JHGD
Journal of Human Growth and Development
www. jhgd.com.br

ORIGINAL ARTICLE

Pancreatic Diversions in Pediatric Patients: a case series

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Manuscript received: november 2024
Manuscript accepted: december 2024
Version of record online: april 2025

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Abstract

Introduction: chronic pancreatitis in children is a rare condition with multiple etiological factors organized into four groups: obstructive, toxic, related to systemic diseases and hereditary. Despite a gap in the literature, pancreatic diversion has been shown to be effective in managing symptoms and preserving exocrine and endocrine pancreatic function.

Objective: this article seeks to demonstrate the improvement in quality of life in patients with chronic pancreatitis with significant anatomical alterations through monitoring and evaluation after undergoing early surgical approach with pancreatic diversion.

Methods: retrospective analysis of 5 cases of pancreatitis treated at the Pediatric Surgery Unit of São Paulo University Medical School Children's Institute using the Puestow technique together with a brief review of the etiologies presented.

Results: all children survived the pancreatic diversion procedure, with 1 case presenting a pancreatic fistula, with good postoperative evolution and no sequelae observed during follow-up.

Conclusion: surgical intervention with pancreatic diversion has proven to be an effective treatment, capable of alleviating pain and preventing complications associated with pancreatic insufficiency.

Keywords: pancreatitis, chronic, pediatrics, pancreaticojejunostomy.

Suggested citation: Ferreira BM, Souza MAB, Avellar MCF, Rodrigues e Mello MA, Rocha FLRMM, Dias LN, Ponte PFA, Tannuri ACA. Pancreatic Diversions in Pediatric Patients: a case series. *J Hum Growth Dev. 2025; 35(1):101-110.* DOI: http://doi.org/10.36311/jhgd.v35.17289

Authors summary

Why was this study done?
Chronic pancreatitis in pediatrics is a rare condition with significant implications for affected patients. There is a lack of studies in the literature in regards to the surgical treatment in the form of pancreatic diversion, which is not considered a first-line approach. Based on our service's experience, this study aims to demonstrate that patients with significant structural changes can benefit from early surgical treatment.

What did the researchers do and find?
A retrospective analysis was conducted on 5 cases of chronic pancreatitis that underwent surgery at the hospital between 2019 and 2024. The outcomes of surgery were tracked in a group of patients who already presented significant anatomical changes or failure of initial therapies. The follow-up of these patients demonstrated a notable improvement in pain patterns, the primary complaint, a reduction in episodes of pancreatitis, and maintenance of pancreatic function.

What do these findings mean?
Based on these findings, an early surgical approach in patients with significant anatomical alterations is beneficial in clinical improvement of symptoms.

Highlights
This study highlights the superior outcomes of surgical management over non-operative approaches, such as endoscopic stenting, in pediatric patients with chronic pancreatitis. Through a retrospective analysis of five cases treated with longitudinal pancreaticojejunostomy (Puestow procedure), the findings demonstrate significant pain relief, reduction in pancreatitis recurrence, and preservation of pancreatic function. The results underscore the efficacy of early surgical intervention in patients with substantial anatomical alterations, suggesting that pancreatic diversion provides a more definitive and long-term solution compared to minimally invasive therapies.

INTRODUCTION

Chronic pancreatitis in children is a relatively rare condition that's presented with multiple etiological factors. These factors can be organized into four groups: (1) Obstructive factors, characterized by various pathologies that obstruct the flow of pancreatic secretions, leading to ductal dilation. Examples include pancreas divisum, pancreatic pseudocysts, neoplasms, annular pancreas, various traumas. (2) Toxic factors (medications, ethanol), (3) Pancreatitis related to systemic diseases - hyperlipidemia, cystic fibrosis, lupus, IgG4 disease, among others. (4) Hereditary pancreatitis, determined by mutations that lead to the early activation of pancreatic enzymes.

