Research Paper

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A study of outcomes after lateral pancrea to jejUnosto my in chronic pancreatitis

Medical Science

KEYWORDS :

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ABSTRACT

The necessity for surgical intervention in patients with chronic pancreatitis has been controversial, varying between a conservative medical approach on one hand and a surgical approach on the other. This study has been undertaken with objective to evaluate the outcomes after lateral pancreaticojejunostomy (LPJ) in chronic pancreatitis, one of the most commonly performed surgeries for chronic pancreatitis. The results have been studied vis a vis the post operative complications and effectiveness of the procedure with regarding to relieving the symptoms of the disease.

Methods

This is a prospective study of 15 cases of *Chronic Pancreatitis* admitted in General Surgery Department, Gandhi Medical College , Secunderabad during the period "July 2011- August 2013".

Inclusion Criteria

Chronic Pancreatis associated with intractable abdominal pain with Main Pancreatic Duct diameter of ≥ 7mm.

Exclusion Criteria

Disease related exclusion criteria were CP in patients with small duct disease or MPD <7mm in diameter.

Patient related exclusion criteria were *Gross cardio-vascular abnormality*, history of *myocardial infarction* within last 6 months, detection *of Pancreatic Malignancy* or *coexisting malignancy* of other organs.

Patients who refused to participate in the study.

Method of collection of data

Patients who were diagnosed to have *Chronic Pancreatitis* based on history, clinical examination, and routine diagnostic workup like skiagrams of the abdomen, USG, CT Scan, and ERCP & met the inclusion criteria were subjected to *Lateral Pancreaticojejunostomy.* Data were collected by review of patients' records. Patients were interviewed according to standardized questionnaire.

Observations and Results

RESULTS

These observations are derived from study conducted on 15 patients of Chronic Pancreatitis during the period "July 2011- August 2013".

These 15 patients were evaluated thoroughly and surgery was performed, postoperative complications were identified; the patients were discharged and evaluated at the end of one month after surgery.

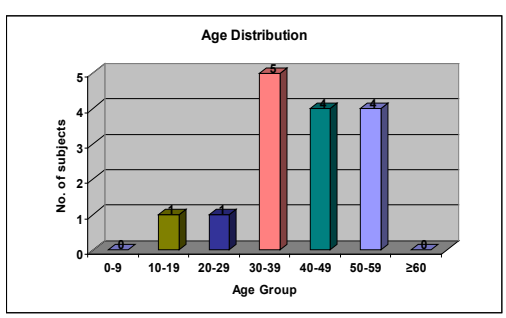
Amongst these 15 patients, 3 did not complete 6 months period after surgery and 2 patients were lost to follow up ,so 10 patients were assessed at the end of 6 months in all.

Distribution According to Age

The present study shows that Chronic Pancreatitis is seen in all age group. The peak age of incidence was seen in the age group 30-39.

Table No. 1 Age Distribution

Age Group (Years)	No. of Subjects (%)
0-9	0(0)
10-19	1(6)
20-29	1(6)
30-39	5(33)
40-49	4(26)
50-59	4(26)
≥60	0 (0)
Total	15 (100)

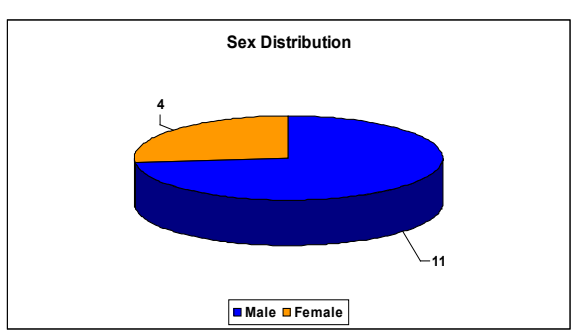


Distribution according to Sex

In the present study occurrence of Chronic Pancreatitis was found predominantly in males.

Table No. 2 Sex Distribution

Sex	No. of subjects (%)
Male	11(73.3)
Female	4(26.6)
Total	15(100)

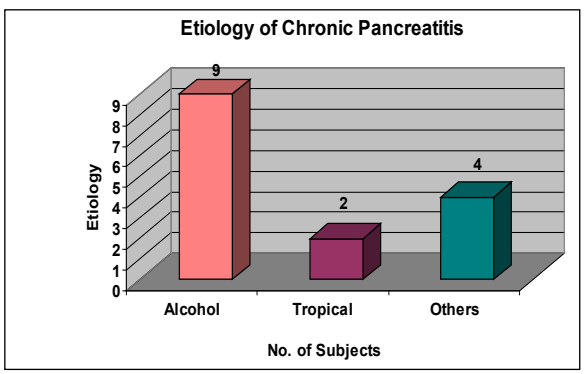


Distribution according to Etiology

Present study shows that Chronic Alcohol intake was most common Etiological Factor. The duration of consumption ranged from 5 to 20 years. Among the alcoholics 33% had consumed country made liquor.

