



Surgical management of chronic pancreatitis: Our institutional experience

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ABSTRACT:- Background: Chronic pancreatitis is a worldwide problem with significant adverse effect on not just the health of the patients, but also their personal and social life. Surgical treatment is offered for patients with long standing pancreatitis, intractable pain, or manifestations of complications thereof. There are several surgical techniques which can be employed, and all of them aim to relieve pain while maintaining the endocrine and exocrine functions of the pancreas.

Aims and objectives: To study the various types of surgical procedures done for chronic pancreatitis and assess morbidity and mortality associated with surgical procedure. Our study also aimed to assess the outcome of various surgeries done for chronic pancreatitis mainly with regards to pain relief, weight gain and diabetic status by adequate follow up.

Study Period: 5 years retrospective study from Aug 2002 to July 2007, and 2 year prospective study from July 2007 to August 2009

Materials and methods: 33 patients who underwent Surgery for Chronic pancreatitis during our study period were included in the study. Careful analysis of history, clinical findings and investigatory findings were done. The type of surgery, the intra-operative and post-operative complications and the outcome for each patient was noted and analysed. Regular follow up was done at 1, 3 and 6 months.

Conclusion: Significant pain relief, weight gain, improvement in diabetic status was seen after all procedures. Hence, surgery plays an important role in the management of chronic pancreatitis unresponsive to medical management, or when associated with severe intractable pain.

Keywords:-Chronic pancreatitis, morbidity, mortality, intractable pain, surgery

I. INTRODUCTION

Chronic Pancreatitis is a worldwide problem. It is a chronic inflammation of the pancreas, associated with morphological and functional changes. These are progressive, and alter the microcirculation, while the inflammatory cells damage the glandular cells. This results in both an exocrine and an endocrine insufficiency. Most commonly, it manifests with recurrent, often intractable abdominal pain, resulting in frequent admissions to the hospital. This affects the personal and social life of the patients, often leading to an inability to work and early retirement. Another problem encountered is addiction to analgesics and narcotics. Hence, it is imperative to nip the problem in the bud with early diagnosis, medical and surgical treatment.

Surgery for chronic pancreatitis is considered mainly if there is failure of medical management. Severe intractable pain abdomen radiating to back, weight gain and uncontrollable diabetes are the main reasons to consider surgery for these cases of chronic pancreatitis. Various surgeries for chronic pancreatitis have been described in literature. Aim of the surgery is to provide relief from intraductal hypertension or gain relief from the pathology which is causing these symptoms. The fact that various surgeries have been described indicates that different forms of pancreatitis may need different surgeries to be performed, for example a disease confined to tail of pancreas may be treated by distal pancreatectomy, whereas pancreatitis due to ductal calculi causing ductal hypertension may be relieved by a drainage procedure. We designed our study to encompass the various aspects of chronic pancreatitis, study the various surgeries done for the same and the outcome of these surgeries.

II. AIMS AND OBJECTIVES

- To study the various types of surgical procedures done for Chronic pancreatitis
- To assess morbidity and mortality associated with the surgical procedures

- To assess the outcome of various surgeries done for chronic pancreatitis mainly with regards to pain relief, weight gain and diabetic status by adequate follow up.

III. MATERIALS AND METHODS

Study period: 5 years retrospective study from Aug 2002 to July 2007, and 2 year prospective study from July 2007 to August 2009.

All patients from the Surgical or Surgical Gastroenterology department KMC Manipal who underwent surgery for chronic pancreatitis were included in our study.

Patients who underwent surgeries for complications of chronic pancreatitis were excluded from the study.

315 cases of chronic pancreatitis were admitted and treated from August 2002 – July 2009. 33 patients were treated surgically, excluding the ones who underwent surgery for complications and were included in the study.

Careful analysis of patient's history and examination findings and appropriate blood tests were done. Other investigations done were Ultrasound abdomen, X-Ray abdomen, Upper GI Endoscopy, CT scan, Endoultrasonography and ERCP depending upon history and clinical findings. Surgical treatment was undertaken only for those patients who had failure of medical treatment.

