Clinical Approach to Chronic Pancreratitis

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ABSTRACT

Chronic pancreatitis is still considered an uncertain process with an undetermined pathogenesis and ill defined treatment. Chronic pancreatitis is distinguished from acute pancreatitis based on structural and functional differences. In acute pancreatitis, the gland is normal prior to the attack, and returns to normal after an acute attack, while in chronic pancreatitis, the gland is already in an abnormal state prior to or following an attack or prior to and following an acute attack.

The most common local complication of chronic pancreatitis is the formation of pseudocysts. Psedocysts are usually formed due to passage obstruction of the pancreatic tract (retention cyst) or due to recurrent acute exacerbation

Several pancreatic abnormalities, such as stones, ductal stricture, fluid collection, and functional sphincter abnormality, could be treated using endoscopy. Adjuvant treatment for biliary duct abnormality such as biliary stricture due to pancreatitis, and stent insertion in cases of duodenal obstruction, could also be performed via endoscopy

Keywords: *Chronic pancreratitis, tropical pancreatitis, treatment*

INTRODUCTION

In 1788, Mr. Cawley reported a young vagabond who died after losing a lot of weight and suffering from diabetes, in whom autopsy revealed multiple pancreatic stones.[1] In 1878, Friedrich wrote, "I am sure that extensive chronic interstitial pancreatitis could be caused by severe alcoholism (drunkard's pancreas)." Prior to 1940, chronic pancreatitis is more of a post-autopsy diagnosis, since it has not been clinically acknowledged.[2]

In 1946, chronic pancreatitis has become known as a separate disease entity when Comfort et al emphasized the presence of a correlation between chronic pancreatitis and alcoholism, as well as explicated the patient's clinical manifestations. They hypothesized that (chronic – red?) pancreatitis is a result of recurrent attacks of acute pancreatitis. Studies in the 1960s and 1970s refuted this hypothesis and began to lead to the concept that chronic pancreatitis is chronic from the beginning and differs from acute pancreatitis. In 1993, Kloppel and Maillet suggested a new concept that has lately gained popularity. They stated that a series of necrosis-fibrosis occurs, and chronic pancreatitis is a result of recurrent acute attacks of alcoholic pancreatitis, both those with clinical as well as subclinical manifestations.[1,2] After two decades since the initial description, there is a great deal of publications on this disease, but chronic pancreatitis is still considered an uncertain process with an undetermined pathogenesis and ill defined treatment.

Definition and Classification

Chronic pancreatitis is a continuous inflammatory disease of the pancreas characterized by irreversible morphological changes and uniquely causes permanent pain and/or dysfunction.[3,4] Chronic pancreatitis is distinguished from acute pancreatitis based on structural and functional differences. In acute pancreatitis, the gland

is normal prior to the attack, and returns to normal after an acute attack, while in chronic pancreatitis, the gland is already in an abnormal state prior to or following an attack or prior to and following an acute attack.[1]

The morphological changes in chronic pancreatitis includes edema of varying degrees, inflammation, and necrosis, based on findings of chronic changes such as fibrosis, inflammation, and loss of exocrine function. We could also see elements of ductal widening, intraductal protein clots, and calcification.[5, 6]

Epidemiology

In several Western industrialized nations, the prevalence of chronic pancreatitis is estimated to be 10 to 15 per 100,000 inhabitants, with an annual incidence rate of 3.5 to 4 per 100,000 inhabitants. This estimation particularly illustrates alcoholic chronic pancreatitis, and is thus proportional with alcohol consumption in the nation in question. Males are more frequently inflicted, probably portraying the fact that they more commonly consume alcohol and are thus more susceptible to chronic pancreatitis. The rate above could very well be underestimated, noting that diagnosis is often not established using high tech instruments such as computed tomography (CT) or ERCP.[7]

In a study in Japan, the incidence and prevalence of chronic pancreatitis is higher than that reported in the West (reports include 12.4 per 100,000 and 45.5 per 100,000 inhabitants). They probably established the diagnosis based on CT scan, ERCP, or other imaging modalities. Based on the survey, the prevalence of chronic pancreatitis in South India is approximately 125 per 100,000 inhabitants.[7] Most of them consist of tropical pancreatitis, characterized by pancreatic calcification. Community-based data from other areas and nations is still much required.

