Asian Journal of Case Reports in Surgery

Volume 7, Issue 2, Page 441-446, 2024; Article no.AJCRS.123448

Duodenal Obstruction from Annular Pancreas Managed with Roux-en Y Limb in Adult: A Rare Case Report

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Authors' contributions

This work was carried out in collaboration among all authors. Author RMH conceptualized and designed the study and did data acquisition. Author GV drafted and critically revised the manuscript for intellectual content, did literature searches, and prepared the manuscript. Author SVA edited and reviewed the manuscript. All authors read and approved the final manuscript.

Article Information

Open Peer Review History:
This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: https://www.sdiarticle5.com/review-history/123448

Case Report

Received: 09/07/2024
Accepted: 11/09/2024
Published: 14/09/2024

ABSTRACT

Annular pancreas is an uncommon congenital disorder, first reported in 1818. This is a rare anomaly. Careful navigation through this complex clinical scenario is needed for precise evaluation and better management strategies— A 54-year-old diabetic male presented with manifestations of progressive emesis which is non-bilious and reduced weight. Investigative findings indicated an annular pancreas that caused gastric outlet obstruction. Due to the worsening of the obstructive symptoms operative management was preferred. Intraoperatively pancreatic tissue was visualized

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Cite as: *Habib, Rajendra Mailarling, Gadi Venkatesh, and Shubham Vitthal Akotkar. 2024. "Duodenal Obstruction from Annular Pancreas Managed With Roux-En Y Limb in Adult: A Rare Case Report". Asian Journal of Case Reports in Surgery 7 (2):441-46. https://journalajcrs.com/index.php/AJCRS/article/view/564.*

encasing the 2nd part of the duodenum circumferentially with enlargement of the 1st part of the duodenum and stomach proximally. A Duodeno-Jejunostomy with the Roux limb was performed, resolving the symptoms. Symptomatology varies based on the age of presentation in the annular pancreas. Surgical bypass procedures successfully alleviate the obstruction and ensure excellent results. Adults suffering from upper GI obstruction might consider the annular pancreas in differentials.

Keywords: Annular pancreas; obstruction; duodeno-jejunostomy; roux limb; surgical bypass.

1. INTRODUCTION

During embryonic development, if the ventral pancreatic duct undergoes mal-rotation, it can lead to a hereditary disorder called the “annular pancreas” (AP). First documented in 1818, this condition can manifest as a fractional or a total rim of pancreas tissue encircling the duodenum. According to autopsy studies, the annular pancreas occurs in approximately 1 in every 20,000 cases. According to estimates, there is a 1 in 12000–15,000 chance of having an annular pancreas, with a 0.05–0.015% incidence [1,2]. Tiedemann first documented this congenital defect and Ecker defined it in 1862, coining the term annular pancreas [3]. The annular pancreas has been linked to several congenital anomalies [4].

The annular pancreas is categorized into “intramural” and “extramural”. In the “extramural” variant, the pancreatic duct (ventral) wraps around the duodenum before merging with the major pancreatic duct. In the “intramural” form, pancreatic cellular tissue blends with muscle fibers inside the intestinal wall. Patients having extramural AP present with signs and symptoms of significant gastrointestinal obstruction whereas “intramural” type develops signs and symptoms of duodenal ulcers [5].

2. PRESENTATION OF CASE

A 54-year-old gentleman with a prior diagnosis of diabetes manifested with complaints of frequent vomiting during the past two months. Vomiting episodes were gradual, progressive, projectile, non-bilious, and included food particles and were not present since childhood. There had been a history of weight loss in the association.

The blood metrics at the time of hospitalization were within acceptable limits.

Fig. 1. CT scan image illustrating the pancreatic head (White arrow) encircling the D2 region of the duodenum (Dotted white arrow)

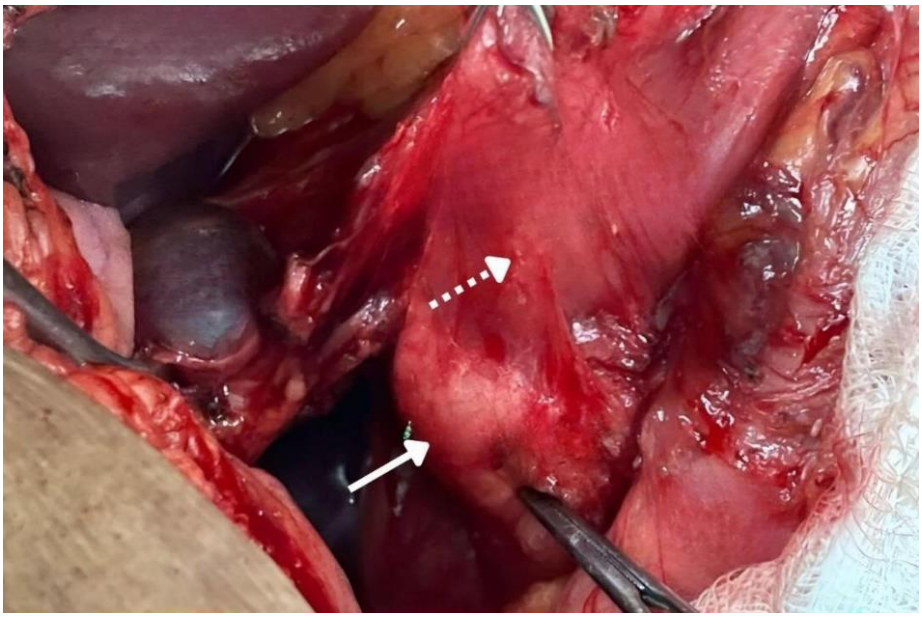

Fig. 2. Intra-operative image visualizing pancreatic tissue encircling the second segment of the duodenum (D2) (White arrow) with distention of the first segment of the duodenum (D1) (Dotted white arrow)

