depending upon the magnitude of disease, size of the main pancreatic duct, parenchymal calcification and patient's predominant symptom.

Results: A male preponderance noted to be about 30:2 in this study. Mean age of presentation was noticed to be in the range of thirty to forty years. This disease was found to be more prevalent in persons who are chronic alcoholic.

Clinically patients presented with chronic abdominal pain with diabetes mellitus and malabsorption due to endocrine & exocrine insufficiency. All the patients had radiological abnormalities. The complications noted were wound infection, wound dehiscence & postoperative persistent pain.

On comparing with post operative pain relief, improvement of exocrine & endocrine function of pancreas, improvement of performance status of the patient among the three surgical procedures compared frey's procedure is the more effective comparing to other two procedures.

Conclusion: In this study it is found that the most common etiology for chronic pancreatitis was chronic alcoholism in the middle aged male . Of the various treatment modalities available for the treatment of this disease Frey's procedure has lower complication rate

Keywords: Anastomosis, Complications, frey's procedure, izbicke's procedure, puestow gillesby procedure,

I. Introduction

Chronic pancreatitis is a progressive inflammatory process of the pancreas leading eventually over several years to pancreatic "cirrhosis". Chronic pancreatitis Clinically, is usually characterised by an initial stage of recurrent acute pancreatitis (early stage CP) and progressive pancreatic dysfunction and/or calcification (late-stage CP).

Alcohol abuse is the prominent risk factor of CP (70%), while CP remains aetiologically undetermined in about 25% or is related to rare causes such as genetic mutations, hyperparathyroidism, trauma or "autoimmunity"⁴. Surgery is frequently indicated for relief of debilitating pain . These surgeries address the head of the pancreas as the nidus of persistent inflammation, and achieve success with both dilated and nondilated duct disease. The LR-LPJ has a lower risk of perioperative problems and may be easier to perform.

To compare the following techniques in the management of chronic pancreatitis

1. Frey's procedure
2. Puestow gillesby procedure &
3. Izbicke's procedure.

To study the rate of success of these three procedures in the management of chronic pancreatitis and its complications, recurrences if any.

1.1 Incidence

In 1998, Lankisch et al reported that the prevalence of chronic pancreatitis in many parts of the world appeared to be in the range of 3–10 per 100,000 people. The rate of patients discharged for chronic pancreatitis is 32.9 per 100,000 hospitalized patients (7).

1.2 Aetiology

The most common cause of chronic pancreatitis is alcoholism and in approximately 70% of cases as a major cause of this disease.¹⁹ It is estimated that alcohol intake greater than 20g per day over a period of 6–12 years produces changes consistent with chronic pancreatitis. The most common congenital anomaly of the pancreas, pancreas divisum, occurs in approximately 10% of the population. Tropical pancreatitis is also attributed as a major cause for chronic pancreatitis due to pancreatic stone formation. Chronic pancreatitis occurs in untreated hyperparathyroidism. Trauma to the back or abdomen may produce pancreatic injury leading to chronic pancreatitis. Chronic pancreatitis is also associated with obstruction of the pancreatic duct secondary to strictures related to pancreatic inflammation.

Idiopathic chronic pancreatitis is the major form of nonalcoholic disease in Europe and North America, occurring in 10–40% of those with chronic pancreatitis. There is an association between patients with pancreatitis and mutation of the cystic fibrosis transmembrane conductance regulator (CFTR) gene as a result of this genetic mutation.⁴⁴ Hereditary chronic pancreatitis affects familial groups and involves a small number of related individuals, an autosomal dominant gene. The mechanism which determines the main manifestation of chronic pancreatitis, i.e., fibrosis of the pancreatic gland, has been well summarized by Taludkar *et al.* [40]. In brief, the oxidation of ethanol to acetaldehyde determines the activation of the pancreatic stellate cells in the quiescent state without any pre-activation; this process generates a state of oxidant stress within the pancreatic stellate cells which subsequently activates the downstream pathways of the fibrogenesis. Pancreatic stellate cells are morphologically similar to hepatic stellate cells. They have long cytoplasmic processes and are situated close to the pancreatic acini.