Etiopathogenesis

In most nations, the most common cause of chronic pancreatitis is alcoholism, ranging from 60 to 70% of all chronic pancreatitis.[2, 4, 6, 8] In certain countries such as India, the majority of patients with chronic pancreatitis suffer from tropical pancreatitis. Other forms of pancreatitis are hereditary pancreatitis, obstructional pancreatitis, autoimmune pancreatitis, and hyperparathyroid associated pancreatitis.[2] It is still in argument whether pancreatitis divisum could cause chronic pancreatitis. Pancreatitis of unknown origin is classified as idiopathic pancreatitis.[6]

Alcoholism

The correlation between chronic pancreatitis and long-term alcohol consumption has long been established. In patients with alcoholic pancreatitis, the amount of consumed alcohol vary from 150 to 175 grams per day, with a mean alcohol consumption of 18 ± 11 years for males and 11 ± 8 years among females. The risk for pancreatitis increases proportionally with the daily intake of alcohol.[2, 7, 8]

It is unclear whether alcohol is a direct toxin or causes pancreatitis by indirect means. Alcohol is metabolized in the pancreas, stimulating destruction of lysozomes and increasing triglyceride content in acinar cells. There are many hypotheses that have been presented to explain the pathogenesis, such as the "Toxic-metabolic" hypothesis, obstruction due to protein hypersecretion, " necrosis-fibrosis" and "oxidative stress" hypotheses. Out of all of these theories, only the "necrosis-fibrosis" and "obstruction" hypotheses are commonly used by researchers.[4, 7]

Sarles and Sahel preferred the obstruction hypothesis, and also emphasizes that alcoholic pancreatitis is chronic in progression from the onset of the disease. According to this theory, alcohol stimulates increased protein content in pancreatic juice, which results in formation of protein plaques in small pancreatic ducts. Protein plaques cause ductal obstruction and eventual calcification. Ductal obstruction causes atrophy of acinar atrophy periductal inflammation, and eventual pancreatic fibrosis. Under normal conditions, pancreatic secretory protein (PSP) or lithostatin prevents precipitation of calcium carbonate, and is believed to play an important role in the etiopathogenesis process.[4,6,7] Reduced lithostatin protein secretion facilitates protein plaque calcification. This occurs during the initial development of the disease, where there is imbalance between stone formation promoter and inhibitor. Several points that cannot be explained by the theory is: (1) most patients with alcoholic pancreatitis come with acute pancreatitis, (2) 50% of patients who die from alcoholic pancreatitis do not demonstrate chronic histophatological changes from their autopsy, (3) many patients with chronic pancreatits demonstrate autodigestive necrosis in their pancreas, and (4) changes in lithostatin secretion is not always found.[7]

The necrosis-fibrosis hypothesis is based on the concept of recurrent acute alcoholic pancreatitis that causes recurrent pancreatic damage. The supporters of this hypothesis believe that peri-acinar and periductal fatty necrosis stimulates periductal fibrosis and then causes

ductal stasis and eventual protein plaque and stone formation. Total ductal obstruction would result in acinar cell necrosis, inflammation, and fibrosis. Resorption of the necrotic area, such as in hemorrhagic necrosis in the pancreas, results in perilobular necrosis mediated by various mediators such as the transforming growth factor (beta-TGF).

It has been demonstrated that alcoholic pancreatitis can be classified into progressive and non-progressive alcoholic pancreatits.[6] If patients do not suffer from severe pancreatitis at the initial attack, their risk for chronic pancreatitis is less compared to patients who suffer from severe pancreatitis at the initial development of the disease. For this reason, Amman and Muellhaupt demonstrated that the progression of alcoholic pancreatitis is correlated with the severity of acute attack. Patients who suffer from recurrent and severe pancreatitis with pseudocyst formation more easily develop calcification pancreatitis. Unfortunately, this hypothesis is unable to explain the following phenomena: (1) how alcohol causes acinar dysfunction and necrosis, (2) how primary chronic pancreatitis occurs in 5-10% of alcoholics, and (3) why biliary pancreatitis never become chronic pancreatitis, even though patients with biliary pancreatitis suffer from recurrent acute pancreatitis.[7, 9]