The type of surgery was greatly influenced by the picture provided by various investigations as well as intraoperative findings. Assessment of Morbidity and Mortality and condition of patient at time of discharge was done.

Condition of the patient was recorded at the time of discharge. All patients were called for follow up at 1 month, 3 months and 6 months to look for pain relief, weight gain and improvement in diabetic status. Some patients were lost to follow up.

IV. OBSERVATIONS AND RESULTS

A total of 33 patients underwent surgery for chronic pancreatitis. Of this, 21 (64%) were male and 12 (36%) were female.

The age range was from 7 years to 69 years, the median age being 37 years.

Most of the patients presented with abdominal pain. Other common presenting complaints were vomiting, loss of weight, flatulent dyspepsia and jaundice.

Most patients presented with abdominal pain in the epigastric region and had recurrent abdominal pain, alternating with symptom free periods, or mild dull aching pain. Around 69% of patients had pain that radiated to the back.

The duration of the pain varied from 1 month to 20 years, however most of our patients had pain for a period of less than 6 months. History of diabetes was present in 36.4% of patients. Most of them were on oral hypoglycaemic agents. Most of them had uncontrolled sugars at the time of presentation. One patient presented with diabetic ketoacidosis.

Around 75% of patients had history of previous hospitalizations for pain.

Almost 18 patients had history of frequent analgesic abuse for relief from the abdominal pain, accounting for almost 55% of patients. 3 patients had a history of narcotic usage.

33.3% patients had history of alcohol intake, and 18% had history of smoking.

93.9% of patients had abdominal tenderness on palpation of which 77% had it in the epigastric region.

There was a palpable mass in 2 patients. 3 patients had clinical ascites, where shifting dullness was demonstrable. One patient had a palpable gall bladder.

Routine haemogram was done for all patients. 12% of patients had haemoglobin of less than 10 mg/dl.

Random blood sugar, fasting blood sugar and post prandial blood sugars were estimated in the patients.

DIABETIC STATUS	NO OF PATIENTS	PERCENTAGE
HIGH SUGARS	16	48
SUGARS NORMAL	17	52

Serum amylase and lipase levels were tested in all patients. Serum amylase was found to be raised in 27.2% patients, while serum lipase was found to be raised in 30.3% patients. Raised total bilirubin levels were seen in 18.2% patients. AST and ALT were raised in 18.2% patients. ALP was raised in 30.3% patients.

The patients underwent the following investigative procedures:

PROCEDURE	NO OF PATIENTS (OUT OF 33)	PERCENTAGE
1) X-RAY ABDOMEN	17	51.5
2) USG ABDOMEN	24	72.7
3) CT ABDOMEN	23	69.7
4) EUS	6	18.2
5) ERCP	9	27.3
6) UGISCOPY	19	57.6

X-Ray abdomen was done in 51.5% patients, and it showed pancreatic calcification in 36.3% patients. USG abdomen was done in patients with abdominal pain to look for pancreatic ductal dilation.

Findings of Ultrasound Abdomen:

ULTRASOUND ABDOMEN FINDING	NO OF PATIENTS (OUT OF 24)	PERCENTAGE
PANCREATIC DUCT DILATION	18	75
INTRA DUCTAL CALCIFICATION	17	70.8
PARANCHYMAL CALCIFICATION	15	62.5
HEAD MASS	4	16.7
PSEUDOCYST	7	29.2
CBD DILATION	6	25

CT abdomen was done in 69.6% patients. The findings were consistent with those of Ultrasound abdomen. 78.3% patients were diagnosed to have pancreatic duct dilation, 87% had parenchymal calcifications, 60.1% had intraductal calcification. 21.7% had a pancreatic head mass, Pseudocysts were found in 26.1% of patients. 8.7% were diagnosed to have splenic vein thrombosis, 17.4% patients had ascites and 8.7% had pleural effusion.