In the quiescent state, these cells contain lipid droplets, store vitamin A and express markers such as desmin, glial fibrillary acidic protein, neural cell adhesion molecule and neurotrophin nerve growth factor just as hepatic stellate cells do. Pancreatic stellate cells contain enzyme alcohol dehydrogenase [45] and, when activated, they assume a myofibroblast-like phenotype [46]. Activated pancreatic stellate cells are characterized by the disappearance of fat globules and the expression of alpha-smooth muscle actin. Ethanol, acetaldehyde and oxidant stress are capable of activating pancreatic stellate cells via three mitogen-activated protein kinase pathways [52], namely extracellular signal kinase, p38 kinase and c-jun amino terminal kinase [53-55], and ethanol and acetaldehyde are also capable of activating phosphatidylinositol 3-kinase and protein kinase C [56].

On the other hand, extracellular signal kinase activation occurs via a signal transduction pathway which involves G-protein Ras and serine threonine protein kinase Raf-1 [57,58]. The Ras superfamily G proteins undergo post-translational modification involving isoprenylation, a process which requires intermediate substrates of cholesterol biosynthesis [59,60] which is regulated by HMG CoA reductase [61]. The fibrotic alterations in chronic alcoholic pancreatitis are not due to recurrent episodes of necrotizing pancreatitis but the disease is due to a chronic stimulation of alcohol on pancreatic stellate cells which play an important role in pancreatic fibrogenesis.

1.3 Diagnosis

1.3.1 Biochemical Measurements

Isoamylase, lipase, trypsin, and elastase levels may be low, normal, or elevated in patients with chronic pancreatitis. The secretin stimulation test is the most sensitive test to diagnose early pancreatic disease in patients who have developed malabsorption problems. The bentiromide test is inexpensive, convenient, and easily available for diagnosis of advanced disease. Para-aminobenzoic acid (PABA) is the result of the synthetic tripeptide bentiromide, cleaved by pancreatic chymotrypsin, in the duodenum and excreted in the urine.

1.3.2 Radiological Testing

1.3.2.1 Plain Abdominal Film

A plain film of the abdomen is usually the first diagnostic test used to establish a diagnosis of chronic pancreatitis. Diffuse, speckled calcification of the gland may suffice as a positive finding.

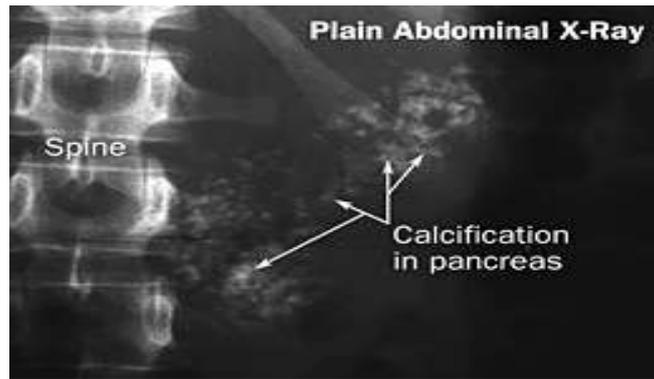


Fig1

1.3.2.2 Transabdominal Ultrasound

Findings of a dilated pancreatic duct (greater than 4 mm), calcification, and large cavities (greater than 1 cm) are associated with chronic pancreatitis.

1.3.2.3 Computed Tomography (CT)

More sensitive than transabdominal ultrasound, CT scanning can demonstrate duct dilation, cystic lesions, and calcification. This technique is useful in discriminating chronic pancreatitis from pancreatic carcinoma.

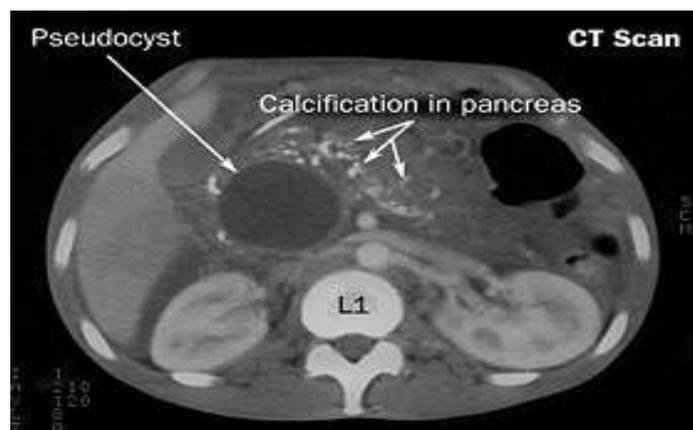


Fig2.