GENETIC MUTATION

The discovery of genetic mutation on the long arm of chromosome 7, which codes cationic trypsinogen in patients with hereditary pancreatitis, clarifies the old belief that there is a genetic defect in patients with hereditary pancreatitis. R122H mutation (mutation of histidine into arginine on codon 122, axon 3) eliminates the region that has the capacity to hydrolyze the trypsin chain that connects two half chains of trypsin. As a result, the trypsin is not activated due to a missing hydrolyzing part. Another mutation in codon 29 (N29I, axon 2) has also been discovered in a Japanese family with hereditary pancreatitis.[7, 10, 11]

Autoimmune Pancreatitis

A specific type of pancreatitis has been identified in Japan. Mr. Ito et al explained 3 cases of autoimmune pancreatitis with diffuse narrowing and irregularity of the main pancreatic duct. All patients improved with corticosteroid administration. Autoantibodies, particularly anti-nuclear and anti-carbonic anhydration, are commonly found in patients with autoimmune pancreatitis.[4, 7]

Tropical Pancreatitis

The chief hypothesis in tropical pancreatitis is that it is due to the consumption of a cassava-type plant containing cyanogenic glycoside, which is freely consumed by inhabitants of South India. Nevertheless, the hypothesis is not commonly accepted because: (1) the plant is not always consumed by many patients with tropical pancreatitis, (2) there is no difference in consumption of the plant by patients with pancreatitis and those without, and (3) long-term consumption of the plant does not cause diabetes or pancreatitis in rats.[4, 7, 12]

Table 1. The Difference Between Alcoholic and Tropical Pancreatitis

Clinical findings	Alcoholic	Tropical
Age (years)	30-40	10-30
Pain (%)	85-90	0-80
Calcification	moderate	dominant
Steatorrhea	common	rare
Diabetes (%)	30-70	80
Insulin requirement (units)	10-40	60-200
Cancer (%)	3-4	9.2

Quoted from [12]

Malnutrition with protein and micronutrient deficiency has also been considered a cause of tropical pancreatitis, as malnutrition could cause pancreatic atrophy. However, malnutrition does not always cause pancreatitis, but is instead a more common consequence of pancreatitis.

The pathogenesis of tropical pancreatitis is not well known. Histopathological changes include extensive acinar destruction, fibrosis, and ductal dilatation.

Immune response disorder, suspicion of infection, and genetic susceptibility are factors that play a role in the etiopathogenesis of tropical pancreatitis.

Progression of The Disease and Differential Diagnosis

Chronic pancreatitis is always marked by progressive and continuous loss of pancreatic tissue.[1] Following the subclinical phase, which varies in time span, the patient would develop recurrent abdominal pain accompanied by exocrine and endocrine deficiency. In most cases, both exocrine and endocrine function will be reduced, even though reduced endocrine function usually occurs more slowly. Several researchers state that progressive loss of pancreatic function causes reduced or absence of pain, while other researchers did not find the phenomena, thus creating a continuous controversy. The impact of cessation of alcohol

consumption on the progression of pancreatitis is also unclear. Several reports state that cessation of alcohol consumption reduces the frequency and severity of pain and the rate of exocrine and endocrine loss. On the other hand, other researchers state that progression will continue despite cessation or continuation of alcohol consumption.

Chronic pancreatitis is associated with a mortality rate of nearly 50% in 20 to 25 years. Approximately 15 to 20% of patients die due to complication of acute attacks. Recent report indicate that pancreatic cancer develops at a rate of approximately 4% after the diagnosis is established.[1]

The most common local complication of chronic pancreatitis is the formation of pseudocysts. Psedocysts are usually formed due to passage obstruction of the pancreatic tract (retention cyst) or due to recurrent acute exacerbation. Another complication is stricture of the biliary tract, which could occur in 3.2% to 45.6% of cases of chronic pancreatitis. Splenic vein thrombosis occurs in almost 10% of cases, which of course could cause varices of the gastric fundus. A rare complication is pancreatic ascites due to pancreatic juice diffusing into the peritoneal cavity from a ruptured duct or pseudocyst. Other complications include pancreaticopleural fistula, obstruction of the biliary duct, and duodenal obstruction.[6]

Malabsorption of vitamin B12 occurs in 40% of patients with chronic alcoholic pancreatitis and almost all patients with cystic fibrosis. Such malabsorption occurs since vitamin B12 is bound to its binding protein in excessive amounts, while under normal conditions, B12 is more commonly bound to intrinsic factors. Almost all patients suffer from glucose intolerance, but few up to the point of diabetic ketoacidosis and complications of peripheral organs (retinopathy, neuropathy, or nephropathy).[6]

