Indian J Surg (December 2015) 77(Suppl 3):S1098–S1102
DOI 10.1007/s12262-014-1173-8

ORIGINAL ARTICLE

Evaluation of Pain Preoperatively and Postoperatively in Patients with Chronic Pancreatitis Undergoing Longitudinal Pancreaticojejunostomy

K. R. Seetharam Bhat · Monty Khajanchi · Ram Prajapati · R. R. Satoskar

Received: 7 June 2014 / Accepted: 11 September 2014 / Published online: 11 October 2014

Abstract Chronic pancreatitis is a fairly common condition with pain being the major symptom, and longitudinal pancreaticojejunostomy (LPJ) is performed for symptomatic relief. The aim of the study is to assess relief of pain post-LPJ for chronic pancreatitis and to evaluate the factors influencing relief of symptoms. A prospective observational non-interventional study enrolling 28 patients. This study involved a questionnaire studying various risk factors and pain related to chronic pancreatitis, pancreaticojejunostomy, and postoperative assessment of pain relief at 1 and 6 months from surgery. Pain was assessed using Visual analogue scale (VAS). In chronic pancreatitis, there is a significant relief in symptoms of pain post-LPJ; the degree of relief was less in the alcoholics vs non-alcoholics (p=0.09) and smokers. There was also reduction in analgesic requirement and frequency of acute attacks of pain. Fifty-seven percent of patients had a complete remission of their pain after LPJ for CP. In chronic pancreatitis, there is a significant relief in symptoms of pain post-LPJ, although the degree of relief is less in the alcoholics and smokers.

Keywords Chronic pancreatitis · Pain · Longitudinal pancreaticojejunostomy · Visual analogue scale

Introduction

Chronic pancreatitis (CP) is characterized by persistent and progressive fibrosis of the pancreas, resulting in the loss of both endocrine and exocrine tissues [1–6] CP can be demonstrated in 0.04 to 5 % of autopsies [1–4]. The prognosis of CP is quite variable. Overall, 10-year survival is about 70 %, and 20-year survival is about 45 %. Alcohol abuse is the commonest etiology of CP (70 %) [1, 2, 7], while in 20 %, it remains undetermined [8].

Pain is the most frequent symptom in CP [7]. Other symptoms include steatorrhea, diabetes mellitus, obstructive jaundice, duodenal obstruction, colonic obstruction, pseudocyst of the pancreas, pancreatic fistula, and pancreatic ascites. Diagnosis is usually by a computerized tomography (CT) scan of the abdomen, and the treatment is medical, surgical, endoscopic, or combined.

Operative procedures designed with the objective of eliminating pain and treating the complications of chronic pancreatitis have historically been classified into:

1. Decompression of diseased and obstructed pancreatic ducts and
2. Denervation of the pancreas or resection of the proximal, distal, or total pancreas.

In longitudinal pancreaticojejunostomy (LPJ), the pancreatic duct is opened longitudinally, and a loop of jejunum is sutured to the duct. Studies have reported pain relief varying from 63 to 93 % from 1973 to 1999 after longitudinal pancreaticojejunostomy [9–15]. In the past, studies have used different tools to assess pain relief like the VAS, the 5-point system suggested by Nealon and Thompson [16], the health status scale by Adams et al. [17], etc. Studies have concluded that continued use of alcohol progressively increases pain after surgery [16–18]. Two studies have concluded that the use of alcohol does not alter the pain but decreases survival [19, 20].

K. R. S. Bhat (✉) · M. Khajanchi · R. Prajapati · R. R. Satoskar
Department of General Surgery, Seth G.S. Medical College and KEM Hospital, Parel, Mumbai, Maharashtra 400-012, India
e-mail: bhat_seetharam@hotmail.com

The aim of the study is to assess relief of pain postlongitudinal pancreaticojejunostomy for chronic pancreatitis in our institute and to evaluate the factors influencing relief of symptoms.

Materials and Methods

A prospective observational study was carried out in the Department of General Surgery in a tertiary care hospital in Mumbai. There were 28 subjects, and the duration of the study was from May 2010 to May 2012. All patients with CP who underwent LPJ that were included in the study is the exclusion criteria. The exclusion criteria are the following:

- All patients of chronic pancreatitis who did not follow up.
- All patients who refused to give consent.
- All patients of CP with pancreatic head mass were excluded from the study.
- All patients who died in immediate postoperative period.