Endoultrasonography (EUS) was done in 6 cases after ultrasound abdomen. This was done in patients diagnosed to have pancreatic head mass suspected with malignancy. FNAC was done in 3 patients, and all 3 were reported as chronic pancreatitis.

ERCP was done in 27.2% patients. 22.2% of patients who underwent ERCP were found to have pancreatic divisum.

ERCP FINDING	NO OF PATIENTS (OUT OF 9)	PERCENTAGE
DILATED PANCREATIC DUCT	6	66.7
INTRA-DUCTAL CALCULI	4	44.5
PANCREATIC DUCT STRICTURE	3	33.3
PANCREATIC DIVISUM	2	22.2

Investigative Procedure findings:

FINDINGS	NO OF PATIENTS (OUT OF 33)	PERCENTAGE
PARENCHYMAL CALCIFICATION	27	81.8
DILATED PANCREATIC DUCT	26	78.8
PANCREATIC DUCT CALCIFICATION	25	75.8
PSEUDOCYST	12	36.4
HEAD MASS	7	21.2
CBD DILATION	7	21.2
ASCITES	4	12.1
PANCREATIC DIVISUM	2	6.1

SPLenic VEIN THROMBOSIS	2	6.1
PLEURAL EFFUSION	2	6.1
OESOPHAGEAL VARICES	1	3
NARROW D1	1	3
SPLENOMEGALLY	1	3
GB POLYPS	1	3

All patients received medical treatment before resorting to surgical treatment

The following measures were used as part of medical management.

METHOD USED	NO OF PATIENTS (OUT OF 33)	PERCENTAGE
NSAIDS	30	90.1
NARCOTICS	4	12.1
PANCREATIC ENZYME SUPPLEMENTS	28	85
ANTIOXIANTS	22	66.7
SOMATOSTATIN ANALOGUES	3	9.09

21.2% patients underwent endoscopic management before surgical treatment, among them 28.5% patients underwent papillotomy and 71.5% underwent pancreatic duct stenting. However 28.5% patients had stent displacement, which aggravated their symptoms. Hence the stent had to be removed.

33 patients underwent surgery for the management of their symptoms. The surgical procedures performed in these patients were grouped as follows:

GROUP	PROCEDURE	NO OF PATIENTS (OUT OF 33)	PERCENTAGE
GROUP A	MODIFIED PUESTOW	17	51.5
GROUP B	SUBTOTAL PANCREATECTOMY + SPLENECTOMY	6	18.2
GROUP C	FREY'S PROCEDURE	5	15.2
GROUP D	SUBTOTAL PANCREATECTOMY + SPLENECTOMY + LATERAL PANCREATICO- JEJUOSTOMY	3	9.1
GROUP E	WHIPPLE'S PROCEDURE	2	6.1

INTRA OPERATIVE FINDINGS:

GROUP A – MODIFIED PUESTOW PROCEDURE

INTRA OP FINDING	NO OF PATIENTS (OUT OF 17)	PERCENTAGE
PANCREATIC DUCT DILATION	17	100
DILATION >7mm	17	100
DUCTAL CALCULUS	15	88.2
PARANCHYMAL CALCIFICATION	9	53
DUCTAL STRICTURE	3	17.6
HEAD MASS	2	11.8
PEUDOCYST	1	5.9

GROUP B: SUBTOTAL PANCREATECTOMY + SPLENECTOMY

INTRA OP FINDING	NO OF PATIENTS (OUT OF 6)	PERCENTAGE
PARANCHYMAL CALCIFICATION	4	66.7
PSEUDOCYST IN THE BODY OF PANCREAS	3	50
PESUDOCYST IN THE TAIL OF PANCREAS	2	33.3
FIBROSED PANCREAS	3	50
PANCREATIC DUCTAL DILATION > 7mm	0	0
SPLENOMEGALLY	1	16.7
PANCREATIC FISTULA	1	16.7
CALCIFICATION OF PANCREAS	1	16.7