Recurrent episodes of pancreatitis lead to inflammatory processes that change the anatomy and incur on a gradual loss of endocrine and exocrine functions. Main presentations are abdominal pain, diarrhea, diabetes mellitus, and undernourishment. In childhood, the incidence is about 0.5 cases per 100,000 people per year, often presenting as intractable abdominal pain that requires frequent hospitalizations[1]. According to the International Study Group of Pediatric Pancreatitis: In Search for a Cure (INSPPIRE), chronic pancreatitis is defined as "the presence of typical abdominal pain, exocrine insufficiency, or endocrine insufficiency, along with imaging findings"[1].

Regardless of the cause of chronic pancreatitis - direct obstruction, a tumor or insidious fibrosis resulting from chronic inflammation caused by an autoimmune disease - the pathophysiology of pain and exocrine insufficiency is generally caused or exacerbated by the dilation of the main pancreatic duct[2]. Furthermore, increased pressure in the excretory system may lead to duct rupture, contributing to complications such as pseudocysts or pancreatic ascites. Concurrently, stagnation of pancreatic fluid also favors the formation of calculi, which are often found in dilated ducts.

Thus, decompressing the pancreatic duct through surgery has been a strategy used to alleviate pain and prevent the loss of endocrine and exocrine function caused by chronic pancreatitis[1,2]. The procedure has been described since the early 20th century, with continuous improvements in techniques over the years. In children, the most common procedure is an adaptation made by Partington of the lateral pancreaticojejunostomy originally described by Puestow[2]. The minimally invasive treatment is the main line of approach today however. With the surgical treatment coming as a last option or in case of failed clinical treatment.

This article describes the evolution and improvement in quality of life of 5 patients with chronic pancreatitis submitted to early pancreatic diversion. It accounts for the experience in the Pediatric Surgery Unit of São Paulo University Medical School Children's Institute (ICr) with pancreatic diversion in anatomically altered pancreas.

METHODS

Study design

A retrospective study, with revision of medical records. It describes quality of life improvement after pancreatic diversion.

In this study, quality of life improvement was considered improvement in pain pattern, decrease in the number of acute pancreatitis events and preservation of endocrine and exocrine function.

Study location and period

Pediatric Surgery Unit of São Paulo University Medical School Children's Institute from 2019 to 2024.

Study population and eligibility criteria

All patients submitted to pancreatic diversion in the service in the last 5 years (between 2019 and 2024) and with clinical records were eligible for the study. There

were 6 patients submitted to pancreatic diversion, and 5 of them had a medical record within the digital system. There was a considerable small sample size due to the rarity of the condition approached in this study.

Of the cases which were included in the present study, we have patients with the following conditions: pancreatic pseudocyst (1 patient), Frantz Tumor (1 patient) and Pancreas Divisum (3 patients).

Data analysis

We analysed demographic data (age, gender) and medical records from previous hospitalizations, the period of which the surgical treatments took place, and outpatient consultations, to evaluate clinical status post-treatment.

Ethical and legal aspects of the research

According to Resolution No. 510, of April 7, 2016 of the Brazilian National Health Council3, studies that use previously collected and properly anonymized data do not require submission to the ethics committee. Since our study is a retrospective, observational, descriptive, non-interventionist study and uses exclusively anonymized data from previous records, approval by the ethics committee is not necessary.

RESULTS

Table 1. Main data of the operated patients

PATIENT	1	2	3	4	5
Diagnosis	Pancreatic Pseudocyst	Pancreatic Tumor (Frantz)	Pancreas divisum with recurrent pancreatitis	Pancreas divisum with chronic pancreatitis	Tortuous and dilated Wirsung Duct (5,5 mm) and Pancreas Divisum
Surgical Procedure	Pancreatic-Enterostomy	Partial pancreatectomy + Pancreatic Diversion	Tail pancreatectomy + Pancreaticojejunostomy (Puestow)	Pancreatectomy + Pancreatic Diversion	Pancreaticojejunostomy (Puestow)
Age at Procedure	4 years	15 years	4 years	5 years	7 years
Previous Clinical Presentation	Persistent vomits post-drainage	Abdominal mass, epigastric pain for 2 years	Abdominal pain related to eating for 2 years	Abdominal pain and diarrhea for 1 month	Abdominal pain, vomits and diarrhea, recurrent since 1 year old
Post-surgery symptoms	Complete remission	Pancreatic fistula with conservative treatment with drains and complete remission after	Complete remission	Improvement in abdominal pain pattern and decrease in episodes of pancreatitis	Complete remission
Post-surgery pancreatic function*	Preserved	Preserved	Preserved	Mostly Preserved**	Preserved
Follow-up time	15 days	2 years and 7 months	20 days	2 years	1 month