1.3.2.4 Magnetic Resonance Cholangiopancreatography (MRCP)

MRCP yields satisfactory pancreatograms in patients with chronic pancreatitis in whom a CT scan showed no abnormalities. MRCP is derived from an enhanced MRI and may be adjusted to optimally visualize the biliary and pancreatic ducts. Dynamic secretin magnetic resonance pancreatography (DSMRP) has further advanced pancreatic visualization. DSMRP may improve the clinician's ability to detect early chronic pancreatitis.

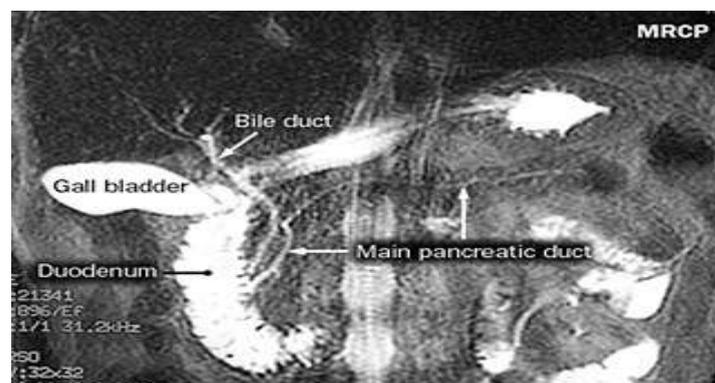
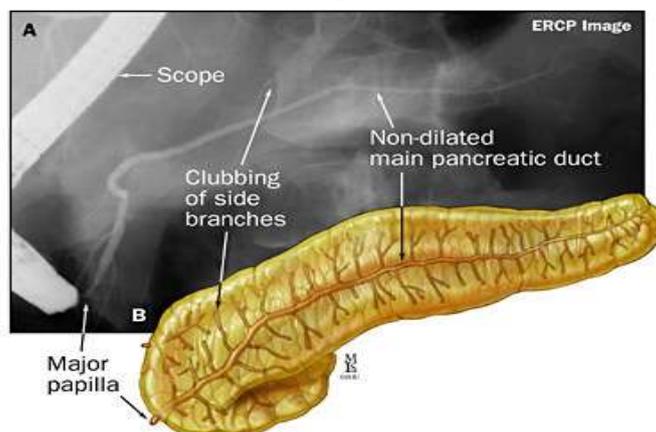


Fig 3

1.3.2.5 Endoscopic Retrograde Cholangiopancreatography (ERCP)

ERCP is a sensitive and specific diagnostic tool in chronic pancreatitis. ERCP shows details of the pancreatic ductal anatomy, including strictures, ductal rupture and pseudocysts. The changes seen on ERCP are often inadequate to be of diagnostic value in the patient with chronic pancreatitis. Mild pancreatitis may present with minimal dilation of the main pancreatic duct and some clubbing of the side branches of the duct.

Fig5



II. Overview

Chronic pancreatitis patients require supportive measures. The initial stage in management of patients with chronic pancreatitis should include assessment of the etiology and severity of the disease, because both of these factors affect the mode of treatment.

Treatment is generally directed toward control of pain, correction of problems related to pancreatic exocrine and endocrine insufficiency, and the correction of associated biliary tract and gastrointestinal tract pathology. Abdominal pain is a difficult symptom to treat in chronic pancreatitis. Because pain is a subjective sensation, there is no objective parameter for measurement or means to monitor its occurrence.

III. Surgical Therapy

There is no single surgical procedure uniformly recommended for all patients with chronic pancreatitis. The surgical procedure is selected according to the severity of pain, ductal morphology, the extent of parenchymal disease, and the overall condition of the patient. The goal of surgery in chronic pancreatitis patients is to relieve intractable pain while preserving endocrine and exocrine functions of the pancreas. The results of surgical procedures are inconsistent in their ability to control pain.

3.1. Puestow Procedure

The longitudinal pancreaticojejunostomy, or Puestow's procedure, is the prototypic drainage procedure for patients with marked dilation of the main pancreatic duct (greater than 7–8 mm). An 8–10-cm segment of the pancreatic duct is unroofed and intraductal concretions removed. The jejunum is divided and the opened pancreatic duct is anastomosed to the jejunum. This allows adequate drainage to enter the jejunum. A jejunojunction reconnects the jejunum to restore continuity of the gastrointestinal tract. This procedure is successful in relieving pain in 70–80% of patients in the short term. Pancreatic function remains unchanged because there has not been resection of the gland. It is a safe and effective surgery with low morbidity and mortality.