GROUP C: FREY'S PROCEDURE

INTRA OP FINDING	NO OF PATIENTS (OUT OF 5)	PERCENTAGE
PANCREATIC DUCTAL DILATION	5	100
DUCTAL DILATION >7mm	5	100
CALCULUS	3	60
HEAD MASS	4	80
DUCTAL STRICTURE	2	40
PSEUDOCYST	2	40
PANCREATIC DIVISUM	1	20

GROUP D: SUBTOTAL PANCREATECTOMY + SPLENECTOMY + LATERAL PANCREATICO JEJUNOSTOMY

INTRA OP FINDING	NO OF PATIENTS (OUT OF 3)	PERCENTAGE
PANCREATIC DUCT DILATION	3	100
DUCT DILATION >7mm	3	100
CALCULUS	3	100
PARANCHYMAL CALCIFICATION	2	66.7
HEAD MASS	1	33.3
PSEUDOCYST	1	33.3
PANCREATIC DIVISUM	1	33.3

GROUP E: WHIPPLE'S PROCEDURE

INTRA OP FINDING	NO OF PATIENTS (OUT OF 2)	PERCENTAGE
HEAD MASS	2	100

Duration of surgery ranged from 2.5 hrs. to 10 hrs. The mean duration being 5.3 hrs. Intra operative blood loss ranged from 200 ml to 3500 ml, the mean being 1060 ml. The duration of stay for the patients ranged between 7 days to 29 days, and the mean being 12.6 days.

SURGICAL PROCEDURE	MEAN DURATION OF SURGERY	AVERAGE INTRA OPERATIVE BLOOD LOSS	AVERAGE POST OP DURATION OF STAY
LATERAL PANCREATICO JEJUNOSTOMY	5.3 HRS	740 ml	13.4 DAYS
SUBTOTAL PANCREATECTOMY	4.5 HRS	1930 ml	9.7 DAYS

WITH SPLENECTOMY			
FREY'S PROCEDURE	5.4 HRS	680 ml	14.2 DAYS
SUBTOTAL PANCREATECTOMY WITH SPLENECTOMY WITH LPJ	6.2 HRS	630 ml	15 DAYS
WHIPPLE'S PROCEDURE	6 HRS	2125 ml	13 DAYS

The most common post-operative complication was wound infection (33.3%) followed by respiratory complications (30.3%) which included pneumonia and pleural effusion. 3 patients developed pancreatic fistula with 2 of them having pancreatico-jejunal anastomotic leak. 2 patients had post-operative delayed ileus.

GROUP	NO OF PATIENTS	WOUND INFECTION	PANCREATIC FISTULA	ASCITES	DELAYED ILEUS	RESPIRATORY COMPLICATIONS
OVERALL	33	11 / 33	3 / 33	6 / 33	2 / 33	10 / 33
GROUP A	17	5 / 17	2 / 17	3 / 17	0 / 17	5 / 17
GROUP B	6	1 / 6	1 / 6	1 / 6	0 / 6	2 / 6
GROUP C	5	3 / 5	0 / 5	1 / 5	0 / 5	0 / 5
GROUP D	3	1 / 3	0 / 3	1 / 3	1 / 3	2 / 3
GROUP E	2	1 / 2	0 / 2	0 / 2	1 / 2	1 / 2

The patient who had undergone subtotal pancreatectomy with splenectomy and lateral pancreatico-jejunosomy developed an enterocutaneous fistula. Exploratory laparotomy was done and a perforation in the jejunum was found which was repaired. This surgery was performed 22 days after the first surgery. 54.5% patients who underwent surgery developed post-operative complications. One patient expired after 8 days of the surgery. He had undergone modified Puestow's procedure. He developed sudden onset weakness and breathlessness with dyspnoea and developed sudden cardiac arrest. He was suspected to have pulmonary embolism. 84.4% patients had complete pain relief at discharge. In all 16 diabetics, the diabetic status improved with a decrease in the insulin dose in 11 patients. One patient was discharged on Oral Hypoglycaemic Agents.