*We used the analysis of each patient's clinical history during follow-up to assess pancreatic function, assuming the maintenance of exocrine and endocrine function based on the absence of diarrhea, steatorrhea, changes in weight and height gain. Development of diabetes mellitus (DM) was excluded in all cases by normal serial glucose levels.
**We analysed pancreatic function by looking through symptoms of endocrine secretion dysfunction and exocrine secretion dysfunction. Although this patient has steadily improved and presents no symptoms by the time of analysis there is data of slight restriction in his diet in the last medical record.

CASE PRESENTATION

Case1

A 4-year-old female child, previously healthy, sought medical attention at another facility due to recurrent vomiting. Imaging revealed a pancreatic pseudocyst. She underwent drainage of the pseudocyst in January 2020, but her symptoms did not resolve, and she continued to receive clinical follow-up. She sought medical attention again due to persistent symptoms at another facility in December 2020 and underwent a new abdominal computed tomography (CT) scan on December 8, 2020, which showed the persistence of the pancreatic pseudocyst. On December 15, 2020, she was admitted to ICr. The drainage of the cyst and antimicrobial therapy were performed on December 18, 2020. On December 22, 2020, an abdominal ultrasound (USG) was performed, which revealed a cystic image in the epigastric region, with thin walls and content exhibiting fine debris in suspension and gas foci. On December 28, 2020, she underwent Roux-en-Y cystic-entero-anastomosis, establishing an anastomosis between the jejunum and the cyst, with satisfactory evolution. She was discharged on January 5, 2021.

Follow-up: This patient was lost to follow-up, being accompanied only for 15 days as it missed the clinical appointment. When the clinical record was analyzed, it was noted that the family comes from another city, and were transferred to ICr only to receive surgical treatment. In the immediate post operative, it was noted that the pain pattern improved drastically without any complication. However, we miss data about pancreatitis episodes afterwards. We also searched in the history of the emergency department which had no findings.

Case 2

A 16-year-old female, previously healthy, presented to ICr on June 7, 2021, with complaints of an abdominal mass associated with pain in the epigastric region and the right lateral side for 2 years, without other associated symptoms. Over the past 4 months, she experienced progressive growth of the mass and worsening of the pain. She underwent investigation with a computed tomography (CT) scan and magnetic resonance imaging (MRI) of the abdomen, which revealed a well-defined expansive lesion with cystic areas and internal bleeding, showing heterogeneous and progressive enhancement, with an apparent origin in the head of the pancreas, accompanied by mild ectasia of the biliary ducts and main pancreatic duct upstream, as well as extrinsic compression of vascular structures. Surgical intervention was indicated and performed on June 17, 2021, resulting in complete resection of the lesion. The patient underwent a partial pancreatectomy, removing approximately 50% of the pancreas, with a Roux-en-Y pancreatic diversion at the tail of the pancreas. The patient developed a pancreatic fistula, and conservative treatment with drainage was chosen. She was discharged on June 28, 2021. The pathological diagnosis of the lesion confirmed a diagnosis of solid pseudopapillary tumor of the pancreas (Frantz tumor).

Follow-up: This patient presented pancreatic fistula in the post operative but didn't need any further procedures, as it was treated with a Jackson Pratt drain and it proved to be efficient. She remained on a low-fat diet until August 18th of 2021. After that, a general diet was released. After six months of surgical follow-up, the patient was discharged and remained with the oncology department. In the records, it has been observed the resolution of the pain, with no new pancreatitis episodes and no diet restrictions, and an expected weight gain. The patient continues to be evaluated by the oncology team, with periodic laboratory tests and abdominal ultrasound at intervals of approximately six months.