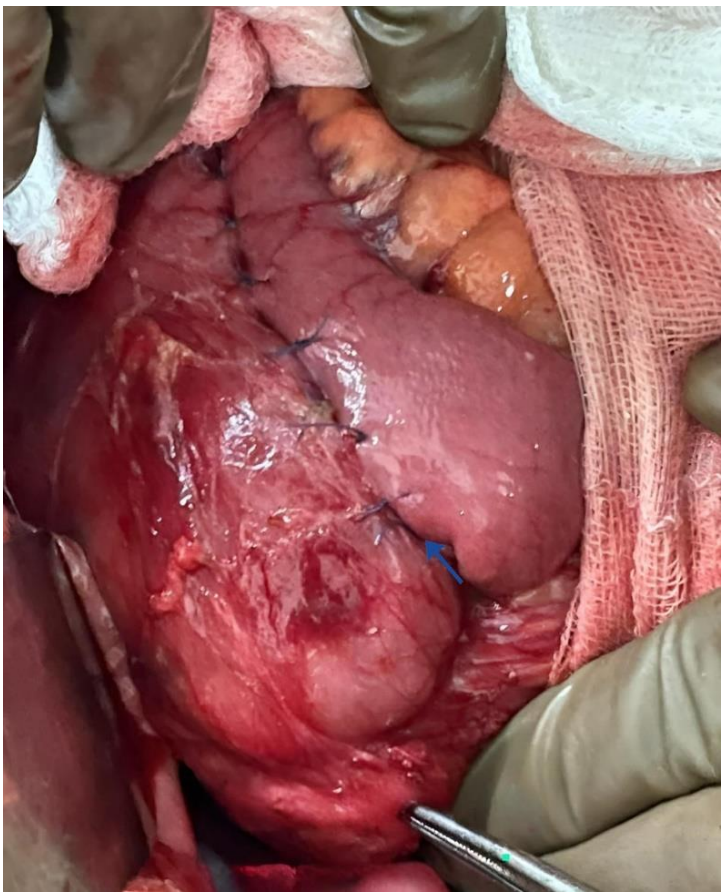

Fig. 3. Intraoperative image showing a Duodeno-Jejunostomy (DJ) (Blue arrow) performed, creating a Roux limb

Ultrasonography (USG) of the abdomen revealed an annular pancreas with pancreatic head enlargement. X-rays of the erect abdomen and chest showed no discernible abnormalities. A computed tomography (CT) image of the abdomen disclosed that the head of the pancreas enfolds the 2ndsegment of the duodenum (D2) (Fig. 1), causing constriction and back pressure changes in the first segment of the duodenum (D1) and stomach.

The conservative approach was initiated, followed by Duodeno-Jejunostomy (DJ) due to the worsening of the obstructive symptoms.

Intraoperatively, pancreatic tissue encompassing the D2 region was visualized with distention of the D1 (Fig. 2) and stomach proximally with collapsed distal bowel loops. A Duodeno-Jejunostomy (DJ) was performed, creating a Roux limb (Fig. 3). The postoperative recovery was smooth and on the 11th day after the surgery patient was discharged.

The histopathology report indicates that there is no evidence of malignancy.

Patient follow-up was conducted for one year using USG and X-rays, which was uneventful.

3. DISCUSSION

Two hypotheses, Lecco and Baldwin, have been postulated to explicate the etiopathogenesis of extramural AP. According to Lecco's hypothesis, the ventral bud(right) sticks to the wall of the duodenum and encircles the intestine as a result of normal foregut rotation, but Baldwin's idea postulates that the persistent ventral bud(left) encircles the duodenum (Fig. 4) [6].

More than two-thirds of neonatal AP cases will have obstructive characteristics, such as abdominal distention, bilious vomiting, reduced meconium passage, and feeding intolerance. Furthermore, newborns with annular pancreas are more inclined to develop “Down's syndrome, esophageal and duodenal atresia,” cardiac abnormalities, “Meckel's diverticulum”, “pancreatic divisum”, and “imperforate anus”. The median age of presentation is one day following birth. It is shown that between fifty and seventy-five percent of annular pancreas patients stay asymptomatic until the 3rd to 6th decades and appear with numerous problems [7].