Patients enrolled using the above inclusion criteria were provided with patient information sheet, and a voluntary informed consent was obtained from them. This study involved a four-paged questionnaire studying various factors and symptoms related to CP, LPJ, and postoperative assessment of symptom relief at 1 and 6 months.

Pain being a major symptom was assessed using visual analogue scale (VAS). The pain VAS is a unidimensional measure of pain intensity, which has been widely used in diverse adult populations. The VAS is widely used due to its simplicity and adaptability to a broad range of populations and settings. Pain was further classified as recurrent continuous pain (multiple episodes in a month), frequent attacks of pain (once a month), and occasional attacks of pain (once in 6 months). Also, the requirement of the number of analgesics both pre- and postoperatively were entered. Other symptoms studied in the questionnaire were weight loss, steatorrhea, and diabetes mellitus and their course postoperatively.

The questionnaire also studied preoperative risk factors that would alter the postoperative results. The factors that were considered included the following:

1. Alcohol intake
2. Smoking
3. Family history of chronic pancreatitis

The end point is 6 months of follow-up from the date of surgery.

Statistical Analysis

The numerical data were tested for normality, and those found to be normally distributed, paired *t* test, were used and those not normally distributed, Wilcoxon signed rank test, were used. The categorical data were expressed in percentage and proportions and compared using chi-square test and McNemar test. All statistical tables and analysis were performed using SPSS (SPSS Statistics 17.0.1, December 2008)

Institutional Ethic Committee approval was taken before commencing the study.

Results

A total of 30 subjects underwent LPJ for CP in the period of this study. Two subjects died in the immediate postoperative period so could not be followed up. So, the total subjects included for this study were 28. 19 (67.85 %) patients belonged to the age group between 20–40 years. Seven (25 %) were above 40 years of age and two (7.14 %) were less than 20 years of age. The sex ratio was 1:1 between males and females. Preoperatively twenty (71.4 %) had recurrent continuous pain, two (7.1 %) had frequent attacks of pain and six (21.4 %) had occasional pain (Table 1).

Preoperative Risk Factors

Nineteen (67.85 %) subjects were nonalcoholic and nine (32.14 %) consumed alcohol. However, among the alcoholics, seven (25 %) consumed alcohol daily and two (7.1 %) were occasional drinkers. Out of the 28 subjects included, 3 (10.71 %) were chronic smokers.

Postoperative Result on Follow-up

The percentage reduction in pain was different in these subjects when assessed by VAS (Table 2). Sixteen (57 %) of the subjects had 100 % relief of their symptoms at the end of 6 months.

Both alcoholics and nonalcoholics had a significant pain relief ($p=0.043$ and $p=0.06$, respectively) at the end of 6 months postoperatively, but when these two groups were

Table 1 Preoperative pain distribution in patients with CP ($n=28$)

Frequency of pain	Pre-op no. of patients with symptoms
Recurrent continuous pain (multiple episodes in a month)	20 (71.4 %)
Frequent attacks of pain (once a month)	2 (7.1 %)
Occasional attacks (once 6 months)	6 (21.4 %)

Twenty-one (75 %) patients required single analgesic drug daily for pain relief preoperatively whereas the remaining 7 (25 %) required more than one analgesic preoperatively

Table 2 Percentage reduction in pain by VAS in the study group at the end of 1 and 6 months

Percentage reduction in pain by VAS	Postoperative pain relief in patients at 1 month follow-up	Postoperative pain relief in patients at 6 months follow-up
100 % Pain relief	13 (46.42 %)	16 (57.14 %)
60 % Pain relief	1 (3.57 %)	0
55.6 % Pain relief	1 (3.57 %)	1 (3.6 %)
50 % Pain relief	3 (10.71 %)	8 (28.6 %)
44.4 % Pain relief	1 (3.57 %)	0
40 % Pain relief	2 (7.14 %)	0
33.3 % Pain relief	0	2 (7.1 %)
25 % Pain relief	6 (21.4 %)	0
22.3 % Pain relief	1 (3.57 %)	0
0 % Pain relief	0	1 (3.57 %)

Ten subjects had VAS score 0 at both 1 and 6 months. Three subjects had VAS score of 0 at 1 month but increased at 6 months. Six subjects who had higher VAS score at 1 month reached to a VAS score of 0 at 6 months

further compared with each other, the nonalcoholic group had a significantly better degree of pain relief by visual analogue scale (p=0.09). Among the nonalcoholics, median VAS came to 0/10 and the alcoholics VAS came down to a median of 4/10 at 6 months.