A differential diagnosis of chronic pancreatitis occurs when we are dealing with two conditions. Firstly, in patients with abdominal pain and normal or minimal imaging findings, pancreatic function may be useful. The second challenge is in patients with suspicion of chronic pancreatitis, which is actually pancreatic cancer. Under such condition, establishing the diagnosis of pancreatic cancer is quite difficult. ERCP plus brush cytology may be useful in such condition. Stricture of the pancreatic tract of over 1 cm unaccompanied by enlarged branches creates the suspicion of pancreatic cancer. The sensitivity of brush cytology is only 20-25%, and the specificity is nearly 100%. Another diagnostic procedure for suspected pancreatic cancer is pancreatic juice cytology, FNAB, and of course assessments of CA 19-9 and CEA tumor markers.[1, 13]

CLINICAL PRESENTATION

Clinical History and Physical Examination

Four cardinal manifestations of chronic pancreatitis are prolonged or recurrent abdominal pain [1], diabetes [7], steatorrhea [5], and calcification.[6] Abdominal pain is usually what brings the patient to the doctor in the first instance.[2]

In developed nations, most patients have a history of severe and long standing alcoholism. They usually report recurrent attacks of upper abdominal pain, often spreading into the mid back or scapula, increasing after meals and lessening when leaning frontward and sitting up. The pain is usually accompanied by nausea and vomiting. It may be continuous or intermittent, and is not relieved with antacids. The pain aggravates with alcohol or fat. In chronic pancreatitis, the pain often requires the use of narcotic pain relief. Ten to 20% of patients manifest with painless pancreatitis. Old-age onset chronic pancreatitis and tropical pancreatitis accompanied by diabetes are often painless in nature.

Patients could present with diabetes, jaundice, or malabsorption. Steaotorrhea with weight loss and diabetes usually reflect advanced disease. Exocrine and endocrine tissue is estimated to have been reduced 80-90% prior to the development of malabsorption and diabetes. Deficiency of fat-soluble vitamins is rarely found.

Physical examination usually does not reveal a lot of abnormality, and there is often a discrepancy between abdominal pain and physical findings. Sometimes there is epigastric tenderness. Subfebrile fever or epigastric mass reflect complication, in the form of pseudocyt formation. [6]

Laboratory Assessment

Serum amylase or lipase is usually normal or mildly elevated, particularly if there is extensive fibrosis and the pancreas is no longer able to synthesize adequate amounts of enzyme. Leukocyte count and electrolytes are also usually normal, except if there is vomiting or inadequate food intake. If alcoholic liver disease is found, liver function test results are usually abnormal. In as many as 5 to 10% of patients with chronic pancreatitis, edema or fibrosis associated compression of the intrapancreatic segment of the biliary duct results in increased serum bilirubin and base phosphatase. Malabsorption due to exocrine insufficiency results in increased stool fat. Such

condition can be detected using Sudan staining and quantitative assessment for stool fat excretion following a diet containing 100 g of fat per day. Stool pancreatic chymotrypsin and elastase testing is usually beneficial to confirm advanced chronic pancreatitis. Serum elastase, deoxyribonuclease, and rybonuclease are increased along with trypsin or creatinine clearance ratio.

Many patients demonstrate glucose intolerance, some demonstrating increased fasting blood glucose.

PANCREATIC FUNCTION TEST

Pancreatic function is particularly helpful to assist the diagnosis and treatment of patients with recurrent abdominal pain whose imaging are within normal limits. A common problem with pancreatic function test is its insensitivity, particularly during the initial stages of the disease, so that a negative pancreatic function test result does not eliminate the possibility of chronic pancreatitis. The test performed obviously depend on the expertise and available resources.[1, 6]

A standard pancreatic function test is the collection of duodenal juices and measurement of its volume, bicarbonate, and trypsin concentration following secretin injection with pancreozimine or without pancreozimine (secretin stimulation test). The secretin stimulation test results are considered to be abnormal if 60% or more exocrine function has been lost.

Another pancreatic function test consists of substrate administration to pancreatic enzyme, followed by measurement of the digestive products of the administered substrate. This last test is often called the tubeless test, since it usually does not use intubation procedures used in other tests. The problem with this test is it is not adequately sensitive and specific. Two tests that are commonly used from the group of tubeless tests are the bentiromide test and pancreolauryl test. Another test can be used to diagnose chornic pancreatitis is measurement of stool chemotrypsin activity and measurement of serum trypsin-like immonoreactivity.