Table No. 3 Etiology of Chronic Pancreatitis

Etiology	No. of Subjects (%)
Alcohol	9(60)
Tropical	2(13.3)
Others	4(26.6)
Total	15(100)

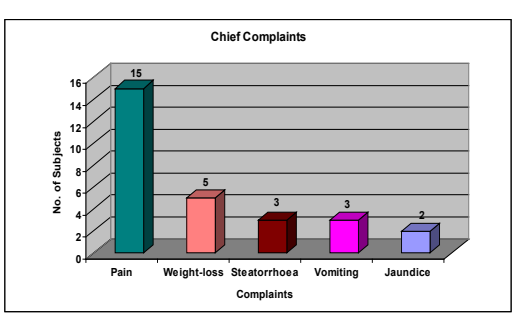


Distribution according to Chief Complaints

Pain was present in 100% of the subjects. Moderate pain was present in 4(26.6%) subjects and severe pain interfering with daily activities was present in 11 (73.3%) subjects. Jaundice was present in 2(13.3%) subjects. Steatorrhoea was present in 3(20%) subjects. Considerable Weight-loss was found in 5(33.3%) subjects.

Table No. 4 Chief Complaints

Complaint	No. of Subjects(%)
Pain	15(100)
Weight-loss	5(33.3)
Steatorrhoea	3(20)
Vomiting	3(20)
Jaundice	2(13.3)



Prevalence of Diabetes

5 out of 15 subjects had Diabetes. One of them was diagnosed *De novo* at the time of admission.

3 out of 4 previously diagnosed subjects had been using oral hypo glycemic agents and one was on Insulin. The duration of Diabetes ranged from 2 to 20Years.

Table No. 5 Blood Investigations.

Hemoglobin <10.0%	No. of Subjects
	4
Serum Proteins <6.0g/dl	4
Blood Sugar > 200mg	2
Serum Bilirubin >2 mg	2

Distribution according to plain x ray abdomen

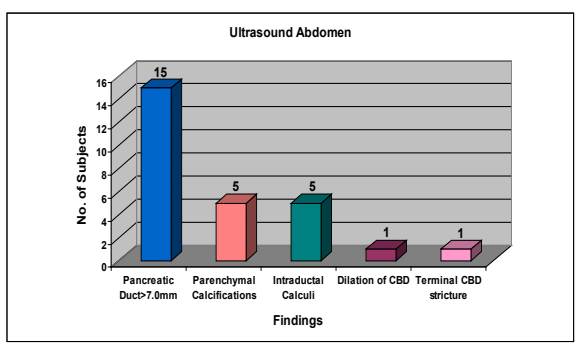
In the present study 4(26.6%) patients had calcifications in plain x ray abdomen.

Distribution according to ultrasound abdomen

Ultrasound abdomen was done in all the cases and dilated duct>7 mm was found in all the cases. Mean duct diameter was found to be 9.4mm. Parenchymal Calcifications were present in 5 subjects. Intraductal Calculi were present in 5 subjects. CBD was dilated in one subject. Terminal CBD stricture was present in one subject.

Table No. 6 Ultrasound Abdomen

USG Findings	Number of subjects
Pancreatic Duct>7.0mm	15
Parenchymal Calcifications	5
Intraductal Calculi	5
Dilation of CBD	1
Terminal CBD stricture	1



Distribution according to CT Scan

CT scan was done in all 15 subjects. Most common finding was atrophy of Pancreas present in 7 subjects**.** Parenchymal Calcifications was present in 5 subjects. Intraductal Calculi was present in 6 subjects.

MRCP was done in 4 cases and the results were similar to that of CT Scan.Distal CBD calculus was identified in one case by MRCP.

Additional Procedures performed:

Cholecystectomy and choledochojejunostomy was performed in one case With distal CBD stricture .Cholecystectomy and choledochoduodenostomy were done in one case with distal CBD calculus.