There was significant pain relief among nonsmokers (p<0.001) postoperatively as compared to their preoperative pain status. Smokers continued to have pain even after surgery, and the reduction of pain was not significant statistically (Table 3).

Analgesic Intake Pre- and Postoperatively

Three subjects who were receiving two or three analgesics preoperatively continued to receive that postoperatively. Two subjects who were receiving single medications preoperatively required two or three analgesics postoperatively, but their frequency of attacks reduced (Fig. 1). Twelve out of sixteen in those who required no medications were nonalcoholics while only 7/12 who required some medications were nonalcoholics.

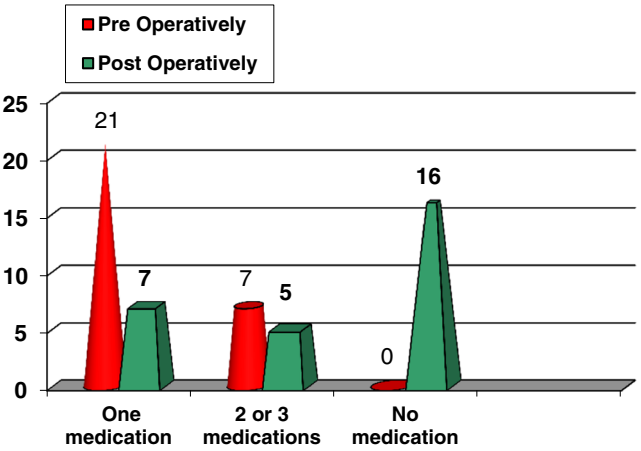

Fig. 1 Comparison of requirement of medication preoperatively and postoperatively (*x*-axis: no. of medication; *y*-axis: no. of subjects)

There was also a significant reduction in weight loss as a symptom seen at the end of 6 months after LPJ. Three subjects had wound infection in the postoperative period. No other complication was encountered.

Discussion

Treatment in chronic pancreatitis is mainly to palliate the symptoms. The present study included 28 subjects who were followed up. Majority of the patients belonged to the age group of 20–40 years. Various studies showed pain relief between 36.5 and 93 % (Table 4).

Isaji in a review article says that pain relief is anywhere between 66 and 91 % after LPJ [21]. In comparison, our study had a pain relief in 100 % of population and 16 (57.1 %) had complete remission of pain on VAS. Many studied in the past have used the different tools to assess pain relief like the 5-point system suggested by Nealon and Thompson [16] and the health status scale by Adams et al. [17]. These are either

Table 3 Percentage reduction in pain by VAS study groups at the end of 6 months

Percentage reduction in pain by VAS at 6 months follow-up	Alcoholics	Nonalcoholics	Smokers	Nonsmokers
100 % Pain relief	1	15	0	16
55.6 % Pain relief	1	0	1	0
50 % Pain relief	5	3	2	6
33.3 % Pain relief	1	1	0	2
0 % Pain relief	1	0	0	1
Total	9	19	3	25

Table 4 Results of various studies analyzing pain relief post-LPJ

Author	Year	No. of patients	Mortality (%)	Mean follow-up (months)	Pain relief (%)
Leger et al. [22]	1973	45	4.5	–	63
Prinz et al. [10]	1978	42	5	108	76
Prinz and Greenlee [11]	1981	43	4.5	95	80
Sarles et al. [15]	1982	69	4.2	60	85
Warshaw [12]	1985	33	3	43	88
Bradley [13]	1987	48	0	69	66
Nealon et al. [23]	198	41	0	14.8	93
O'Neil and Aranha [24]	2000				50–90
Balakrishnan et al. [3]	2008				36.5
Our study	2010–2012	30	6.67	6	100 % (pain reduction) 16 (57.1 % complete remission)

investigation-based or more complex to administer when compared to VAS. VAS has previously been used to evaluate surgical and medical treatments in CP [14] and is an effective tool used by both medical professional and allied health workers like auxiliary nurse midwife (ANM), nurses, health workers, etc. in remote areas and can be used in large scale follow-up care in rural setup, thus useful in third world and developing nations.

