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Original Article

Surgery Section

An Audit of Management of Chronic Pancreatitis with Pancreatic Ductal Disruption Resulting in Ascites and Pleural Effusion

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ABSTRACT

Introduction: Pancreatic Ductal Disruption (PDD) may remain a localised collection to form pseudocyst or dissect into adjacent organs or rupture freely into the peritoneal cavity or pleural cavity resulting in massive or high-volume ascites or pleural effusions. The management of pseudocyst is well known among general and gastrosurgeons, but ascites and plural effusion remain difficult decisions. Depending on the availability of resources total parenteral nutrition, octreotide, pancreatic duct stenting are used with varying success. There are no guidelines as to which intervention is preferable in different clinical scenarios.

Aim: To audit the clinical characters and management of patients with pancreatic ascites and pleural effusion.

Materials and Methods: This study was done at the Department of Surgical Gastroenterology, Karnataka Institute of Medical Sciences, Hubballi, Karnataka, India. Fifty two patients with pancreatic ascites or pancreatico pleural fistula in the background of chronic pancreatitis satisfying both inclusion and exclusion criteria were identified and studied from the prospectively maintained database of patients with chronic pancreatitis in the period from September 2010 to September 2020. The patients were classified as conservatively managed, endoscopic main pancreatic duct stenting or surgery. Statistical analysis was done using windows excel. The results were expressed as percentage, mean and Standard Deviation (SD).

Results: Five patients with ascites and two patients with pleural effusion responded completely to conservative measures (13.4%). In one of them ascites recurred at two months and one had left pleural effusion recurrence at one month. Fifteen patients died while on conservative management (68.2% mortality). Among eight patients undergoing endoscopic pancreatic duct stenting, ascites/pleural effusion resolved in six (75% success rate) and remained asymptomatic during mean follow-up of 12 months. Two patients who were not improving after stenting were lost to follow-up. Twenty-two patients underwent surgery namely lateral pancreatojejunostomy with resolution of symptoms. Two patients undergoing surgery died in postoperative period due to sepsis and chest infection (9.1% mortality). At a mean follow-up of 14 months they remained symptom free.

Conclusion: Conservative management alone has high mortality. Early aggressive management can aim to stop leak either by pancreatic duct stenting or surgical lateral pancreatojejunostomy will help reduce mortality and morbidity.

Keywords: Lateral pancreaticojejunostomy, Octreotide, Pancreticopleural fistula, Pancreatic duct stenting

INTRODUCTION

An alcoholic patient presenting with tense ascites or breathlessness from massive pleural effusion is a common scene in an emergency. The investigations and management goes along established protocols including Chest X-ray, Ultrasound of abdomen and large volume tapping or paracentesis to relieve the symptoms. The ascites is often diagnosed as cirrhosis of liver and massive pleural effusion is often treated as tuberculosis with no improvement. An index of suspicion is needed to diagnose the pancreatic origin of the fluid [1], hence, generally a long time is spent consulting different physicians and trying multiple therapies before diagnosis is picked up. The patient suffers nutritional debility with low albumin, anasarca and muscle depletion with increased susceptibility to infections. The present study was done to evaluate the clinical characters of patients being admitted at our centre with pancreatic ascites or pleural effusion, their management and outcome.

MATERIALS AND METHODS

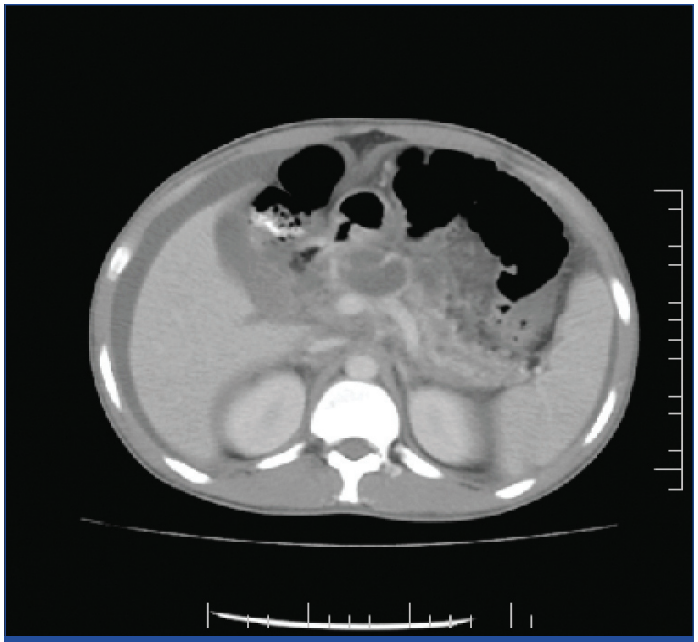
The present study was a prospective cohort study which was conducted at Karnataka Institute of Medical Sciences, Hubli, Karnataka, India. A formal approval was taken from the Institutional Ethics Committee vide their letter no KIMS/EC/96/2019-2020. The prospectively collected data of all patients suffering from pancreatitis from September 2010 to September 2020 was analysed. Informed written consent was obtained from each patient to use their data and images for research and publication.