3.2 Frey's procedure

Local Resection of the Head of the Pancreas with Longitudinal Pancreatico-Jejunostomy

The operation was designed to remove most of the head of the pancreas while preserving the body and tail of the pancreas, the stomach, and duodenum to minimize morbidity. The DPPHR does not preserve the posterior capsule, which mandates 2 anastomoses.

3.3 Izbicki's "V" Shaped Ventral Pancreatic Excision

In this procedure a long "V" shaped excision of ventral aspect of the pancreas is done with a lateral pancreaticojejunostomy by a mucosa to capsule anastomosis. This procedure drains the main as well as the second and third order ducts. This is an ideal procedure for small duct disease with a maximum diameter of the Wirsung's duct less than 3mm.

IV. Inclusion Criteria

Clinical & Radiological features of Chronic pancreatitis with persistent pain.

Pancreatic ductal dilatation

Severe malabsorption

Multiple relapse

Pseudocyst pancreas

V. Exclusioncriteria

- Patients unfit for prolonged anaesthesia
- Pseudoaneurysm
- Infected Pseudocyst
- Pancreatic malignancy
- Periapillary carcinoma with pancreatitis
- Acute exacerbation of chronic pancreatitis
- Patients not willing for follow up

VI. Results

A total of 32 patients were admitted with complaints relating to chronic pancreatitis and its complications. The above patients were included in the study, findings noted, appropriate treatment instituted and followed up for a period of 6 months.

