

Treatment of chronic pancreatitis by laparoscopic DuVal procedure: report of a pediatric case

Tratamiento de la pancreatitis crónica mediante el procedimiento de DuVal laparoscópico: reporte de un caso pediátrico

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Abstract

Background: Pancreatitis is rare. Obstruction is common. They can be corrected with endoscopy, if they fail they need surgery.

Case report: We reported a patient with pancreatitis secondary to pancreas divisum, laparoscopic DuVal shunt was performed. Male 12 years, multiple pancreatitis pictures and failed sphincteroplasty attempts. Colangio resonance showed pancreas divisum. A DuVal-type shunt was built for laparoscopy. Follow-up 5 years. There has been no recurrence of pain and lipase was normalized at 6 months. The pancreatic duct was not dilated, in the face of difficulty making a lateral anastomosis was used the technique proposed by DuVal by laparoscopic approach.

Keywords: Chronic pancreatitis. DuVal procedure. Laparoscopy.

Resumen

Antecedentes: La pancreatitis es una enfermedad rara. La obstrucción es común y se puede corregir con endoscopia; si fracasa, necesitará cirugía. **Caso clínico:** Reportamos un paciente con pancreatitis secundaria a páncreas divisum. Se realizó derivación tipo DuVal laparoscópica. Varón de 12 años, con múltiples cuadros de pancreatitis y fallidos intentos de esfinteroplastias. La colangiorresonancia mostró páncreas divisum. Se realizó una derivación tipo DuVal por laparoscopia. Seguimiento de 5 años. No ha habido recurrencia del dolor y la lipasa se normalizó a los 6 meses. El conducto pancreático no estaba dilatado. Ante la dificultad para hacer una anastomosis lateral se utilizó la técnica laparoscópica propuesta por DuVal.

Palabras clave: Pancreatitis crónica. Procedimiento de DuVal. Laparoscopia.

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Introduction

Pancreatitis is a relatively rare disease in pediatric patients; its incidence is estimated at 1 per 50,000 children¹. In the chronic form, the pancreatic parenchyma is destroyed and replaced by fibrous tissue². It is characterized by recurrent episodes of severe pain and other symptoms such as diarrhea, steatorrhea and diabetes mellitus, which are symptoms secondary to exocrine and endocrine insufficiency³. Etiology is varied, but obstructive causes due to pancreatic duct alterations are the most common^{1,4,5}. This pancreatic flow obstruction increases the pressure of the duct and parenchyma, which causes the characteristic abdominal pain⁶. This symptom is the most common indication for surgical treatment⁷, the purpose of which is to eliminate pain and preserve pancreatic function. In cases with pancreatic drainage anomalies, this can be corrected with endoscopic methods, and if they fail, some type of surgical treatment will be required, which is why it is important for pancreatic ductal anatomy to be known⁸. From 5% to 20% of patients with pancreatitis have anatomical abnormalities, with the most common being pancreas divisum⁹. Pancreas divisum is an embryonic anomaly of the pancreatic ducts resulting from a failure of the dorsal and ventral pancreatic ducts to fuse¹⁰, which was described by Opie in 1903¹¹. Although its relationship with the development of pancreatitis is controversial, there are several reports of its association with this entity¹²⁻¹⁵. When a patient develops pancreatitis with no evidence of another etiology and pancreas divisum is identified, it should be regarded as the cause of this condition and be treated in order to avoid complications¹⁰. The first report of a laparoscopic approach in adults to create a shunt to the jejunum was published in 2004¹⁶. The first report in children of the robotic-assisted performance of a lateral pancreaticojejunostomy was published in 2011¹⁷. Only a few reports of laparoscopic approaches have appeared involving minimally-invasive performance of a lateral pancreaticojejunal anastomosis in children, who have the presence of a dilated pancreatic duct in common^{18,19}. For the performance of this sort of Puestow-type lateral pancreaticojejunal shunts, pancreatic duct dilation is required to exist¹⁹⁻²¹. In 1954, Merlin K. DuVal proposed the performance of an end-to-side pancreaticojejunal anastomosis to decompress the pancreas that does not require pancreatic duct dilation²².

The purpose of this work is to report the case of a pediatric patient with chronic pancreatitis secondary to pancreas divisum, without pancreatic duct dilation, with failure to endoscopic treatment, who underwent a traditional DuVal-type laparoscopic pancreaticojejunostomy, with control of the pancreatic inflammatory process.