The sensitivity of pancreatic function tests in assisting the establishment of the diagnosis is 67-88%, and the specificity approaches 90% compared to histological examinations.[7]

Imaging

In the appropriate clinical setting, the finding of pancreatic calcification is adequate for the establishment of a diagnosis. Calcification is found in 30% of cases, and is a patognomonic sign. Calcification is usually found in the ductal system and not in the parenchyma. Ultrasound examination could demonstrate pancreatic enlargement, ductal dilatation, or pseudocysts, and has a sensitivity of 60 to 70% and a specificity of 80 to 90%. CT has been reported to have a sensitivity of 74 to 90% and a specificity of 85%. CT could demonstrate calcification and cyst that could not be demonstrated using ultrasound. ERCP is a standard imaging procedure used for diagnosis or treatment. Ductal changes that lead to the suspicion of chronic pancreatitis could be well visualized using ERCP. Unfortunately, early changes are often missed by ERCP. In general, ERCP has a sensitivity of 66 to 89% compared to histology, and a specificity of 89 to 100% in advanced pancreatitis. MRCP is an MRI technique, which is very good in visualizing the pancreatic ductal system and the biliary ducts. MRCP could provide non-invasive, detailed, 3-dimensional coronal and frontal slices of the pancreatic ducts and biliary tract. The disadvantage is that it is only able to demonstrate early ductal changes in 10-25% of cases.[5, 14]

Endoscopic ultrasound is also beneficial to diagnose chronic pancreatitis, particularly in early stages. A comparison study revealed that normal endoscopic ultrasound findings are correlated with abnormal pancreatic function test in 87 to 100% of cases. In cases of early chronic pancreatitis established by endoscopic ultrasound, pancreatic function test demonstrates abnormal findings in only 13 to 57% of cases. Comparison between endoscopic ultrasound and histology demonstrates a sensitivity of 85% and a specificity of 67%. Endoscopic ultrasound is able to demonstrate changes in the ducts and parenchyma, such as echotexture of the glands, calcification, lobulation, and fibrotic stranding.[3, 7]

Based on all of the information above, it could be noted that if possible (be it rare) to obtain a histopathological sample, pathological examination is the best evidence and could be considered to be the gold standard diagnostic method for chronic pancreatitis. CT-scan is very good in demonstrating calcification, even though calcification is usually only found in advanced stages. ERCP is better in demonstrating ductal changes. If none of the above examinations are found, pancreatic function test can be performed. Secretin stimulation test is the most sensitive examination to determine exocrine function. An abnormal finding indicates chronic pancreatitis under the appropriate clinical condition. Endoscopic ultrasound is beneficial to assist the establishment of early abnormalities. More data is needed prior to accepting endoscopic ultrasound as a

routine examination standard in chronic pancreatitis. The Asia Pacific Consensus mentions that one positive test result from the following is adequate for the diagnosis of chronic pancreatitis: (1) ductal changes under ERCP, (2) positive secretin stimulation test, (3) pancreatic calcification found on diagnostic imaging, (4) the presence of abnormality on endoscopic ultrasound.[3, 7, 15]

MANAGEMENT

Pain

Pain, both continuous and episodic, is the most common symptom that brings patients to seek treatment. Pain is also the most difficult problem to solve. The pathogeneses of pain that are often mentioned in references are ductal hypertension, parenchymal ischemia, perineural eosinophillic inflammation, and pseudocyst with increased intra-cyst pressure.

Non-invasive approaches include cessation of alcohol consumption and provoking foods, administration of non-opioid as well as opioid analgesics, nerve blocks, cessation of smoking, reduction of pancreatic secretion using high protease pancreatic enzyme, cholecystokinin receptor antagonist, or somatostatin.[1 5, 7]

Even though proof of efficacy of pancreatic enzyme is still limited to two random clinical trials, due to its widespread use, easy administration, and rare side effects, administration of enzymes is often the first choice for pain management. In a placebo-controlled, double-blind crossover study, pancrelipase (Viocase), with a dose of 6 tablets consumed 4 times a day for 1 month, significantly reduced pain in 75% of patients with mild to moderate illness. In a multicenter pilot study, ocreotide, with a subcutaneous dose of 4 x 200 micrograms, reduces the pain score for over 25 in 65% of patients with severe chronic pancreatitis.[1, 5]