Case 3

A 4-year-old female child, with a history of nonspecific abdominal pain since 18 months of age, associated with eating. She denies nausea or vomiting. She reports episodes of jaundice that were investigated with abdominal ultrasound, but no diagnostic clarification was obtained. An endoscopic retrograde cholangiopancreatography (ERCP) was performed on August 31, 2021, which revealed a condition of pancreas divisum and chronic pancreatitis with calculi. Given the findings, the patient was hospitalized for a pancreaticojejunostomy and caudal pancreatectomy on September 23, 2021, and was discharged on September 29, 2021.

Follow-up: Patient lost to follow-up soon after the surgery. In the time the patient remained in the hospital, we observed an immediate improvement in the pain pattern with no complications recorded. When the clinical record was analyzed, it is stated that the patient was discharged to his home state where he would do the follow-up and stay in touch through phone with the hospital if required. We have no further information about him after the discharge, however, it was found no data about new pancreatitis episodes or abdominal pain after the procedure in the records of the emergency department.

Case 4

A 5-year-old male child, with a history of recurrent pancreatitis since December 2021, is under investigation for autoimmune pancreatitis. He was admitted to an external service for treatment and diagnosed with pancreas divisum and chronic pancreatitis. On September 24, 2022, he presented again with abdominal pain, vomiting, jaundice, diarrhea, and respiratory symptoms, without fever. Upon admission, tests revealed a significant increase in amylase and lipase levels, as well as dilation of the pancreatic duct and signs of inflammation on abdominal ultrasound. During hospitalization, pancreatitis was treated, and he underwent pancreatic Roux-en-Y diversion surgery on October 5, 2022, resulting in improvement of his condition.

Follow-up: This patient exhibited abdominal pain and recurrent diarrhea for 1 month after the procedure. The pain pattern improved with good response to analgesics at home, with no need to go to the emergency department. The gastrointestinal pattern also returned to normal. During the 2 years of follow-up, it presents a total of 5 episodes that led him to the emergency department. However, in comparison to his previous records, we saw a decrease in frequency and severity of each episode with shorter periods of hospitalization. Furthermore, in these 2 years, he presented slow improvement in the diet tolerance. The most recent medical record states a slight restriction to the amount of protein intake, maintaining expected weight gain for age.

Case 5

An 8-year-old male child began experiencing recurrent vomiting and diarrhea at the age of 1 year old, requiring multiple hospitalizations due to dehydration. In January 2023, he was admitted to an external facility and diagnosed with acute pancreatitis. During his evaluation at ICr an ultrasound revealed a tortuous and dilated Wirsung duct (diameter of 5.5mm) with no obstructive factor present, and a magnetic resonance cholangiopancreatography (MRCP) also showed irregular dilation of the Wirsung duct extending to the head of the pancreas. Consequently, the patient was diagnosed with pancreas divisum. He underwent laparotomy on August 7, 2024, with a transverse supraumbilical incision and surgical dissection, finding the pancreas to have a hardened consistency. After sectioning the tail of the pancreas, a dilated Wirsung duct was observed (Image 1), consistent with previous exams. The procedure continued with the longitudinal opening of the entire pancreatic parenchyma, exposing the main pancreatic duct. This enabled the performance of a subsequent entero-enteral anastomosis followed by a pancreaticojejunostomy, thus characterizing the procedure as Roux-en-Y pancreatic diversion positioned transmesocolically (images 2 and 3).

Follow-up: This is the most recently operated patient in our service. During the immediate postoperative period until discharge, the patient showed complete

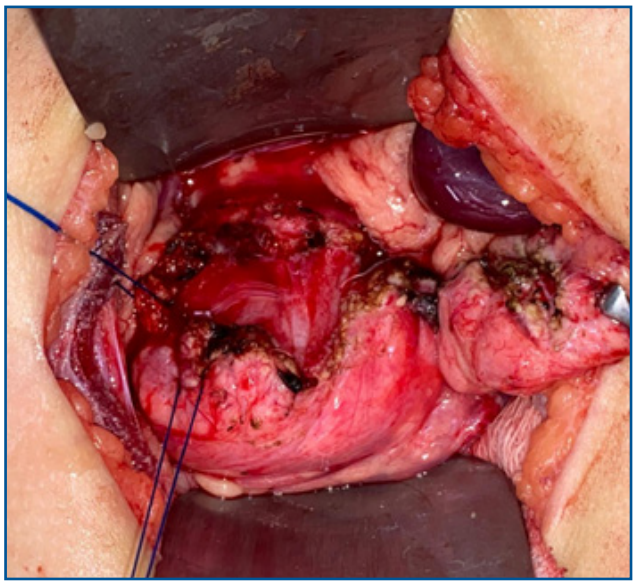

Image 1: Overview of the abdominal cavity of the patient with visualization of the section of the Wirsung duct of the pancreas