Inclusion criteria: Patients with massive pleural effusion or massive ascites in the presence of chronic pancreatitis were included.

Exclusion criteria: Patients with ascites or pleural effusion in presence of acute pancreatitis were excluded. Ascites from leaking pseudocysts and with underlying pancreatic cancer were also excluded.

Chronic pancreatitis was identified on a Multidetector Computed Tomography (MDCT) on finding pancreatic atrophy, duct dilatation, or calcifications [Table/Fig-1]. The fluid, either ascites or pleural effusion was analysed for protein, cell count and amylase levels. An exudative fluid with high amylase generally in thousands confirmed pancreatic origin of the fluid. All patients on diagnosis underwent large volume paracentesis in order to dry up the peritoneal cavity, or large bore intercostal drainage in case of pleural effusion. They were kept nil orally, given parenteral nutrition and octreotide 100 micrograms subcutaneously eight hourly along with diuretics for atleast five days. As the parenteral nutrition was in short supply, some clear liquids and fat free diets were allowed.

Patients who did not respond to conservative measures were counselled for endoscopic or surgical intervention with due risks explained. Those with some duct dilatation or ductal stones underwent surgical management. Patients with undilated ducts could not be offered surgery for fear of not being able to identify the duct intraoperatively. Patients with poor performance status or poor general condition often due to chronic malnutrition were not considered to undergo surgery. These patients who were unfit

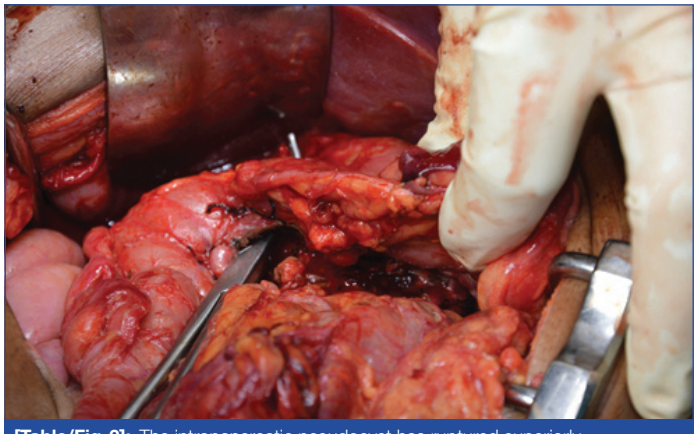


[Table/Fig-1]: Multidetector Computed Tomography (MDCT) showing pancreas atrophic with duct dilatation and intrapancreatic pseudocyst in head.

to undergo surgery and also those unsuitable for surgery due to lack of duct dilatation were counselled for pancreatic duct stenting. As the pancreatic duct stenting facility was not available at the institute, patients were referred to private centers at their own cost. Patients who were very poor and could not afford were continued on conservative management.

Surgical Procedure

Those with reasonably good general condition and with some duct dilatation on CT scan, or intraductal stones underwent surgery, that is lateral pancreaticojejunostomy. Abdomen was opened with midline laparotomy. All the ascitic fluid sucked out. Duodenum Kocherised and front of the pancreas exposed by incising gastrocolic and duodenocolic omentum. Pancreatic duct located by aspirating with 22 G needle and cutting on the pancreas over the needle. When duct could not be located like this, pancreas was incised over a palpable stone or else by transversely cutting the pancreas in a layer-by-layer fashion over body region. The entire duct from head to tail laid open and a roux limb of jejunum used to create a side-to-side pancreatojejunostomy. In some patients the site of leak could be made out [Table/Fig-2,3]. No attempts were done to locate the site of the leak either by preoperative Magnetic Resonance Cholangiopancreatography (MRCP) or by intraoperative pancreatography as it would not have changed the management.