In this study, an attempt is made to analyze the preoperative risk factors and its influence on the postoperative results in LPJ. It is a proven fact that alcoholism and smoking are independent risk factors for CP [17, 25, 26]. Others like familial, trauma, pancreatic divisum, cassava intake, and drug intake were absent in the study group [3]. There was a significant difference in pain relief among the alcoholics as compared to nonalcoholics who did better. Most of the studies have only studied how continued use of alcohol affected the postoperative results of LPJ. Though Schnelldorfer and Adams studied the influence of preoperative alcohol intake on postoperative results, they did not find any difference between alcoholics and nonalcoholics [20]. According to our study, nonalcoholics did significantly better than alcoholics. As the number of smokers who had CP was only three, no comparison was made. Thus, surgery appears to be one single factor that has drastically altered outcomes of the disease.

The requirement of analgesics was reduced to nil at 6 months in 16 subjects. Two subjects required lesser medication and eight required the same number of medication as before. In fact, two required more medication than before. Interestingly, those subjects who required more medications belonged to the female sex and were nonalcoholics, and they too had reduction in the frequency of attacks of pain.

On literature, search complication rates have been between 4 and 8 % in various studies after a longitudinal pancreaticojejunostomy [17, 18, 27]. In the present study, only 3/28 (10.71 %) subjects had wound infections; there were two immediate postoperative deaths. None of them required any re-surgery.

Limitations

The study limitations are short months of follow-up. Limitations to the use of the pain VAS include older patients, who may have difficulty in completing the pain VAS due to cognitive impairments or motor skill issues, and scoring which is more complicated since it cannot be administered by telephone, limiting its usefulness in research [28]. We would have to see the results of pain relief over the years to comment on the effective procedure for pain relief. The questionnaire should have probably included the history of alcohol intake even in the postoperative period to evaluate its influence postoperatively also on pain relief.

Conclusion

Fifty-seven percent of patients had a complete remission of their pain after LPJ for CP. In chronic pancreatitis, there is a significant relief in symptoms of pain and weight loss postlongitudinal pancreaticojejunostomy, although the degree of relief is less in the alcoholics and smokers.

Acknowledgments The authors would like to thank The Dean and the Head of the Department of General Surgery for the constant support and encouragement.