For patients with continuous pain who have received maximum non-invasive treatment, ERCP may be beneficial to re-evaluate the caliber and morphology of the pancreatic duct. Usually, over half of the patients who are studied demonstrate ductal dilatation with several stricture areas, and the remainders have normal (2-4 mm) ducts and smaller ducts. Ducts larger than 8 mm in diameter could undergo decompression using internal surgical drainage procedure such as longitudinal pancreaticojejunostomy (modification of the Peustow procedure). Ducts less than 8 mm could not undergo such procedure. Advanced chronic pancreatitis pain (in large ducts) could be reduced using pancreaticojejunostomy in 80 to 90% of cases, but 5 years following surgery, only 50 to 60% of patients are still free from pain.[3, 15]

Surgical intervention is usually taken when the pain continues after other management means, and if (1) there is temporary ductal dilatation that failed to respond to endoscopic treatment, (2) there is suspicion of mass of the pancreatic head, or (3) there are complications such as pseudocysts, which preclude endoscopic treatment.[3,15]

Another alternative for drainage is the insertion of an endoprothesis or stent, placed in the pancreatic duct using endoscopy. Recent reports demonstrate that 30 to 76% patients that undergo stent insertion demonstrate alleviation of pain symptoms in a follow-up period of 14 to 36 months. Some recommend for stent to be used for short-term as well as to be used to determine the possible benefits of surgical intervention.

Patients with pain without pancreatic duct dilatation are more difficult to manage, since for them surgical intervention is not possible. Experience using stent in such conditions is still very limited, but clinical improvement is reported in 50% of patients. Most patients with pain without ductal dilatation continue non-invasive treatment or are recommended for resection. There have been attempts to percutaneously block the celiac plexus nerves, but results are still disappointing.

Other treatments that are still under trial and seem to be promising are: steroid block of the celiac ganglion, cholecystokinin receptor antagonists, pancreatic stone dissolving agents, anti-oxidants, and anti-cholinergics.

Malabsorption

If over 90% of exocrine function has been lost, malabsorption will be clinically manifest. Steatorrhea (fat malabsorption) causes more of a problem compared to azotorrhea (protein malabsorption), since it is always accompanied by diarrhea and gassiness. Treatment consists of a low fat diet. Patients are usually advised to eat a diet of approximately 30% fat, 24% protein, and 40% carbohydrate. Moderately long chain triglyceride is also beneficial, since its absorption require only little pancreatic enzyme and does not require bile salts. For continuous complaints, substitution of pancreatic enzyme should always be administered prior to meals. To avoid degradation of pancreatic enzymes when passing through the gaster, the following strategies could be undertaken: neutralization of gastric acid, prevention of acid secretion, or using enteric-coated enzymes. There are no extra benefits of using enzyme agents with high-lipase action.[6, 7]

The Role of Endoscopy

The use of endoscopy for chronic pancreatitis was first reported in 1997, when pancreatic sphincterotomy was performed to reduce pain due to stone in the pancreatic duct. Since then, pancreatic endoscopy has become more important and is a treatment alternative for inoperable chronic pancreatitis. In general, the aim of endoscopic treatment is to alleviate pain.

Several other pancreatic abnormalities, such as stones, ductal stricture, fluid collection, and functional sphincter abnormality, could be treated using endoscopy. Adjuvant treatment for biliary duct abnormality such as biliary stricture due to pancreatitis, and stent insertion in cases of duodenal obstruction, could also be performed via endoscopy. Procedures such as stent insertion or stone extraction ensure pancreatic drainage and reduce intraductal pressure. Extra-corporeal shock wave lithotripsy (ESWL) usually accompanies endoscopy in cases of large stones.

Complete elimination of the stone from the main pancreatic duct using endoscopic sphincterotomy and Dormia net have been achieved in 82% of cases. In cases of chronic pancreatitis with stricture of the main pancreatic duct, stent insertion improves clinical conditions in 70 to 80% of cases.[15]

CONCLUSION

1. Patients with recurrent, and often unspecific, abdominal pain, should always warrant the possibility of chronic pancreatitis.
2. The etiology, pathogenesis, and management of chronic pancreatitis are still not completely clear.
3. The diagnosis of chronic pancreatitis often requires complex procedures or instruments.
4. The management of pain in chronic pancreatitis requires an interdisciplinary approach.

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