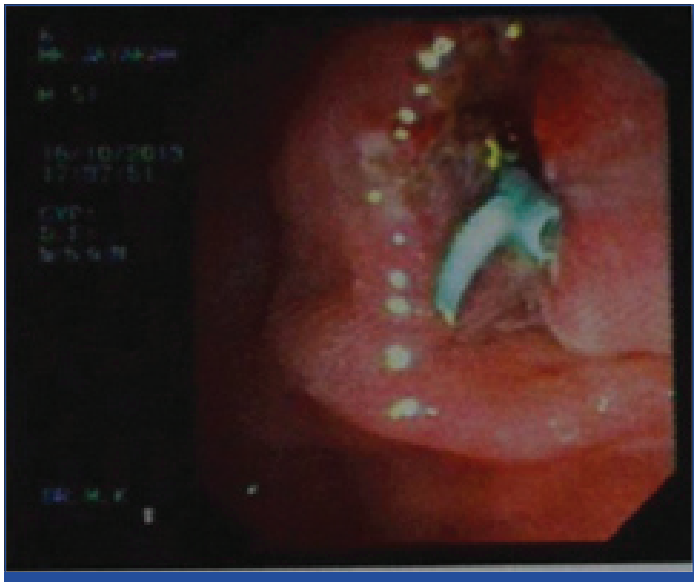
[Table/Fig-2]: The intrapancreatic pseudocyst has ruptured superiorly.

Endoscopic Pancreatic Duct Stenting

Pancreatic duct stenting was done using side viewing endoscope. Pancreatic ductal cannulation was achieved with 0.032" guidewire. A pancreatogram was taken. A plastic pancreatic stent either straight or single pigtail of size 5 Fr×5 cm or 5 Fr×7 cm were used [Table/Fig-4,5]. As the facility for pancreatic duct stenting was not available in the institute and patient had to spend money in private, many patients did not opted for endoscopic pancreatic duct stenting.

[Table/Fig-3]: The site of disruption being suture closed.

[Table/Fig-4]: Pancreatogram showing leak from main pancreatic duct in distal tail.



[Table/Fig-5]: Pancreatic stent.

STATISTICAL ANALYSIS

The data were entered into Microsoft Excel sheet and mean, percentages and SD were calculated.

RESULTS

There were 52 cases of chronic pancreatitis with massive ascites or pleural effusion which were of pancreatic origin based on imaging and finding of high amylase in fluid. The patient demography is shown in [Table/Fig-6]. Most patients were young (Mean age 31 years) males, and alcohol was the major cause. Massive ascites was the leading presentation followed by left sided pleural effusion, right sided pleural effusion and bilateral pleural effusion in decreasing frequency. They were symptomatic for a mean duration of 40 days.

Variables	Number (%)
Age (years) mean (SD)	31±9
Sex (Male:Female)	51:1
Aetiology (%)	
Alcohol	37 (71.2)
Tropical pancreatitis	15 (28.8)
Presentation	
Massive ascites	43 (82.7)
Pleural effusion left	6 (11.5)
Pleural effusion right	1 (1.9)
Pleural effusion bilateral	2 (3.9)
Duration of symptoms in days mean (SD)	40 (15)
Hb mean (SD)	7.8 (1.3)
Albumin (gm/dL)	2.1 (0.3)

[Table/Fig-6]: Patient demographic characteristics (N=52).

Among eight patients undergoing pancreatic duct stenting six had resolution of symptoms including one with left sided pancreaticopleural fistula. In two patients the ascites continued and had repeated paracentesis and were lost to follow-up. Twenty-two patients underwent lateral pancreaticojejunostomy. There were two deaths. All had good relief of ascites and pleural effusion [Table/Fig-7].

Management	Success (%)	Recurrence (%)	Mortality (%)	Follow-up (months)
Conservative management (n=22)	7 (13.4)	2 (28.5)	15 (68.2)	8
Pancreatic duct stent (n=8)	6 (75)	0	0	12
Lateral pancreticojejunostomy (n=22)	20 (90.9)	0	2 (9.1)	14

[Table/Fig-7]: Management and outcome.

Out of 22 patients who had no intervention either surgery or stenting, seven patients (31.8%) responded with conservative management which included tube intercostal drainage for pleural effusion and large volume paracentesis for ascites. Fifteen patients eventually succumbed to death (68.2%).