References

1. Uys CJ, Bank S, Marks IN (1973) The pathology of chronic pancreatitis in Cape Town. Digestion 9:454–468
2. Olsen TS (1978) The incidence and clinical relevance of chronic inflammation in the pancreas in autopsy material. Acta Pathol Microbiol Scand A 86A:361–5
3. Balakrishnan V, Unnikrishnan AG, Thomas V, Choudhuri G, Veeraraju P, Singh SP (2008) A prospective nationwide study of 1, 086 subjects from India. Chron Pancreatitis 9:593–600
4. Zuidema PJ (1959) Cirrhosis and disseminated calcification of the pancreas in patients with malnutrition. Trop Geogr Med 11:70–4
5. Geevarghese PJ (1986) Calcific pancreatitis. Varghese Publishing House, Bombay
6. Etemad B, Whitcomb DC (2001) Chronic pancreatitis: diagnosis, classification, and new genetic developments. Gastroenterology 120:682–707
7. Durbec JP, Sarles H (1978) Multicenter survey of the etiology of pancreatic diseases. Relationship between the relative risk of developing chronic pancreatitis and alcohol, protein and lipid consumption. Digestion 18:337–50
8. Charles F, Brunicardi FDK, Anderson TR, Billiars LD, Dunn GJ. Hunter JB, Mathews et al. (2010) Schwartz's Principles of surgery. 9th edition. The McGraw-Hill Companies, Inc, Table 33–6
9. Nealon WH (2000) Surgical options for chronic pancreatitis. San Diego, California. Progr Abstr Dig Dis Week Session 422
10. Prinz RA, Kaufman BH, Folk FA, Greenlee HB (1978) Pancreaticojejunostomy for chronic pancreatitis. Two- to 21-year follow-up. Arch Surg 113:520–5
11. Prinz RA, Greenlee HB (1981) Pancreatic duct drainage in 100 patients with chronic pancreatitis. Ann Surg 194:313–20
12. Warshaw AL (1985) Conservation of pancreatic tissue by combined gastric, biliary, and pancreatic duct drainage for pain from chronic pancreatitis. Am J Surg 149:563–9
13. Bradley EL (1987) Long-term results of pancreatojejunostomy in patients with chronic pancreatitis. Am J Surg 153:207–13
14. Nealon WH, Walser E (2003) Duct drainage alone is sufficient in the operative management of pancreatic pseudocyst in patients with chronic pancreatitis. Ann Surg 237:614–20. doi:10.1097/01.SLA.0000064360.14269.EF, discussion 620–2
15. Sarles JC, Nacchiero M, Garani F, Salasc B (1982) Surgical treatment of chronic pancreatitis. Report of 134 cases treated by resection or drainage. Am J Surg 144:317–21
16. Nealon WH, Thompson JC (1993) Progressive loss of pancreatic function in chronic pancreatitis is delayed by main pancreatic duct decompression. A longitudinal prospective analysis of the modified Puestow procedure. Ann Surg 217:458–66, discussion 466–8
17. Adams DB, Ford MC, Anderson MC (1994) Outcome after lateral pancreaticojejunostomy for chronic pancreatitis. Ann Surg 219:481–7, discussion 487–9
18. Nealon WH, Matin S (2001) Analysis of surgical success in preventing recurrent acute exacerbations in chronic pancreatitis. Ann Surg 233:793–800
19. Mannell A, Adson MA, McIlrath DC, Ilstrup DM (1988) Surgical management of chronic pancreatitis: long-term results in 141 patients. Br J Surg 75:467–72
20. Schnelldorfer T, Adams DB (2008) Surgical treatment of alcohol-associated chronic pancreatitis: the challenges and pitfalls. Am Surg 74:503–7, discussion 508–9
21. Isaji S (2010) Has the Partington procedure for chronic pancreatitis become a thing of the past? A review of the evidence. J Hepatobiliary Pancreat Sci 17:763–9. doi:10.1007/s00534-009-0181-8
22. Leger L, Lenriot JP, Lemaigre G (1974) Five to twenty year follow-up after surgery for chronic pancreatitis in 148 patients. Ann Surg 180:185–91
23. Nealon WH, Townsend CM, Thompson JC (1988) Operative drainage of the pancreatic duct delays functional impairment in patients with chronic pancreatitis. A prospective analysis. Ann Surg 208:321–9
24. O'Neil SJ, Aranha GV (2003) Lateral pancreaticojejunostomy for chronic pancreatitis. World J Surg 27:1196–202. doi:10.1007/s00268-003-7238-7
25. Maisonneuve P, Frulloni L, Müllhaupt B, Faitini K, Cavallini G, Lowenfels AB, Ammann RW (2006) Impact of smoking on patients with idiopathic chronic pancreatitis. Pancreas 33:163–8. doi:10.1097/01.mpa.0000227916.94073.fc
26. Kalady MF, Broome AH, Meyers WC, Pappas TN (2001) Immediate and long-term outcomes after lateral pancreaticojejunostomy for chronic pancreatitis. Am Surg 67:478–83
27. Terrace JD, Paterson HM, Garden OJ, Parks RW, Madhavan KK (2007) Results of decompression surgery for pain in chronic pancreatitis. HPB (Oxford) 9:308–11. doi:10.1080/13651820701481497
28. Hawker GA, Mian S, Kendzerska T, French M (2011) Measures of adult pain: Visual Analog Scale for Pain (VAS Pain), Numeric Rating Scale for Pain (NRS Pain), McGill Pain Questionnaire (MPQ), Short-Form McGill Pain Questionnaire (SF-MPQ), Chronic Pain Grade Scale (CPGS), Short Form-36 Bodily Pain Scale. SF. Arthritis Care Res (Hoboken) 63 Suppl 1:S240–52. doi: 10.1002/acr.20543