

# Laparoscopic Partial Pancreatectomy in a Patient with Pancreas Trifurcation and Recurrent Acute Pancreatitis

Marcel Autran Machado, Tiago Basseres, Rodrigo C Surjan, Fabio F Makdissi

Department of Surgery, University of Sao Paulo, Brazil

## ABSTRACT

**Introduction** Embryologically the pancreas develops by the fusion of dorsal and ventral pancreatic elements. The ventral pancreatic bud gives rise to part of the head and uncinata process, while the remainder of the head, body, and tail of the pancreas develops from the dorsal pancreatic bud. Failure in this process may result in pancreatic duct variation. Several types have been described, including bifid pancreatic duct, ectopic pancreas and duplication anomaly. To our knowledge, pancreatic trifurcation has never been described so far. **Aim** To present a video of a laparoscopic partial pancreatectomy resection in a patient with trifurcation of pancreas and intermittent acute pancreatitis. **Methods** A forty-year-old woman suffering from intermittent episodes of acute pancreatitis with first onset at 2-years of age with multiple surgical interventions for abdominal abscess drainage until puberty when severity and number of episodes decreased. Three years ago, she experienced a new episode of severe acute pancreatitis with prolonged hospitalization and since then intermittent episodes. MRI revealed an anomalous pancreas with three pancreatic ducts. One of them with signs of obstruction and pancreatitis. Laparoscopic resection of the diseased pancreas was proposed. Results Operative time was 150 minutes. Blood loss was minimum. Recovery was uneventful and patient was discharged on the 4th postoperative day. Final pathology showed no signs of malignancy. Patient is well with no sign of the disease 12 months after operation. **Conclusion** Although anomaly of the pancreatic duct is extremely rare, this case should alert clinicians to be aware of such an anatomical variant that may alter the flow characteristics in the pancreatic ductal system resulting in an increased risk of relapsing episodes of acute pancreatitis. Our patient received the correct diagnosis only 38 years after the first episode of acute pancreatitis.

## INTRODUCTION

Congenital anomalies of the pancreatic duct and the pancreas are very unusual findings [1-3]. These anomalies may not be detected until adulthood and are often just an incidental finding in asymptomatic patients. Embryologically the pancreas develops by the fusion of dorsal and ventral pancreatic elements. The ventral pancreatic bud gives rise to part of the head and uncinata process, while the remainder of the head, body, and tail of the pancreas develops from the dorsal pancreatic bud [1]. Failure in this process may result in pancreatic duct variation. Several types have been described, including bifid pancreatic duct, ectopic pancreas and duplication anomaly [1-3].

We describe herein a trifurcation of the pancreas tail in a patient with recurrent episodes of acute pancreatitis since childhood that was not diagnosed until adulthood. To our knowledge, pancreatic trifurcation has never been described so far.

## PATIENT AND METHODS

A forty-year-old woman suffering from intermittent episodes of acute pancreatitis with first onset at 2-years of age with multiple surgical laparotomies for abdominal abscess drainage until puberty when severity and number of episodes decreased. She remained asymptomatic until three years ago when she experienced a new episode of severe acute pancreatitis with prolonged hospitalization. Since then presented intermittent episodes of acute pancreatitis ranging from mild to moderate severity. MRI revealed an anomalous pancreas with trifurcation of the pancreatic tail along with the presence of three pancreatic ducts. One of them with signs of obstruction and pancreatitis. Laparoscopic resection of the diseased pancreas was proposed.

At laparoscopy, there were multiple adhesions from previous operations. These adhesions were carefully divided. Opening of the lesser sac is performed and anterior surface of the pancreas is exposed. At this point, we can see the distal pancreas duplicated and a third diseased pancreas is identified running from the body of the pancreas in direction to the stomach. Complete mobilization of the duodenum and head of the pancreas is performed with Kocher maneuver. This step is essential to evaluate pancreatic anatomy. Diseased pancreas was carefully dissected. Cleavage plan between diseased pancreas and remaining pancreas is identified and dissected. Dissection progresses and diseased pancreas

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**Correspondence** Marcel Autran Machado

Department of Surgery

University of Sao Paulo, Rua Dona Adma Jafet 74 cj 102

SAO PAULO, Sao Paulo 013208050

Brazil

**Phone** +551132564098

**Fax** +551132598231

**E-mail** dr@drmarcel.com.br

can be isolated. Distal part of the diseased pancreas is carefully dissected towards the stomach, where there is no plan of cleavage. The plan is to remove this diseased pancreas, dividing the proximal and distal part with stapler. The distal part of the diseased pancreas is divided with stapler, at the level of the stomach and the proximal part is divided with stapler using a bioabsorbable staple line reinforcement. Resection of the diseased pancreas is completed and surgical specimen is removed through umbilical port, inside a plastic retrieval bag. Abdominal cavity is reviewed for bleeding and it is drained.

## RESULTS

Operative time was 150 minutes. Blood loss was minimum. Recovery was uneventful and patient was discharged on the 4th postoperative day. Final pathology showed no signs of malignancy. Patient is well with no more episodes of acute pancreatitis 18 months after operation.

## Discussion

The development of pancreatic anatomical anomalies has not been studied thoroughly. Normal embryologic development of the pancreas is thought to begin approximately 5 weeks after fertilization [2, 3]. Two outgrowths of mesoderm from the foregut that represent the ventral and dorsal pancreas. The dorsal pancreas rotates, and approximately 8 weeks after fertilization, the two parts merge to form the pancreatic gland. The ventral part gives rise to most of the pancreatic gland in humans. Initially it has two lobes with two primitive ducts. One duct eventually develops to become the main pancreatic duct. The other lobe and duct regress and represent the uncinate process of the developed pancreas [1, 2].

Two variants of malformation are usually identified. The first group, migration anomalies, includes ectopic pancreas and annular pancreas. Ectopic pancreas forms when inappropriate migration of portions of the pancreas allow seeding of adjacent structures and is most commonly found in the stomach. Failure of these prepancreatic buds to rotate fully results in annular pancreas, in which the head of the pancreas completely encircles the duodenum. The second group, fusion anomalies, represents failure of the dorsal bud to merge successfully with the duct of Santorini and the ventral bud with the duct of Wirsung, resulting in pancreas divisum [2, 3].

However, an even rarer third type of anomaly can occur and affect the number and form of main pancreatic duct. Number variations occur when more than one primary channel forms. Bifid duct is a form of this rare number variation anomaly. Its incidence is not known, especially due to the fact that this kind of malformation may not have clinical importance [2].

In the present case we describe not only a unique case with number variation of the pancreas but also a case with recurrent acute pancreatitis episodes due to this anomaly. We identify that the bifid tail of the pancreas was not harmful but the anomalous third pancreatic bud and duct was chronically obstructed causing acute pancreatitis. After safe laparoscopic removal of this anomalous and diseased pancreas the patient resumed a normal life. Other type of treatments such as distal pancreatectomy or even central pancreatectomy would be inadequate or would remove a large portion of normal pancreas. To the best of our knowledge, it was the first case with pancreas trifurcation described so far and therefore the first to be treated by totally laparoscopic approach.

In conclusion, although anomaly of the pancreatic duct is extremely rare, this case should alert clinicians to be aware of such an anatomical variant that may alter the flow in the pancreatic ductal system resulting in an increased risk of relapsing episodes of acute pancreatitis. Our patient received the correct diagnosis only 38 years after her first episode of acute pancreatitis.

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## Conflict of Interests

Authors declare no conflict of interests for this article.

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