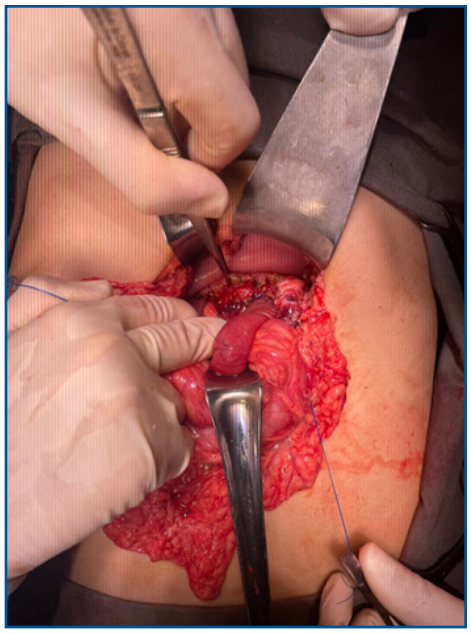

Image 2: Anastomosis of the posterior portion of the duct with the duodenum

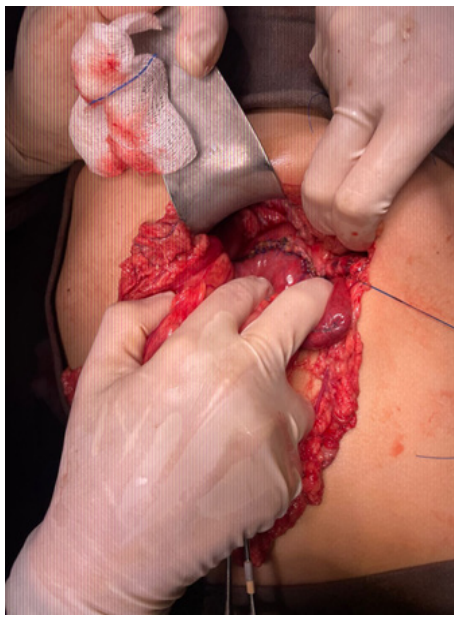

Image 3: Completed Roux-en-Y Pancreatic Diversion

improvement in the pain pattern without any complications. He was evaluated in an outpatient consultation after one month with no reported complaints. In order to find further information, we looked through the emergency department history and found no records that the patient sought the service for abdominal pain or acute pancreatitis episodes.

Description of the surgical technique: Puestow surgery

The main indications for pancreaticojejunostomy are to treat segmental stenosis of the pancreatic duct associated with ductal dilation. The primary etiology is alcoholic pancreatitis, but chronic pancreatitis is also included in this context, as discussed in this article. In these cases, surgery allows not only the drainage of pancreatic juice into the intestinal tract but also the rest of pancreatic acini affected by ectasia and dilation, enabling their regeneration[4].

The abdomen is accessed via a transverse supraumbilical laparotomy or a Chevron incision. Surgical dissection is performed, along with ligation of the omental and epiploic vessels found nearby, until the pancreas is accessed. At this point, it is necessary to free the anterior surface of the pancreas, which may be adherent to the stomach due to the inflammatory process. Palpation of the dilated duct is possible, but another common study is intraoperative ultrasound to confirm its exact position, as well as puncture and aspiration with a needle to verify its location[2]. Based on these findings, the best surgical approach can be determined, which, regardless of the situation, will involve the creation of a Roux-en-Y, whereby the distal segment of the jejunum is brought retrocolically to the pancreatic area. The loop is opened and positioned over the pancreas, oriented with its free end facing the tail of the pancreas.