6.1 Age and Gender distribution of the Study Population.

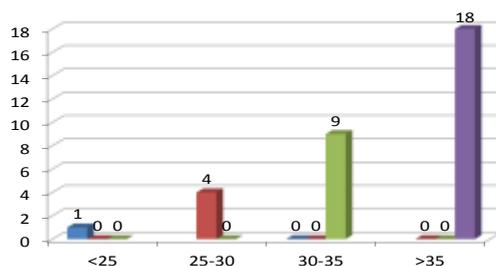


Fig 8

6.2 Distribution of the patients based on the type of treatment procedure Performed

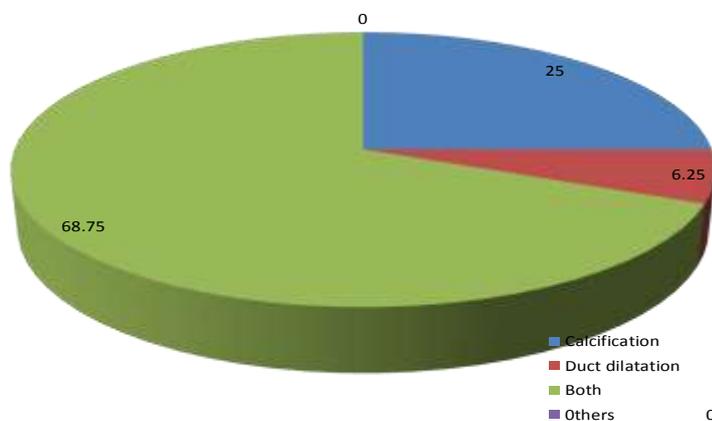


Fig 10

6.3 Distribution of the Patients on the basis of duration of Surgery

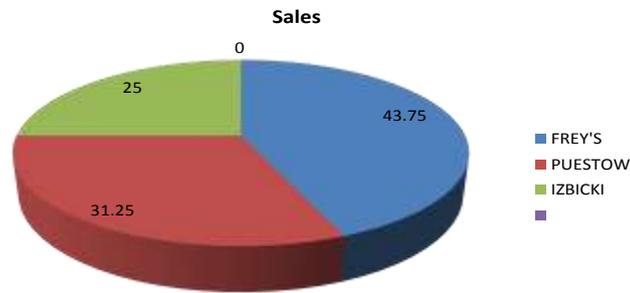


Fig 11

6.4 Distribution of the Treatment Groups based on the Duration of Surgical Procedure Performed

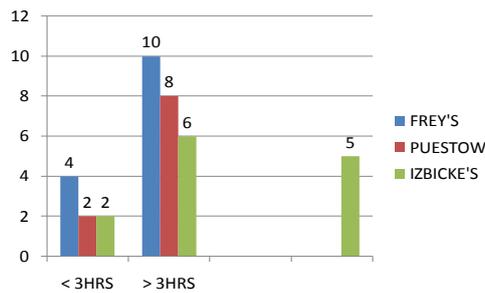


Fig 12 6.5 Distribution of the Treatment Groups and their Duration

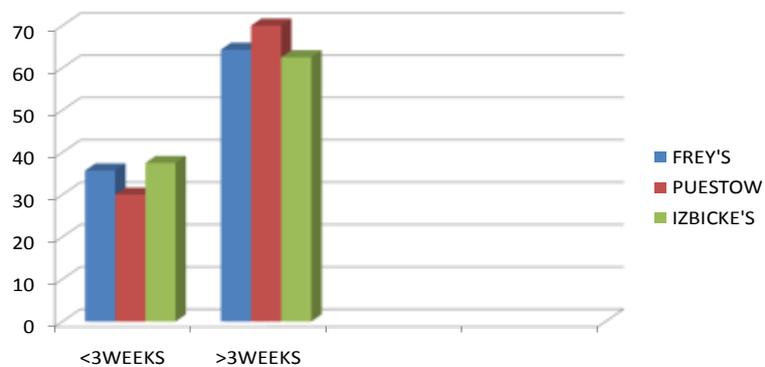


Fig 13

6.6 Ease of the procedure

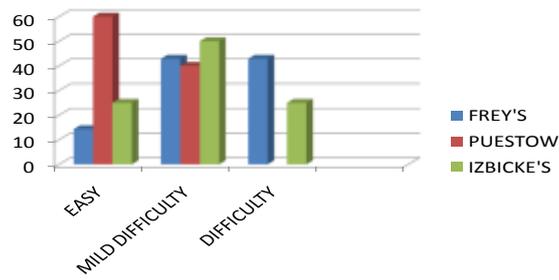


Fig 14

6.7 Monitoring of patients

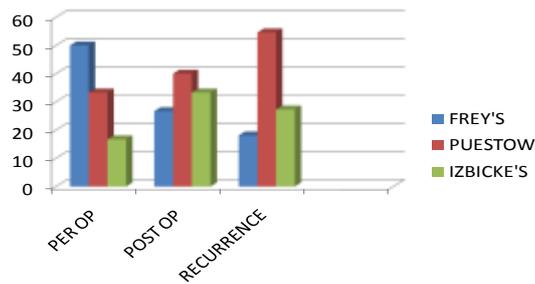


Fig 15

6.8 Gender Distribution between the Study Population and the Treatment Groups.

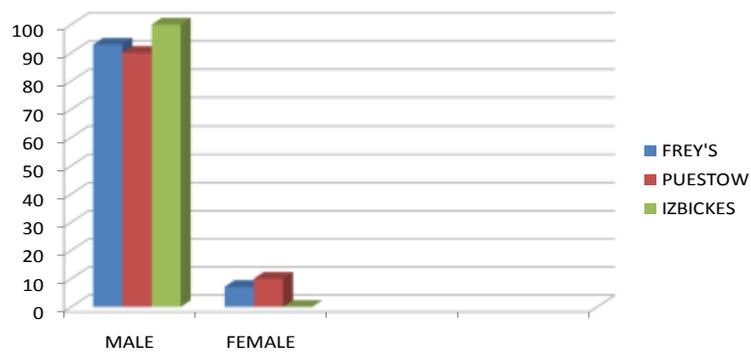


Fig 16

6.9 Distribution of the patients on the basis of their Occupation and Treatment groups.

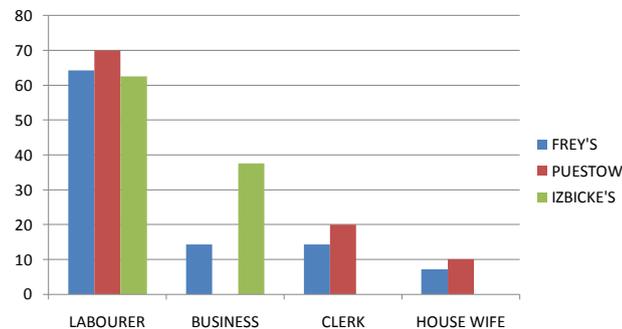


Fig 16

VII. Discussion

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. Main indication for surgery is intractable abdominal pain and choosing the best technique to be used for a patient remains a challenge.

Sex incidence

The disease is more common in males than females for reasons like Alcoholism, smoking and occupation. The western literature also confirms that this disease is predominant in males. The Indian male for obvious reasons like Alcoholism, smoking and occupation were noted to be more prone for the disease than the female counterpart. In this study majority (93.75%) of the study population was Males and Females consisted of only a few (6.25%). The male: female ratio was noted to be approximately 15:1 in this study.