Clinical case

Twelve-year-old male with a history of autism, whose condition had started at age 3, with clinical manifestations consistent with acute abdomen, which was documented by exploratory laparotomy, with preoperative diagnosis of acute appendicitis, as abdominal manifestations secondary to acute pancreatitis. Due to a torpid evolution, an open cholecystectomy was practiced 10 days later. Since this event, the patient experienced three to four episodes of acute pancreatitis per year, characterized by severe, disabling pain, with pancreatic enzymes elevation, which required hospitalization, management with narcotics and fasting, with temporary symptom remission. At 8, 9 and 11 years of age, there were three failed attempts at endoscopic sphincteroplasty with pancreatic duct stenting. At 12 years of age, he experienced a new pancreatitis event, with serum amylase and lipase elevation. A simple T2-weighted magnetic resonance cholangiopancreatography showed a partial division of the main pancreatic duct consistent with incomplete pancreas divisum, with Wirsung and Santorini ducts caliber reduction, and with a 5-mm pancreatic duct (Fig. 1). In view of this new relapse, without having been able to stent the pancreatic duct, and given the evidence of this anatomical anomaly, a distal pancreas-to-jejunum shunt was created, with resection of the tail of the pancreas and DuVal-type laparoscopic end anastomosis to the jejunum. The surgical technique was as follows: patient in dorsal decubitus, surgeon positioned between the patient's legs, cameraman to the right and assistant to patient's left; four-port approach (one transumbilical of 10 mm, one of 3 mm at right clavicular midline, another of 5 mm at left clavicular midline and one more of 3 mm at left anterior axillary line); 5-mm and 30° optics, with a pressure of 10 mmHg and 1-L/min insufflation; gastric elevation with percutaneous point, omentum dissection until the pancreas was seen in its entirety, dissection of the tail of the pancreas separating it from the splenic vessels, until it could be dislocated and separated from the pancreatic body (Fig. 2); at 20 cm from the angle of Treitz, the intestine was cut and separated, using an Endo GIA

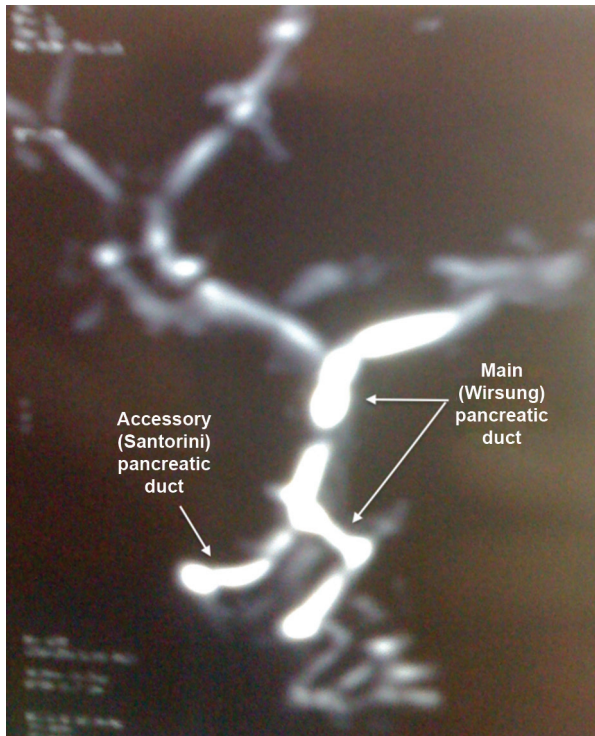


Figure 1. T2-weighted simple magnetic resonance cholangiopancreatography, in which partial division of the main pancreatic duct is observed, which is consistent with an incomplete pancreas divisum, with Wirsung and Santorini ducts decreased caliber, and with a 5-mm pancreatic duct.

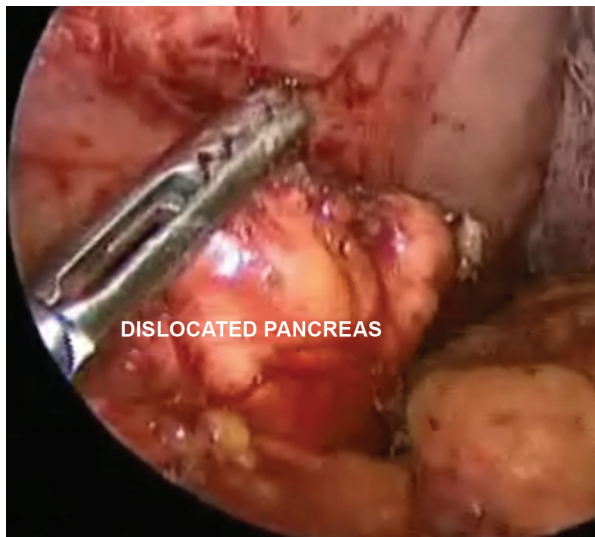


Figure 2. Dislocated pancreatic tail, with splenic vessels being respected.