Post operative complications

There was no surgical mortality. Delayed gastric emptying was seen in 4 subjects ,post operative pneumonia developed in 2 subjects , wound infection developed in 4 subjects. There were no postoperative pancreatic fistulae.

Outcomes at the end of one month after surgery

Pain: At the end of one month after surgery 9 subjects had completely been relieved of pain ,4 had mild pain and in two subjects the pain is unrelieved.

Table No. 7 Pain After One Month

Pain	No of subjects (%)

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Completely relieved	9(60)
Mild pain	4(26.6)
unrelieved	2(13.3)
Total	15(100)

Steatorrhoea and use of enzyme supplements: Three subjects were having symptoms of exocrine insufficiency out of these two were using enzyme supplements pre operatively.

Post operatively all the three were placed on enzyme supplementation and there symptoms were controlled at the end of one month.

Diabetes : Total 4 subjects were having diabetes pre operatively two patients were on oral hypoglycemic agents ,two were using insulin, one subject was detected to have diabetes de novo.

At the end of one month 3 patients were on oral hypoglycemic agents and two were on insulin.

Table No. 8 diabetic status at end of one month

Diabetic status	No of subjects(%)
No diabetes	10(66.6)
On oral hypoglemics	3(20)
On insulin	2(13.3)
Total	15(100)

Outcomes at the end of six months after surgery

Pain: At the end of six months out of 10 subjects present for follow up 6 Were pain free and 2 had mild pain requiring occasional use of non narcotic analgesics,2 subjects had severe pain requiring narcotic analgesics and one required hospital admission for pain .

Table No. 9 Pain At End Of Six Months

Pain	No of subjects(%)
No pain	6(60)
Mild pain	2(20)
Severe pain	2(20)
Total	10(100)

Steatorrhoea and Use of enzyme supplements:

One subject who had steatorrhoea previously was lost to follow up.Another patient who previously did not have steatorrhoea developed steatorrhoea at end of six months.One patient's symptoms persisted despite enzyme therapy.

Table No. 10 Steatorrhoea

	1 month (%)	6 month(%)
No steatorrhoea	12(80)	7(70)
Enzyme supplementation	3(20)	2(20)
Symptoms despite enzyme supplementation	0(0)	1(10)
Total	15(100)	10(100)

Diabetes : One subject on insulin therapy was did not complete six months from the date of operation .One subject previously on oral hypoglycemics needed insulin for the control of blood sugars.

Table No. 11 diabetic status at end of 6 months

Diabetic status	No of subjects(%)
No diabetes	6(60)
On oral hypoglemics	2(20)
On insulin	2(20)
Total	10(100)

Change in weight : Pre operative body weights were measured in all the subjects and weight was measured at the end of six months.

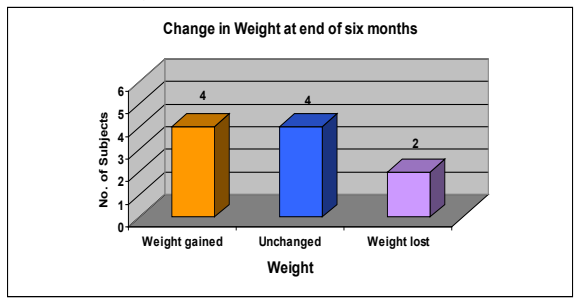
4 subjects had weight gain of more than 5% of body weight .2 subjects had weight loss of 5% of body weight

Weight remained unchanged or gain/loss of less than 5% in 4 subjects.

Table No. 12 Changes in weight

Weight	No of subjects(%)
Weight gained	4(40)
Unchanged	4(40)
Weight lost	2(20)
Total	10(100)

Level of activity:



Two of the subjects were employed before surgery,the number of subjects who have been employed after six months after surgery is four .

Four of the subjects were dependent on caregivers for daily activities before surgery,out of these one was lost to follow up.

At the end of six months two subjects were dependent on caregivers.

DISCUSSION

The peak age of incidence in Chronic pancreatitis according to the present study is from 30-39 where 33% of the patients were found to be in this group. The mean age of incidence was found to be 40.53.

Balakrishnan et al [76] in a study in 2008 found that mean age group of chronic pancreatitis is 39.7 years.? **Toshio Sato et al** [77] **o**bserved mean age of 45 years and **W Schlosser et al** [78] observed mean age as 45.8.

Thus the results of our study correlates with these studies.