CONDITION ON DISCHARGE	NO OF PATIENTS	PERCENTAGE
COMPLETE PAIN RELIEF	27 / 32	84.4
SUGARS CONTROLLED	16 / 16	100
IMPROVED DIABETIC STATUS	12 / 16	75

The mean duration of follow up was 15.4 months. 93.9% patients were available for the follow up period which ranged from 1 month to 7 years. One patient expired 8 days after the surgery, and one patient lost for follow up.

DURATION OF FOLLOW UP	NO OF PATIENTS (OUT OF 31)	PERCENTAGE
UPTO 3 MONTHS	10	32.3
3-6 MONTHS	7	22.6
6MONTHS – 1 YR	4	13
1-5 YRS	10	32.3
>5 YRS	1	3.2

At one month follow up 72.7% patients had pain relief without analgesics. 9% patients had pain but of reduced intensity, requiring occasional analgesics. 9% patients had no relief of pain, it was the same intensity as before.

One patient developed steatorrhea after surgery, one patient who had steatorrhea prior to surgery improved. Both these patients had undergone Frey's procedure. 51.5% patients showed weight gain after surgery. 22.6% patients maintained their weight and 18.1% patients had weight loss post operatively. 36.3% patients showed improved diabetic status in the form of decreased

insulin requirements post-surgery. One patients who was not a diabetic prior to surgery developed diabetes. He had undergone subtotal pancreatectomy with splenectomy.

GROUP	NO	COMPLETE PAIN RELIEF	DECREASED PAIN	SAME PAIN	INCREASED WEIGHT	SAME WEIGHT	DECREASED WEIGHT
OVERALL	30	24 / 30	3 / 30	3 / 30	18 / 30	6 / 30	6 / 30
GROUP A	14	12 / 14	1 / 14	1 / 14	10 / 14	2 / 14	2 / 14
GROUP B	6	4 / 6	1 / 6	1 / 6	3 / 6	3 / 6	0 / 6
GROUP C	5	4 / 5	1 / 5	0 / 5	3 / 5	0 / 5	2 / 5
GROUP D	3	2 / 3	0 / 3	1 / 3	2 / 3	0 / 3	1 / 3
GROUP E	2	2 / 2	0 / 2	0 / 2	0 / 2	1 / 2	1 / 2

Follow up at 1 month:

GROUP	PRE OP DIABETICS	IMPROVED DIABETIC STATE	SAME DIABETIC STATE	DETERIORATED DIABETIC STATE	STEATORRHEA
OVERALL	15 / 30	10 / 15	3 / 15	2 / 15	1 / 30
GROUP A	7 / 14	5 / 7	2 / 7	0 / 7	0 / 14
GROUP B	2 / 6	1 / 2	1 / 2	0 / 2	0 / 6
GROUP C	4 / 5	2 / 4	0 / 4	2 / 4	1 / 5
GROUP D	1 / 3	1 / 1	0 / 1	0 / 1	0 / 3
GROUP E	1 / 2	1 / 1	0 / 1	0 / 1	0 / 2

57.5% patients were available for follow up at 6 months. 33.3% patients had complete pain relief. 6% patients continued to have severe pain. Approximately 90% of patients either had weight gain or had maintained their weight. 9% patients continued to have steatorrhea, all from the Frey's procedure group.

GROUP	NO	COMPLETE PAIN RELIEF	DECREASED PAIN	SAME PAIN	INCREASED WEIGHT	SAME WEIGHT	DECREASED WEIGHT
OVERALL	19	11 / 19	6 / 19	2 / 19	12 / 19	5 / 19	2 / 19
GROUP A	9	4 / 9	4 / 9	1 / 9	6 / 9	1 / 9	2 / 9
GROUP B	4	3 / 4	1 / 4	0 / 4	3 / 4	1 / 4	0 / 4
GROUP C	3	2 / 3	0 / 3	1 / 3	2 / 3	1 / 3	0 / 3
GROUP D	2	1 / 2	1 / 2	0 / 2	1 / 2	1 / 2	0 / 2
GROUP E	1	1 / 1	0 / 1	0 / 1	0 / 1	1 / 1	0 / 1

Follow up at 6 months:

The final Histo-pathology report of one patient was mucin secreting adenocarcinoma pancreas. She had a mass in the body of the pancreas, with dilated main pancreatic ducts. She had undergone subtotal pancreatectomy with lateral pancreaico jejunostomy with splenectomy. Another patient developed disseminated intra-abdominal malignancy and a nodule on the anterior abdominal wall, the biopsy of which revealed metastatic adenocarcinoma.