With the loop prepared, the most commonly performed procedure is broad excision of the anterior wall, as recommended, due to the high prevalence of stenosis and calculi in these patients. Regarding the anastomosis, the literature presents a variety of options, with the main techniques being single-layer suturing with separate 4-0 absorbable sutures passing through the edges of the pancreatic duct and jejunum, anterior and posterior[4], and two-layer pancreaticojejunostomy. The latter is performed in the following steps: first, a series of sutures are placed to approximate the seromuscular layer of the jejunum and the pancreatic capsule in the posterior plane. With the structures closely approximated, the anastomosis is created between the jejunal wall through its entire thickness and the duct edge, including the ductal mucosa in the anterior and posterior planes. After the anastomosis, reinforcement is achieved with the anterior suture line between the seromuscular layer of the jejunum and the pancreatic capsule. Finally, an omental flap is used to cover the entire pancreaticojejunostomy[2].

DISCUSSION

Patients with chronic pancreatitis develop significant dilation of the Wirsung duct. This can occur due to primary or secondary obstruction resulting from chronic inflammation, fibrosis, or scarring[2]. Obstruction to flow leads to an increase in intraductal pressure, which is one of the mechanisms perpetuating pain in these patients.

It is primarily due to this pathophysiological fact that most patients with chronic pancreatic conditions experience significant relief from previous pain after surgery. However, long-term results mainly depend on the underlying cause of chronic pancreatitis and whether the triggering factor persists after surgery.

Surgery is, however, not considered a first-line treatment for chronic pancreatitis. In a collaboration between the European Pancreatic Club and the Hungarian Pancreatic Study Group, a consensus guideline on pancreatitis states that surgical intervention may be indicated for children with chronic pancreatitis after first failing conservative or endoscopic treatment, specially if pain is persistent and acute episodes are recurrent[5]. However, pain is the strongest predictor of poor quality of life[6].

Chronic pancreatitis has a significant impact on the quality of life of patients. In a study at Primary Children's Medical Center in the University of Utah, the study demonstrated significantly lower health-related quality of life (HRQOL) and higher fatigue in patients with chronic pancreatitis in comparison to healthy children. Among the factors evaluated by the scales, HRQOL included physical health, psychosocial health, emotional functioning, social functioning, school functioning; and fatigue included: general fatigue, cognitive fatigue and sleep/rest fatigue[7].

In a prospective cohort evaluating HRQOL at the University of Minnesota, nineteen consecutive pediatrics patients with chronic pancreatitis were treated with total pancreatectomy and islet autotransplant and had an improvement in HRQOL[8]. Even though it constitutes a different surgical approach to the diversion surgery performed in the cases in the present study, this shows that surgery impacts on quality of life.

There is, in contrast, a lack of evidence comparing improvement in quality of life between the possible treatment options, including surgery, endoscopic and clinical treatment. Taking that into account, it is essential to understand the possible etiologies of chronic pancreatitis in pediatric patients in order to choose the most adequate treatment to improve quality of life in each clinical case.

A pancreatic pseudocyst (PP) is a fluid-filled cavity within the pancreas that is not involved by epithelial tissue. In individuals under 18 years old, epidemiology predominantly associates PPs with trauma rather than complications from pancreatitis, given the rarity of the latter in the pediatric population[9].

Conversely, during the follow-up of these PP cases, those of non-traumatic origin require more significant interventions for the management of symptomatic patients. Various approaches are available depending on the location and size of the PP, ranging from endoscopic diversions, pancreatic resections, or drainage procedures[9].

PPs associated with acute pancreatitis arise as a late complication, usually after four weeks. PPs are more prevalent in cases of chronic pancreatitis, with estimates ranging from 5% to 17%10. In these cases, conservative management may be adopted, but in patients with

significant ductal dilation associated with PPs, drainage procedures are proven to be beneficial[11].

In Case 1, the patient presented with a symptomatic pseudocyst despite multiple endoscopic drainages and diversion attempts. The proposal for a drainage procedure was considered in this scenario due to the treatment's refractoriness, aiming for cyst resolution and improved pancreatic prognosis. The patient experienced significant improvement post-operatively; however, long-term follow-up at the hospital was not feasible due to missed scheduled appointments, likely due to being from another city. Regardless, the patient did not present any new visits to the hospital emergency department.