stapler (Covidien Company, Minneapolis, USA) with a 45-mm cartridge, which was reinforced with a second plane of 2-0 silk continuous suture; the distal jejunal

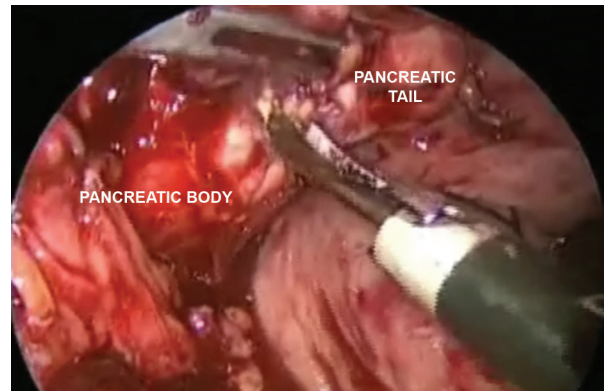


Figure 3. Pancreatic tail resection with harmonic scalpel.

loop was ascended through the colonic mesentery, and the pancreatic tail was resected, incising the pancreatic periphery with harmonic scalpel and the central part with scissors to avoid damaging the pancreatic duct (Fig. 3); the antimesenteric border of the ascended jejunum loop was incised and an end-to-side single-plane anastomosis was performed with 2-0 silk continuous suture (Fig. 4); subsequently, video-assisted single-plane end-to-side en Roux-Y anastomosis was carried out with 3-0 non-absorbable suture.

Surgical time was 163 minutes. The patient evolved without complications, had oral route started at fifth day and was discharged at seventh day. Lipase values had decreased from 1,210 to 400 U/L at discharge. Follow-up was clinical and with laboratory tests for 5 years, with the presence of abdominal pain being evaluated and serum amylase and lipase being determined. There has been no pain recurrence and lipase was normalized at 6 months postoperatively, remaining within normal range for up to 5 years after the operation, with biannual determinations (Fig. 5). Pancreatic activity was assessed with endocrine function, with normal glycemic levels, and exocrine function with tryptic activity and fat determination in stool, which were normal at 5 years. Due to the good clinical and laboratory evolution, no radiological study was deemed necessary. The resected pancreas segment pathology report indicated lobule atrophy with islets of Langerhans disappearance, with protein content within its lumen, with ductal ectasia and moderate interstitial fibrosis, which were findings consistent with chronic pancreatitis (Fig. 6).

Discussion

Chronic pancreatitis treatment will depend on its etiology. Morphology of the pancreatic ducts should be

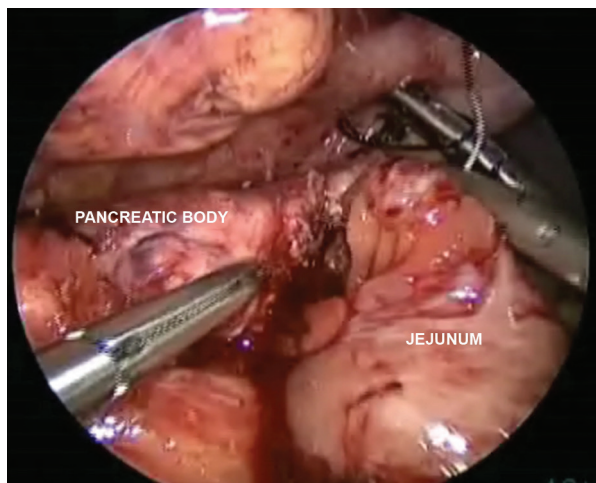


Figure 4. Single-plane anastomosis of the pancreatic body to jejunal loop.

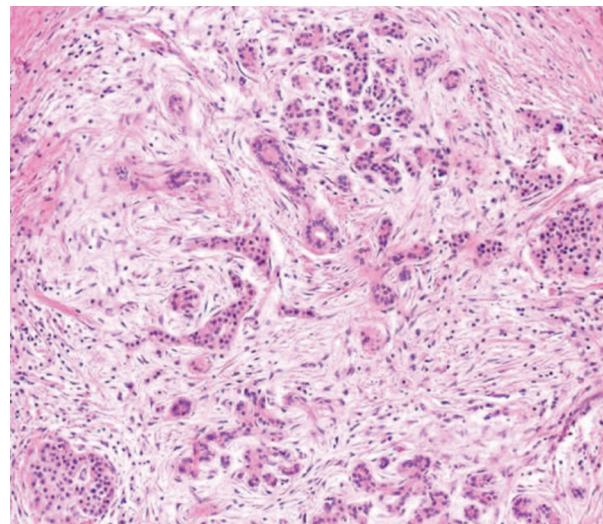


Figure 6. Histopathological image showing lobule atrophy with islets of Langerhans disappearance; findings consistent with chronic pancreatitis.