Age incidence

The disease occurs rarely in subjects beyond 50years for reasons that have already been explained. It is more commonly seen in the age groups of 30 to 40 years because the time taken for the manifestation of the disease is high. Females tend to develop this disease at an earlier age than the male counterparts because the etiology is different in females compare to males.

In this study more than two third of the patients (81.38%) were between the age group of 30 to 40 years. The Mean Age of the studied population was 36.8 ± 4.54 with minimum age being 24 and maximum age being 51 years, which is comparable with, other standard studies namely

Occupation incidence

Occupation has an important role in the development of chronic pancreatitis. It's seen in people who are manual labourers who are more for chronic alcoholism and smoking to overcome the stress and strain from their prolonged work.. In this study nearly 2/3 rd (75.0%) of the patients were manual labourers by occupation. businessman consisted of about 12.5% of the population.

Body Mass Index

Most of the patients presented with chronic alcoholism are malnourished due to loss of appetite and exocrine and endocrine deficiency. Over weight and obesity are considered to be less contributing factor.

Investigation

Diagnosis of chronic pancreatitis is mostly clinical and by radiological imaging. There specific investigations that are needed for the confirmation of endocrine and exocrine deficiency are available. x ray abdomen, ultrasound abdomen, CECT Abdomen, MRCP are routinely done in these patients to know the duct and parenchymal calcification, duct diameter, and to rule out CBD and Gallbladder pathology.

Treatment

Among the 32 patients, 14 patients underwent FREY'S PROCEDURE, 10 patients underwent Puestow procedure and 8 patients underwent IZBICKE'S PROCEDURE. All the patients treated with B/L flank drains and kept on nil oral for 5 days. Drains were removed on 7th POD after confirming that there is no anastomotic leak. All are given IV antibiotics for 7 days.

Nearly half of the males (43.3%) were treated with Frey's procedure and 30% of males treated with Puestow procedure. Where as in females, equal number of patients were treated with Frey's procedure and Puestow procedure.

Time taken for surgery

Average time taken for Puestow and Izbicke's procedure were 3 hours. Extra 30 to 45 minutes were taken for Frey's procedure in which the head coring has to be done. This time includes from time of induction to recovery of the patient from Anaesthesia.

Complications

Per operative complications mainly excessive bleeding noted in more number of patients with previous abdominal surgeries with adhesions. In other cases the dissection was easy and there was no significant per operative complications.

In few cases post op wound infection occurred which was treated with appropriate antibiotics and dressings and allowed to heal by secondary intention. Post operative diabetic management was difficult in most of the cases for which Diabetologist opinion obtained and Insulin was given. Nutrition support was given to most of the patients.

Duration of hospital stay

It can be seen that more than half of the patient (65.6%) treated by all the three procedures had a hospital stay of more than two weeks duration, which includes preoperative evaluation. The hospital stay is prolonged in patients who had wound infection and uncontrolled Diabetes. The association between the duration of hospital stay and type of treatment procedure performed was statistically not significant.

VIII. Recurrence

Recurrence of pain was more among patients who underwent Puestow procedure (60%) followed by (37.5%) in Izbicke's procedure and least rate of recurrence was noted in Frey's procedure.

IX. Conclusion

In our study of 32 patients who presented with clinical and radiological features of chronic pancreatitis the following observations were made:

Recurrent attacks of abdomen pain and progressive insufficiency of endocrine and exocrine organ function.

2. It is more common in patients with alcohol abuse.

3. It's a diagnosis based on history, clinical findings, radiological investigations like ultrasound abdomen, CECT abdomen and MRCP in selective cases

4. Treatment of chronic pancreatitis mainly focused on pain management, treatment of exocrine and endocrine insufficiency, prevention of weight loss and prevention of disease progression.

5. Duct drainage, Radical resective surgery and local resections are the most common surgical techniques in the surgical therapy.

6. In this study three main surgical procedures namely FREY'S, PUESTOW and IZBICKE'S procedure were compared.

7. The difference between the duration of surgery, hospital stay, wound healing, per op and post op complications are statistically not significant.

But the recurrence of symptoms is very low in FREY'S procedure (14.3%) compare to 37.5% in IZBICKE'S procedure and 60% in PUESTOW'S procedure.

8. Frey's, proved to be highly effective in controlling abdominal pain secondary to this disease in long term, combined with small interference on exocrine and endocrine function.

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