In some cases of pancreatitis associated with pancreatic pseudocyst, Endoscopic retrograde cholangiopancreatography (ERCP) does not prove to be effective[12]. Therefore, surgical management in experienced services stands out as a possibility for the treatment of these patients, aiming to improve the quality of life of patients refractory to minimally invasive measures.

The Frantz tumor was originally described in 1959 as "a papillary tumor of the pancreas, benign or malignant," and it is a rare condition that most commonly affects young women. It was later renamed by the World Health Organization as solid pseudopapillary tumor and has a low-grade of malignancy; however, it may progress to metastasis in the peritoneum and regional lymph nodes[13]. This condition is even rarer in children, with a literature revision by A. Raffel in 2004 estimating 111 cases by that point in time[14].

Symptoms are usually related to the size of the tumor and compression of adjacent organs, presenting with abdominal discomfort, nausea, and weight loss. Tumors located in the pancreatic head tend to evolve with earlier symptoms, including a palpable mass on physical examination. This is exemplified in a case report by Spătaru RI *et al*, as a patient with Frantz tumor presented with acute abdominal pain, apparently due to a minor abdominal trauma, palpable mass in lower abdomen and a 12/12cm retroperitoneal mass15. In contrast with Case 2, presented in our study, the first patient had the tumor resected without sacrificing pancreatic tissue and therefore did not need pancreaticojejunostomy like the latter.

Diagnosis is typically made via imaging, such as computed tomography (CT) or magnetic resonance imaging (MRI), which reveals an encapsulated mass with solid and cystic components.

Nonoperative treatments are not a reasonable option for Frantz tumor. Campanile *et al*.[16], in a descriptive study, demonstrated that the median survival of patients with incomplete tumor resection was 5.7 years, a value considered unacceptable for the pediatric age group in which this tumor occurs. If even more conservative surgery is inadequate for this disease, treatments other than complete resection of the lesion should not be routinely attempted.

The only curative treatment is surgical excision, and the type of procedure varies according to the lesion's location. Lesions in the pancreatic head tend to be treated with duodenopancreatectomy, while caudal lesions are treated with distal pancreatectomy. Complications from surgery may include pancreatic fistula, bleeding, infection, or delayed gastric emptying. The role of adjuvant chemotherapy and radiotherapy in unresectable cases is still under debate. The prognosis is good, even in metastatic cases[13,17].

Case 2 observed in this study followed the patterns noted in the literature concerning clinical presentation and imaging findings. The proposed treatment, involving caudal and body pancreatectomy along with pancreaticojejunostomy, aimed to do the resection of the lesion, preserve pancreatic function, and remit symptoms, given that significant dilation of the main pancreatic duct was already evident. The diversion, therefore, aims to prevent complications possibly related to existing ectasia, reducing the risk of symptom recurrence and the need for future surgical interventions. The patient is under follow-up with the oncology team, with periodic ultrasound examinations, remaining asymptomatic since the surgical treatment.

Finally, Pancreas Divisum (PD) is the most common congenital anatomical alteration, observed in 5% to 11% of the population18. It results from a failure in the fusion of the dorsal and ventral ducts. This primarily leads to the ventral duct draining into the major papilla, while the longer dorsal duct drains into a smaller papilla.

It is believed that a long duct draining into a relatively smaller papilla would generate greater ectasia and intraductal pressures, potentially predisposing patients to abdominal pain and recurrent pancreatitis. However, among patients with PD and ductal dilation, most are asymptomatic, raising questions about the exact pathophysiology of PD and chronic pancreatitis (CP).

Given our main hypothesis for the pathogenesis, first-line treatment has been established as an endoscopic approach to dilate this smaller papilla or to cannulate it with a stent.

Recent studies that explore other interventions for pancreas divisum have been included for comparison with pancreaticojejunostomy. In patients with pancreas divisum which were submitted to ERCPs, a follow-up telephone survey was arranged with similar criteria of the present study, regarding pancreatitis recurrences and ongoing pancreatitis-type symptoms. 25% (5/20) of those patients had resolved pancreas symptoms, with a median phone survey follow-up time period of 20 months, 2 of those patients having been submitted to only one ERCP and 3 of them being submitted to 2 ERCPs. 40% (8/20) had an improvement in symptoms, with a median follow-up time of 35 months, and the number of ERCPs ranged from 1 to 419.