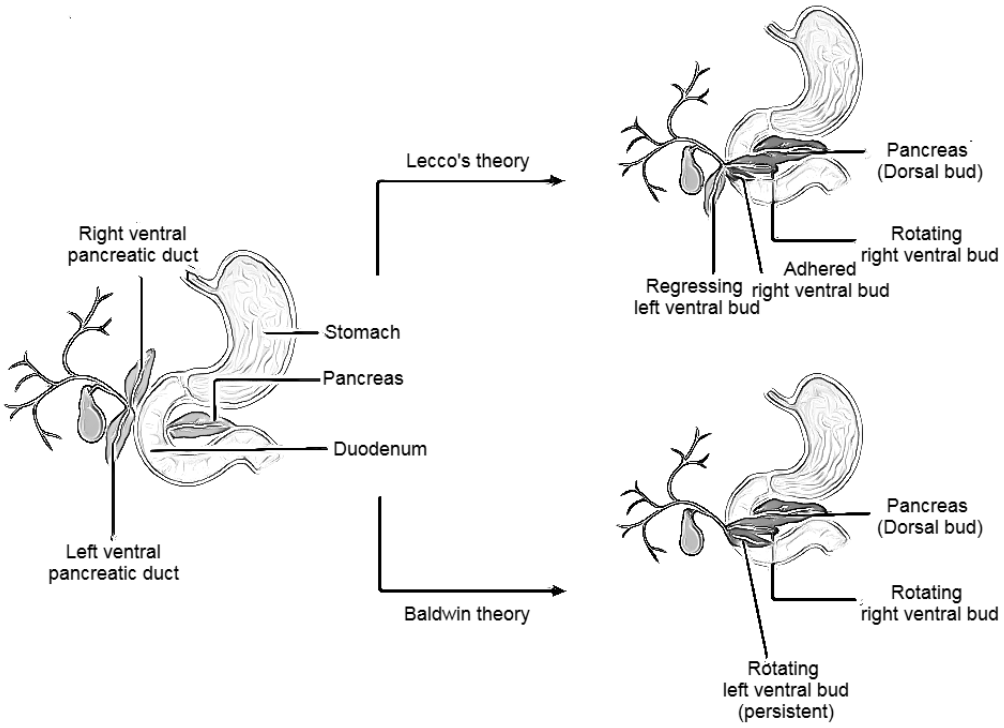

Fig. 4. Sketch image demonstrating theories of etiopathogenesis in the annular pancreas

Upper GI tract blockage symptoms define adult AP, including epigastric discomfort, nausea, Gastric outflow blockade, ulcer-related illness with upper GI bleeding, acute or chronic pancreatitis, pancreatic head malignancy, and blocked bile ducts are all possible implications in adults. The clinical symptoms were associated with the degree of duodenal or common bile duct compression by the AP. The wide range of symptomatic presentation in the annular pancreas points towards wide differential diagnoses such as duodenal ulcers causing stricture and periampullary mass lesions obstructing the duodenum 2nd segment.

Imaging methods such as ultrasonography, conventional gastrointestinal (GI) radiography, and upper GI series can all reveal duodenal blockages. Abdominal CT and MRI images (contrast-enhanced) can disclose the pancreas head around the D2 region. “Endoscopic Ultrasound (EUS)”, “Endoscopic Retrograde Cholangio-Pancreatography (ERCP)”, and “Oesophago-Gastro-Duodenoscopy (OGD Scopy)”, can provide a precise preliminary estimate of the amount of pancreas encasing the duodenum, alongside the pancreato-biliary ductal system [8].

Surgery is the preferred therapy for AP that causes effective duodenal blockage. A surgical bypass can circumvent duodenal compression. Bypass procedures may include Gastro-Jejunostomy (GJ), Duodenoduodenostomy, or Duodeno-Jejunostomy (DJ). In 20% of adult patients with AP, there is an association with complicated pancreaticobiliary disease that requires surgery. Surgery options for complicated pancreaticobiliary disease include Pancreatico-duodenectomy, biliary sphincteroplasty, Lateral Pancreato-Jejunostomy (LPJ), and biliary system shunting [9].

Laparoscopic bypass can also be performed, which allows for earlier mobilization, feeding, and a shorter hospital stay than the open operation [10].

In summary, the differentials to be included in patients with an annular pancreas in a newborn child include duodenal atresia, duodenal web, and midgut volvulus whereas in adults duodenal ulcers causing strictures and mass lesions in the periampullary lesion causing duodenal obstruction can be considered [11].

In children, the prognosis is excellent, whereas in adults, the prognosis is favorable provided there is no underlying cancer [9].

4. CONCLUSION

AP is a rare anomaly which is ought to be looked into in adults who have upper gastrointestinal obstructive symptoms. The patient with considerable obstructive symptoms needs surgical bypass procedures. Both laparoscopic and open procedures can be explored, however further comparative research is a requisite to decide on the technique of choice. When dealing with the annular pancreas in the elderly and adults, it is important to consider the possibility of cancer.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of this manuscript.

CONSENT

As per international standards or university standards, patient(s) written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

As per international standards or university standards written ethical approval has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Peer-review history:
The peer review history for this paper can be accessed here:
https://www.sdiarticle5.com/review-history/123448