Table No. 13

Balakrishnanet Al	ToshioSato et al	W Schlosser et al	Present study
39.7 years	45 years	45.8 years	40.53 years

In the present study 11 out of 15 subjects were males corresponding to 73.3% of all cases. **Balakrishnan et al** [76] ,in a study found that 71.0%

of cases were males and 29.0% were females. **Wei Xing et al**[79] in a study found out 60.57% males and 39.42% females .These studies clearly show male preponderance of the disease and the present study confirms it.

Table No. 14

Balakrishnan et al	Wei Xing et al	Present study
71.0% males 29.0% females	60.57% males 39.42% females	73.3% males 26.6% females

In chronic pancreatitis chronic alcohol consumption is most common etiological factor noted with 60% of subjects having alcohol as etiology in the present study.**H.G.Beger et al** [80] also

stated that alcohol is the etiological factor in 60-80% of the patients.Another study **by Ramesh Roop Rai et al** [81] found alchol intake as etiology in 59.5% of the cases.

Despite the experimental evidence of the direct toxic effects of alcohol on the pancreas, it must be acknowledged that not all alcoholics develop pancreatitis. In fact, only 5–10%of heavy drinkers develop chronic pancreatitis and so, research efforts have focused on identifying additional cofactors or susceptibility factors. Studies into candidates for these cofactors including drinking patterns, diet, smoking and dyslipidaemia have thus so far yielded conflicting results.[82]

Other etiological factors like tropical pancreatitis was present in 2 subjects(13%).

Out of 15 patients of chronic pancreatitis the chief presenting complaints were pain (100%),weight loss(33%),steatorrhoea,vomittings 20% each and jaundice(13.3%).The results are comparable to study by **Wei-xing Chen et al.** [79]

Table No. 15

	Wei-xing Chen et al	Present study
Pain	90.7%	100%
Weight loss	43.3%	33.3%
Jaundice	10.6%	13.3%

Persistant and intractable pain is the principal clinical feature of chronic pancreatitis and has perhaps greatest detriment in the quality of life [83]

In the present series all the 15 subjects had pain pre operatively 11 subjects had severe pain for which they were using narcotic analgesics and had hospital admissions 4 subjects had moderate pain ,they occasionally required narcotic analgesia.

Weight loss was present in 5 subjects it could reflect the development of exocrine and endocrine insufficiency or it could be because of poor intake of food due to chronic pain or due to malnutrition secondary to chronic alcoholism.

Jaundice was present in 2 subjects in the study one due to terminal CBD stricture and another due to distal CBD calculus.

In the present study 4subjects had hemoglobin less than 10.0g%.4 subjects had serum proteins< 6mg /dl .2 subjects had bilirubin >2mg%,2 subjects had blood sugars >200mg%.

These values indicate poor nutritional status in patients of chronic pancreatitis. These parameters were corrected before taking the subjects for surgery.

The finding of diffuse (but not focal) pancreatic calcifications on plain abdominal films is quite specific for chronic pancreatitis. Calcifications occur late in the natural history of chronic pancreatitis and may take from 5 to 25 years to develop[83] . Calcifications are most common in alcoholic, late-onset idiopathic, hereditary, and tropical pancreatitis and far less common in early-onset idiopathic pancreatitis. Calcifications are not static once they develop and may in fact wax and wane over time [84] .

In the present study calcifications were detected in 4 subjects(26.6%).

Ultrasonography has been widely studied as a diagnostic tool for chronic pancreatitis[85]. Ultrasonographic findings indicative of chronic pancreatitis include dilation of the pancreatic duct, shadowing pancreatic ductal stones, gland atrophy or enlargement, irregular gland margins, and changes in the parenchymal echotexture.

In the present series the mean pancreatic duct diameter was found to be 9.4mm.Parenchymal calcifications were found in 5 subjects and intraductal calcifications were identified in 5 subjects. One subject had distal CBD stricture. Biliary strictures have been recognized as characteristic complications of chronic pancreatitis. In hospitalized patients with pancreatitis, the incidence of biliary stricture accounts for about 5% to 9% [86]

The overall sensitivity of CT for chronic pancreatitis is between 75% and 90%, with a specificity of 85% or more.[87] Although CT is more expensive than ultrasonography and exposes the patient to ionizing radiation, it is more sensitive and more specific.

In the present study pancreas atrophy was present in 7 subjects(46.6%) in CECT scan,whereas parenchymal calcification and intraductal calculi were present in 5(33.3%) and 6 (40%)subjects respectively.