In regards to surgical treatment for pancreas divisum and its complications, in a study by Neblett W W 3rd *et al.*, 8 patients with complete pancreas divisum were submitted to different surgical interventions. Accessory sphincteroplasty plus major sphincteroplasty/ cholecystectomy was performed in 2 patients, with 1 excellent result and 1 failed result. Accessory sphincteroplasty alone was performed in 5 patients, of which 1 had an excellent result following stenting, 1 had an improvement in quality of life, 1 lost to follow-up and 2 failed proceeding to Puestow Surgery.

Longitudinal pancreaticojejunostomy was performed in 3 patients. The 2 patients submitted to this procedure after the failed sphincteroplasty had improvements in quality of life, and 1 patient, being primarily submitted to pancreaticojejunostomy, had an excellent result[20]. Despite having a low study count, the patients submitted to pancreaticojejunostomy had only positive results, in comparison with other surgical procedures, which resonates with the findings in the present study.

In Cases 3, 4, and 5 presented above, our patients already exhibited significant structural changes in the pancreas with signs of calcification on imaging and distortion of the pancreatic duct anatomy. Thus, our patients benefited from the surgical approach of pancreatic diversion (PD)[21,22]. It is noteworthy that follow-up for Case 3 took place in the patient's home state, and it was not possible to follow this case over a longer period. In Case 4, where we had a longer follow-up, although complete remission was not achieved, the patient showed significant improvement in pain patterns and a reduction in the frequency and intensity of pancreatitis episodes. Finally, Case 5 represents the most recent surgery, with the patient being followed for one month post-operatively. To date, there have been no spontaneous visits to the emergency department following the procedure.

Limitations: a descriptive study with a small sample does not provide quantitative statistical analyses. The study also does not include comparisons with other therapeutic modalities (conservative or minimally invasive treatment) within the same service. Also, 2 of all patients were lost to follow-up probably because of distance from the city of origin, which leaves us without knowing if they are evolving well.

Strengths: study that monitors patients with rare conditions, not very frequent in the literature, with specialized treatment in a national reference center, demonstrating good results for complex and infrequent diseases. In addition, it can serve as an initial basis for further investigations.

CONCLUSION

In all of the 5 patients included, results of post-operative and clinical follow-up showed remission in symptoms with low complications and general improvement in quality of life. Notwithstanding having a low count of patients included, this study shows positive results regarding the pancreatic diversion as a surgical treatment for diverse pancreatic affections in pediatric patients.

Conflicts of Interest:

there are no conflicts of interest amongst the authors of this research.

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Resumo

Introdução: a pancreatite crônica em crianças é uma condição rara, com múltiplos fatores etiológicos organizados em quatro grupos: obstrutivos, tóxicos, relacionados a doenças sistêmicas e hereditárias. Apesar de uma lacuna na literatura, a derivação pancreática tem se mostrado eficaz na gestão dos sintomas e na preservação da função pancreática exócrina e endócrina.

Objetivo: este artigo busca demonstrar em pacientes com pancreatite crônica com alteração anatômica significativa a melhora na qualidade de vida por meio do acompanhamento e evolução destes após serem submetidos à abordagem cirúrgica precoce com derivação pancreática.

Método: análise retrospectiva de 5 casos de pancreatite abordados no serviço de Cirurgia Pediátrica do Instituto da Criança do Hospital das Clínicas da Faculdade de Medicina da Universidade de São Paulo através da técnica de Puestow em conjunto com uma breve revisão das etiologias apresentadas.

Resultado: as crianças sobreviveram ao procedimento de derivação pancreática, com 1 caso apresentando fístula pancreática, com boa evolução em pós-operatório e sem sequelas observadas no seguimento.

Conclusão: a intervenção cirúrgica com derivação pancreática se mostrou como um tratamento eficaz, capaz de remitir a dor e prevenir complicações associadas à insuficiência pancreática.

Palavras-chave: pediatria, pancreatite crônica, pancreaticojejunostomia.