GROUP	PRE OP DIABETICS	IMPROVED DIABETIC STATE	SAME DIABETIC STATE	DETERIORATED DIABETIC STATE	STEATORRHEA
OVERALL	12 / 19	9 / 12	0 / 12	3 / 12	3 / 19
GROUP A	5 / 9	4 / 5	0 / 5	1 / 5	0 / 19
GROUP B	2 / 4	1 / 2	0 / 2	1 / 2	0 / 19
GROUP C	3 / 3	0 / 3	0 / 3	0 / 3	3 / 19
GROUP D	1 / 2	1 / 1	0 / 1	0 / 1	0 / 19
GROUP E	1 / 1	0 / 1	0 / 1	1 / 1	0 / 19

Of the 93.9% patients followed up 69.6% patients had complete pain relief after surgery. Only 3% patients continued to have severe pain after surgery. 81.8% patients had either weight gain or had maintained their weight. 3% patients had developed diabetes after undergoing subtotal pancreatectomy. Diabetic status had deteriorated in 15.1% patients. 9% patients had steatorrhea after Frey's procedure. The morbidity associated with

surgery was 54% with most common postoperative complication being wound infection. 74 % had complete pain relief after surgery and another 23% had decreased pain , both in severity and frequency. 87% had weight gain or had maintained their weight. Only one patient had new onset diabetes after resectional surgery. 5 patients had deterioration of diabetic status. There were 2 mortalities (5.6%) , one 8 days after surgery due to pulmonary thrombo-embolisms and another after 9 months of malignant cachexia due to disseminated intraabdominal malignancy. Both had undergone modified Puestow's procedure. Significant pain relief, weight gain, improvement in diabetic status was seen after all procedures.

V. DISCUSSION

In this study, there were 12 females and 21 males, the male: female ratio being 1.8: 1. The incidence of chronic pancreatitis is considered to be higher in males mainly because males consume more alcohol than females. In a study by Khanna et al [1] the incidence was more in females while it was equal in a study by Traverso et al [2]

Male preponderance was also seen in two similar studies by Schnelldorfer et al [3] and Thierry Barney et al [4].

	SCHNELLDORFER et al³	THIERRY BARNEY et al⁴	CURRENT STUDY
SAMPLE SIZE	372	68	33
MEAN AGE , AGE RANGE IN YEARS	46 (14-74)	44 (25-75)	37 (7-69)
GENDER- MALE %	52	83.8	63
GENDER- FEMALE %	24	14	22

As noted in most cases of pancreatitis pain is the preponderant presenting symptom as seen in 97% our patients presenting with it as their chief complaint. Associated symptoms included vomiting, anorexia, loss of weight and steatorrhea. The most common site of pain was epigastrium (68.7%). History of loss of weight was seen in 54.5% of patients which was a similar observation to the study conducted by Thierry Barney et al [4]. Weight loss was closely correlated with anorexia, abdominal pain, and nausea and vomiting. 6.1% of our patients had steatorrhea compared to 16% and 6% in 2 other studies [3] [4]. 47% of patient's pre operatively were a diabetic which is high compared to the other two studies [3] [4]. Long term alcohol intake is one of the important aetiology for pancreatitis. History of long term alcohol intake was present in 40% of patients in our study. In our study, there was found to be an association between smoking and chronic pancreatitis independent of alcohol consumption.

In our study, 12 patients had diabetes pre operatively and were on treatment, and 4 patients developed diabetes post operatively. Serum amylase and lipase were evaluated in all patients without any bias. Serum amylase was raised in 9 patients, serum lipase was raised in 10 patients. These cases mainly presented with an acute exacerbation of chronic pancreatitis.