DISCUSSION

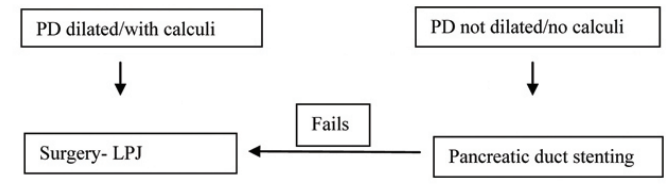
Pancreatic duct disruption in chronic pancreatitis results in the fluid finding its way into peritoneal or pleural cavity resulting in pancreatic ascites and pleural effusion. Clinically, it presents as large volume or massive ascites or pleural effusion which rapidly reaccumulate on tapping. The fluid is high in amylase and should be differentiated from ascites and pleural effusion of acute pancreatitis and tuberculosis. Pancreatic ascites was historically treated with conservative medical management with nil orally, parenteral nutrition, nasojejunal feeding, antisecretory agents like octreotide and repeated paracentesis with the hope of reducing pancreatic secretion and seal the site of leak by bringing together serosal surfaces, but the results were poor. These patients continued to reaccumulate ascites, develop severe malnutrition sepsis and died [2-5]. The surgical interventions were fraught with complications. The surgery done was mainly resection of the distal pancreas or putting a jejunal patch over the site of leak after a direct pancreatography. The pancreatography involved a duodenotomy to cannulate the ampulla [6-9]. Then came advancements in endoscopic management. The endoscopic cannulation of pancreatic duct and inserting a stent into pancreatic duct or a nasopancreatic drain has shown encouraging results.

The stents by bridging the disruption when placed across disruption or by reducing the resistance at the ampulla help seal the disruption [10-12]. Eckhauser F et al., reported the efficacy of endotherapy in 50 to 90% of patients [13]. In a series of 53 patients, Gupta S et al., reported 73.6% of patients benefited from endotherapy [14]. The factors which favour ductal healing are lack of stones or strictures and ability to place the stent across the leak site. The leaks in tail are less likely to be successfully stented compared to head and body leaks. A failed therapeutic Endoscopic Retrograde Cholangiopancreatography (ERCP) has a risk of superinfection of pleural and peripancreatic fluid. In present study, endotherapy was successful in 75% of cases. This advancement involves specialised skills, substantial experience and equipment and is not available in most small cities and in government hospitals.

Lateral pancreaticojejunostomy offers a comprehensive solution to the problem of duct disruption, stricture and calculi and by reducing the compartmental pressure within pancreas; it gives good relief from pain as well. Even if the site of disruption is not identified, by providing a low pressure exit path to pancreatic secretion, the leak sites get sealed. There is no need of duodenotomy and duct cannulation or need for intraoperative pancreatography. However, the crux is the duct should be identifiable intraoperatively and patient's general condition should permit a safe general anaesthesia and surgery. If duct is undilated there is fear of not being able to do appropriate pancreatojejunostomy. Surgery, in presence of a dilated duct and calculi decompresses the entire duct, removes stones and strictures and seals leaks and gives relief from debilitating pain. Hence, surgery is used as the first option in all patients with dilated duct and calculi. Surgery is also used for patients with failed pancreatic duct cannulation.

The pancreatic duct disruption should be managed aggressively in order to improve outcome. Early aggressive intervention before the patient's general condition deteriorates due to malnutrition and hypoproteinemia holds the key to successful outcome. Chebli JM et al., similarly noted that interventional therapy either endoscopic or surgical should be considered the best approach in management of internal pancreatic fistula [3]. In a multivariate analysis of 139 cumulative cases, the only treatments related to success were surgery and transpapillary stenting, and with no apparent benefit of somatostatin analogues [15]. Till date, the published literature is limited to few case reports. There are no randomised studies. Due to low incidence, comparative studies with different treatment approaches are not available [16].

Pancreatic duct stenting alone is sufficient in patients with no duct dilatation. Hence, a simple algorithm [Table/Fig-8] for pancreatic ascites and pleural effusion can be proposed based on presence of pancreatic duct dilatation and calculi. Those with duct dilatation and calculi directly undergo surgery and those without dilatation and no calculi go for pancreatic duct stenting. An occasional patient with leak in the tail demonstrated on imaging, and who fails stenting can be offered distal pancreatectomy.