MRCP was done in four subjects overall and it enabled the diagnosis of distal CBD calculus in one subject who had dilated CBD in ultrasound abdomen.

In one subject with distal CBD calculus cholecystectomy and choledochoduodenostomy was done and in another subject with distal CBD stricture cholecystectomy and choledochojejunostomy was done.

There was no surgical mortality in this study. No case of pancreatic fistula was noticed. Delayed gastric emptying was noticed in 4 subjects ,4 subjects had wound infections and two subjects had post operative pneumonia.

Table No. 16

Complication	No of subjects
Delayed gastric emptying	4
Wound infection	4
pneumonia	2

Post operative outcomes

Pain:

Pain relief remains the principle aim of any surgery for chronic pancreatitis. **Amman et al** [88] have suggested that pancreatic involution and progressive exocrine insufficiency may have a role in late pain relief.

This hypothesis was not confirmed by **Nealon et al**. [89] who found that the pancreatic diversion delays the deterioration of pancreatic function.

Though the exact mechanism producing pain in chronic pancreatitis has not been well established yet, elevated pancreatic intraductal pressure and involvement of sensory nerves in scar were supposed to be the possible causes. According to the study of intra operative measurement of pancreatic intraductal pressure by **Bradley**[90] mean pancreatic intraductal pressure in the patients of chronic pancreatitis with dilated duct was significantly higher than that of control patients. **White et al** [91]observed that elevation of pancreatic intraductal pressure above 25 cm of water produced abdominal pain in a patient with chronic pancreatitis.? The rationale of pancreatic duct drainage procedures is the reduction of increased intraductal pressure.

A study by **Toshio Sato et al** [77]has proved efficacy of Lateral pancreaticojejunostomy .They found pain relief in 90.7% of patients.

Nealon et al [89] found pain relief in 93% of series. **W.Schosser et al** [78],found pain relief in 68 % and occasional pain in 29%.

According to present study pain relief of 86.66% was present at end of first month and pain relief of 80% at the end of six

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months.

Table No. 17

Pain	No of subjects (%)at 1 month	No of subjects(%)at 6 months
No pain	9(60)	6(60)
Mild pain	4(26.6)	2(20)
Severe pain	2(13.3)	2(20)
Total	15(100)	10(100)

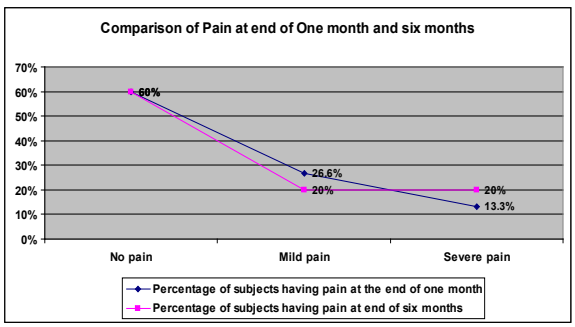


Table No. 18

Pain relief	Toshio Sato et al	Nealon et al	W.Schosser et al	Present Study at end of 1 month	Present Study at end of 6 months
	90.7%	93%	68 %	86.6%	80%

Despite the numerous reports on surgical procedures used in chronic pancreatitis, there is no "evidence-based" gold standard in the surgical management of chronic pancreatitis-induced pain, owing to the limited number of randomized controlled trials within the field of pancreatic surgery[92].

The present study demonstrates that lateral pancreaticojejunostomy is a safe procedure with an good outcome on pain relief, supporting what has been described previously [93]

Steatorrhoea and Use of enzyme supplements :
There is no known treatment able to retard the progressive destruction of the gland by the chronic inflammatory process or continued alcoholism, and lateral pancreaticojejunostomy is no exception [94]. It is probably the least damaging surgical treatment [95].?

Pancreaticojejunostomy avoids sacrifice of functioning pancreatic tissue, and it allows the remaining pancreatic secretions to enter the intestine and contribute to digestion[96].

Despite few clinical studies, exocrine insufficiency has never been shown to be improved by surgical pancreatic diversion. Two

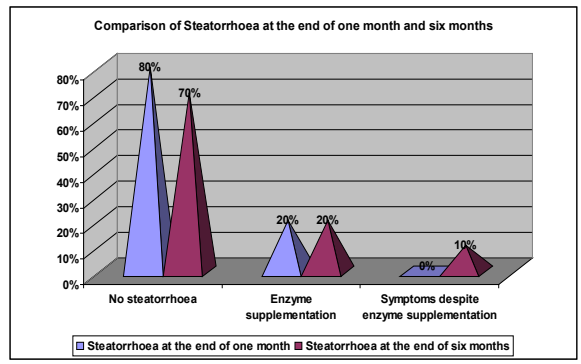
patients reported by **Warshaw et al** [97] . had no improvement in steatorrhoea after lateral pancreaticojejunostomy.