In our study, the liver function tests were typically normal. When elevated, compression of the intra pancreatic bile duct by fibrosis or oedema was thought of. 30% of the patients from our study had raised ALP levels suggestive of CBD obstruction, the most common cause being a pancreatic head mass (15%)

The most commonly performed investigations were Ultrasound abdomen (72.7%) and CT scan abdomen (69.7%). In 14% patients both CT scan and Ultrasound abdomen were done, to pick up details on CT that were missed on USG abdomen.

Pathology of the tail region was better demonstrated on CT scan, as well as portal venous system pathology. Vascular complications like aneurysm, haemorrhage and venous thrombosis and readily picked up on CT scan. Endoultrasonography is a very useful tool especially in the pathologies in the region of head as a pathological diagnosis can be obtained by means of doing a FNAC along with the procedure.

Endoultrasonography was done for 18.1% patients, and out of them, 9% patients underwent FNAC since malignancy was suspected. ERCP was done in 27% of patients.

The most common investigative finding in our study was pancreatic calcification (81.8%) followed by pancreatic ductal dilation (78.8%) whereas in the study by Schnelldorfer et al [3], pancreatic duct dilation was the commonest finding (71%) and calcification was seen in only 31% of the patients.

In our study, pancreatic pseudocysts were found in 36.4% similar to the study by Schnelldorfer et al [3]

In patients with large duct dilation (>7mm) intraductal and interstitial pressures are thought to play a role in the genesis of pancreatic pain [5], whereas in small duct disease, neuropathic mechanisms seem to dominate. In our study the most common surgical procedure performed was modified Puestow's procedure (51.5%). The most common indication was intractable pain abdomen, secondary to pancreatic ductal dilation.

Almost all patients with ductal dilation of > 7mm underwent modified peustow's procedure. Frey's procedure was considered when ductal dilation co-existed with head prominent disease.

Whipple's procedure was considered for those patients who had head mass with no ductal dilation, and suspicion of malignancy was present. According to Sakorafas et al [6], in the presence of strong suspicion for an underlying malignancy with head dominant chronic pancreatitis, pancreatico-duodenectomy must be preferred over other procedures. If there was an associated pancreatic ductal dilation, lateral pancreatico jejunostomy was done.

The mean duration of surgery was 5.3 hrs, the maximum being for the subtotal pancreatectomy with splenectomy. The average blood loss was 1060ml, the maximum being during Whipple's procedure.

The mean duration of hospital stay was 12.6 days, maximum for patients who underwent subtotal pancreatectomy with splenectomy. In the study by schnelldorfer et al [3], the maximum duration of stay was found in patients who underwent Whipple's procedure. The morbidity in our study was 53% comparable to the similar study by schnelldorfer et al [3] (22%). Peri-operative mortality was 5.6% in our study compared to 1.3% in the study by schnelldorfer et al³. Extra abdominal complications was found in 58.9% in our study, mainly wound infection and respiratory complications, which was significantly high compared to other similar studies[3]. Pain relief was seen in 24 patients at the time of discharge. Of the 16 diabetics, the diabetic status improved well in the form of reduction in the dose of insulin in 11 patients, and one patient was discharged on oral hypoglycaemic agents.

The mean follow up was 15.4 months, and 35.5% of patients were available for follow up after one year.

Morbidity and mortality rates are generally low after lateral pancreatico-jejunostomy, averaging 20% and 2% respectively as shown in the study by Kalady et al [7]

Outcome: The morbidity associated with surgery was 54% and most common postoperative complication was wound infection.

74% had complete pain relief after surgery, and 23 had decreased pain in terms of intensity and frequency.

87% had weight gain or maintained their weight.

VI. CONCLUSION

Our study shows that a significant number of patients achieve relief from pain, gain weight, and there is an improvement in their diabetic status following surgery for chronic pancreatitis.

Hence, surgery plays an important role in the management of chronic pancreatitis unresponsive to medical management, or associated with severe intractable pain.

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