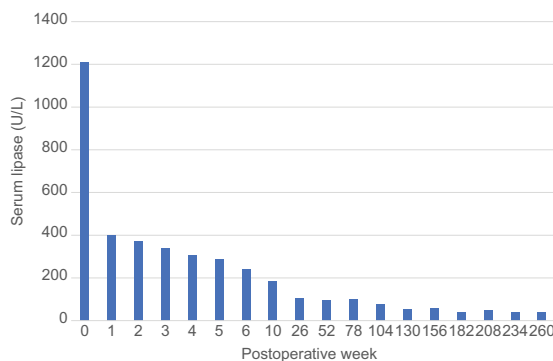


Figure 5. Serum lipase postoperative quantification, with normal figures since postoperative week 5 and without elevations indicating relapse over a 5-year follow-up (normal: 23-300 U/L).

identified by endoscopic retrograde cholangiopancreatography or magnetic resonance cholangiopancreatography. In up to 90% of children, performing an endoscopic retrograde cholangiopancreatography is possible, which, in addition to being diagnostic, can also be therapeutic⁸. Magnetic resonance cholangiopancreatography visualizes both ducts¹¹, which allows the pancreatic duct to be assessed in order to plan the type of treatment. Although there is controversy about the role of pancreas divisum as a cause of chronic pancreatitis, there are several reports indicating that the treatment of this malformation allows the control of the chronic inflammatory condition^{10,12-15}, as it occurred in the presented case. Our patient had the following indications for surgical treatment: intractable pain, pancreatic drainage alterations and failed endoscopic procedures⁷.

There are different surgical treatment options, each one with advantages and disadvantages, which is why the type of treatment should be individualized for each patient^{3,18}. In pediatrics, there are publications with Frey or Puestow techniques carried out with traditional surgery^{19,20}. The procedure that has most frequently been performed is with the Puestow technique, which requires for the duct to be dilated in order to perform a lateral pancreaticojejunal anastomosis. In our patient, the pancreatic duct was not dilated, which is why total pancreatectomy had been considered for symptom control; however, considering that performing this procedure, even with pancreatic islet transplantation, entails a possibility of requiring insulin of up to 58.7%, in addition to experiencing exocrine insufficiency for life^{21,22}, in a patient with autism, and given the technical difficulty for locating the duct, which was not dilated, which would complicate a lateral anastomosis to the jejunum, we decided to use the technique proposed by DuVal²³. A resection of the tail of the pancreas up to the body was performed, with pancreas-to-jejunum end anastomosis, with splenic circulation preservation, which could be carried out by laparoscopy. This technique also has the advantage that it resects an area where fibrosis is expected to occur, as demonstrated by the histopathological report, in addition that it is possible to confirm jejunal shunt patency by endoscopic retrograde cholangiopancreatography several years after surgery²³. There are very few reports of these procedures in children using minimally-invasive approaches. In this case, the

laparoscopic approach was possible, despite previous operations, which allowed a suitable dissection of the splenic vessels and the pancreas, enabling the creation of a functional drainage to the jejunum, without leaks or fistulas, with preservation of the spleen.

We expect to have a follow-up evaluation at 5 years in order to have the certainty that there is control of pancreatic inflammatory processes. In addition, in case of relapse, there is always the option of performing some other procedure, such as Puestow's or Frey's²⁴⁻²⁶, before considering the option of complete resection of the pancreas in a child with autism.

Pancreas divisum is an important cause of recurrent pancreatitis in children, and it should be identified in patients who experience more than one episode of pancreatitis^{15,16}. Surgical treatment is aimed at relieving pancreatic duct obstruction; when this is not possible by placing a stent, as it occurred in our patient, a shunt from the pancreas to the jejunum should be carried out^{10,14}. When there is pancreatic duct dilation, a Puestow-type shunt can be performed²⁰; however, if the duct is not dilated, the DuVal-type approach is a good option²².

In this patient, performing this pancreatojejunal shunt procedure by minimally invasive surgery was feasible, with no incidents, with adequate long-term control of the disease and preserving the already known advantages of laparoscopy. However, a larger number of cases are needed for the laparoscopic DuVal procedure to be validated.

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Conflicts of interest

The authors have no conflicts of interest to declare.

Ethical disclosures

Protection of human and animal subjects. The authors declare that the procedures that were followed adhered to the ethical standards of the responsible committee for experimentation on human beings and were in agreement with the World Medical Association and the Declaration of Helsinki.

Confidentiality of data. The authors declare that they have followed the protocols of their work center on the publication of patient data.

Right to privacy and informed consent. The authors have obtained informed consent from the patients and/or subjects referred to in the article. This document is in the possession of the corresponding author.

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