In another report**, Sato et al** [77] ,found that only one of 13 patients had improved fat absorption postoperatively. Using both faecal fat and 14C-labelled phenylacetic dipalmitate oil**, Bradley and Nasrallah** [98] showed a mild decline in postoperative fat absorption in eight of 10 patients. It seems that pancreatic insufficiency is caused more by glandular destruction than by duct obstruction.

In the present study preoperatively 3 subjects had steatorrhoea ,and two were using enzyme supplements,at the end of one month 3 subjects were using enzyme supplements,one of these subjects was lost to follow up.

At the end of six months one of the subjects symptoms are persisting inspite of enzyme supplementation,one subject developed symptoms who was previously asymptomatic and put on enzyme replacement.

These findings are consistant with previous studies that there is no improvement in exocrine function after lateral pancreaticojejunostomy.



Diabetes :

In the present study 5 out of 15 subjects had diabetes (33.3%).\ **Balakrishnan et al** [76] in a study of 1033 subjects with chronic pancreatitis,noted diabetes mellitus in 418(40.8%) subjects.

Wei Xing et al [79] found incidence of diabetes to be 29.8%

Table No. 19

Balakrishnan et al	Wei Xing et al	Present study
40.8%	29.8%	33.3%

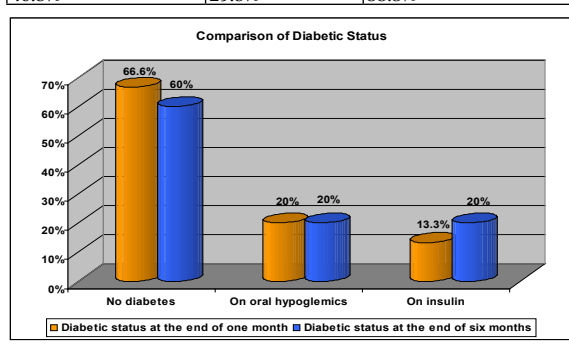


Table No. 20

Diabetic status	No of subjects(%)at end of one month	No of subjects(%) at end of six months
No diabetes	10(66.6)	6(60)
On oral hypoglemics	3(20)	2(20)
On insulin	2(13.3)	2(20)
Total	15(100)	10(100)

According to the present study there is no improvement in glycemic status of the subjects after surgery,in fact the percentage of subjects needing insulin actually increased at the end of six months.

The findings of the present study are consistent with the study done by

Roland Anderson et al [99]which states that there is progressive deterioration of endocrine function, over time.

Weight Gain:
Weight gain was seen in 4 subjects out of the available 10 at the end of 6 months of follow up. Weight gain is attributed due to relief of pain.

Table No. 21

Change in weight	Sato et al	Present study
Weight gain	36%	40%
Unchanged	37%	40%
Weight loss	28%	20%

The results obtained in the present study are comparable with study done by **Sato et al** [77].

Level of activity :

Before undergoing surgery only two out of 15 subjects had been employed ,after surgery four out of 10 subjects have been employed at the end of six months.

Table No. 22

% of subjects employed before surgery	% of subjects employed at end of 6 months
13.3	40

The results are similar to that obtained by a study **Thomas schnelldorfer[100],** in which 41% of subjects could return to full time work.

CONCLUSIONS

1. Lateral pancreaticojejunostomy is an effective surgery for relieving pain in chronic pancreatitis.
2. Lateral pancreaticojejunostomy can safely be performed in patients with chronic pancreatitis with minimal morbidity.
3. The study demonstrates good outcome in relieving pain after lateral pancreaticojejunostomy.
4. The present study also confirms the effectiveness of draining a dilated pancreatic duct to relieve pain in chronic pancreatitis
5. This study finds significant improvement in quality of life after lateral pancreaticojejunostomy.
6. Weight gain is also seen in significant number of subjects following lateral pancreaticojejunostomy.
7. This study implies that there is no improvement in endocrine or exocrine dysfunction following lateral pancreaticojejunostomy, and the surgery cannot arrest the progressive endocrine and exocrine insufficiency seen in chronic pancreatitis.

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