[Table/Fig-8]: Algorithm for management of pancreatic ascites and plural effusion.
PD: Pancreatic duct; LPJ: Lateral pancreatojejunostomy

As the endoscopic management is available only in large tertiary care centers and corporate hospitals, many poor patients may not get the appropriate treatment. As lateral pancreatojejunostomy can be done safely in most surgical setups, and also gives more comprehensive remedy for pancreatic duct disruption as well as pancreatic pain, surgery may be a better treatment option in selected patients. The patients general condition is usually poor due to chronic alchoholism and malnutrition. Hence, there is little scope for randomisation and treatment has to individualised. Because the response to expectant management with parenteral nutrition and antisecretory medications is low, conservative management cannot be continued indefinitely. If patient is reaccumulating the fluid despite adequate measures, valuable time should not be lost and some intervention either stent or surgery has to be done.

Limitation(s)

The study population was heterogenous and often with low albumin and anasarca. The selection for stenting was absolutely on basis of financial affordability. Delayed diagnosis and poor general condition caused poor outcome and posed severe limitation for any intervention.

CONCLUSION(S)

Free disruption of pancreatic duct results in pancreatic ascites and massive pleural effusion. This can be successfully addressed by endoscopic pancreatic duct stenting procedure or by liberal use of lateral pancreatojejunostomy with long term good results.

REFERENCES

[1] Kanneganti K, Srikakarlapudi S, Acharya B, Sindhaghatta V, Chilimuri S. Successful management of pancreatic ascites with both conservative management and pancreatic duct stenting. Gastroenterology Res. 2009;2(4):245-47.

[2] Kozarek RA. Management of pancreatic ascites. Gastroenterol Hepatol (N Y). 2007;3(5):362-64.

[3] Chebli JM, Gaburri PD, de Souza AF, Ornellas AT, Martins Junior EV, Chebli LA, et al. Internal pancreatic fistulas: Proposal of a management algorithm based on a case series analysis. J Clin Gastroenterol. 2004;38(9):795-800.

[4] Munshi IA, Haworth R, Barie PS. Resolution of refractory pancreatic ascites after continuous infusion of octreotide acetate. Int J Pancreatol. 1995;17(2):203-06.

[5] Gislason H, Grønbech JE, Søreide O. Pancreatic ascites: Treatment by continuous somatostatin infusion. Am J Gastroenterol. 1991;86(4):519-21.

[6] Sankaran S, Walt AJ. Pancreatic ascites: Recognition and management. Arch Surg. 1976;111(4):430-34.

[7] Closset J, Gelin M. The management of pancreatic ascites and pancreaticopleural effusion. Acta Gastroenterol Belg. 2000;63(3):269.

[8] Adler J, Barkin JS. Management of pseudocysts, inflammatory masses, and pancreatic ascites. Gastroenterol Clin North Am. 1990;19(4):863-71.

[9] Oh YS, Edmundowicz SA, Jonnalagadda SS, Azar RR. Pancreaticopleural fistula: Report of two cases and review of the literature. Dig Dis Sci. 2006;51(1):01-06. Doi: 10.1007/s10620-006-3073-7. PMID: 16416200.

[10] Varadarajulu S, Noone TC, Tutuian R, Hawes RH, Cotton PB. Predictors of outcome in pancreatic duct disruption managed by endoscopic transpapillary stent placement. Gastrointest Endosc. 2005;61(4):568-75.

[11] Saeed ZA, Ramirez FC, Hepps KS. Endoscopic stent placement for internal and external pancreatic fistulas. Gastroenterol. 1993;105(4):1213-17.

[12] Shah HK, Shah SR, Maydeo AP, Pramesh CS. Pancreatico-pleural fistula. Endoscopy. 1998;30(3):314.

[13] Eckhauser F, Raper SE, Knol JA, Mulholland MW. Surgical management of pancreatic pseudocysts, pancreatic ascites, and pancreaticopleural fistulas. Pancreas. 1991;6:S66-75.

[14] Gupta S, Gaikwad N, Samarth A, Sawalakhe N, Sankalecha T. Efficacy of pancreatic endotherapy in pancreatic ascites and pleural effusion. Med Sci. 2017;5(2):6.

[15] Gómez-Cerezo J, Barbado Cano A, Suárez I, Soto A, Ríos JJ, Vázquez JJ. Pancreatic ascites: Study of therapeutic options by analysis of case reports and case series between the years 1975 and 2000. Am J Gastroenterol. 2003;98(3):568-77.

[16] Gapp J, Hoilat GJ, Chandra S. Pancreatic Ascites. [Updated 2021 Feb 9]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2021 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK507851/.

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