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Case Report

Annular pancreas: Radiological features of a rare case of infantile vomiting[☆]

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ABSTRACT

Our purpose is to illustrate the radiological aspects of the annular pancreas as an etiology of duodenal obstruction in infants. We report the case of a 4-month-old girl, who was admitted to our department with postprandial vomiting evolving since birth. The initial examination found a severely dehydrated patient. Abdominal ultrasound showed gross dilatation of the stomach and duodenum, it also showed pancreatic tissue surrounding the duodenum, suggesting a diagnosis of annular pancreas as the cause of the duodenal obstruction. Post-contrast abdominal CT showed the gastric and duodenal dilatation, and a ring of pancreatic tissue surrounding uncompletely the second portion of the duodenum. The patient underwent a bypass surgery which consisted in a duodeno-duodenostomy with simple post-operative follow-up and no recurrence of digestive symptoms. Annular pancreas is a rare pathology to be sought in neonatal obstruction. A good knowledge of radiological semiology is essential for a good diagnostic approach. However, surgery is the only effective way to diagnose and treat this pathology.

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Introduction

Annular pancreas is a rare congenital abnormality defined by a ring of cephalic pancreatic tissue partially or completely surrounding the second part of the duodenum [1–3].

The clinical expression is dominated by duodenal obstruction during the neonatal period but may remain asymptomatic and be revealed in late adulthood due to complications.

In the pediatric population, the ultrasound remains the first-line examination realized, followed by CT scan and MRI.

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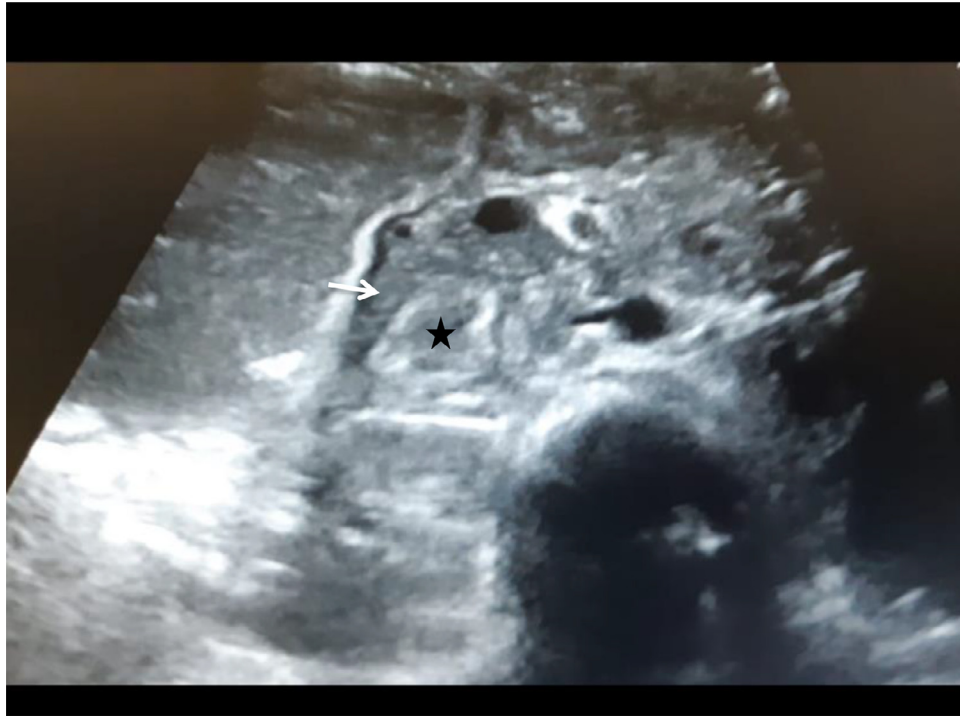


Fig. 1 – Ultrasonographic image showing pancreatic tissue (white arrow) surrounding the second portion of duodenum (black star).

Duodenal bypass is the procedure of choice for treating duodenal obstruction caused by annular pancreas.

Observation

We report the case of a 4-month-old girl, born at term without complications. She was admitted to our pediatric emergency department for chronic post-prandial vomiting with weight loss. She had no history of jaundice or transit disorder.

On presentation, the patient's vital signs were stable. She was hypotonic and had severe dehydration signs (decreased skin turgor and oliguria). Her weight was below the third percentile.

The abdominal examination revealed a distended and soft abdomen. Bowel sounds were normal.

Blood tests were realized but revealed no pathology. The patient underwent an upper gastrointestinal endoscopy which showed a Grade II esophagitis with a duodenal obstruction.

Abdominal ultrasound showed gross dilatation of the stomach and duodenum, it also showed pancreatic tissue surrounding the duodenum, suggesting a diagnosis of annular pancreas as the cause of the duodenal obstruction (Fig. 1).

A barium X-ray of the upper gastrointestinal system was obtained and showed that the stomach was markedly strained and enlarged, same as the bulb and the first and second parts of the duodenum that were also enlarged (Fig. 2). This study was complemented by a post-contrast abdominal CT,

better visualizing the gastric and duodenal dilatation, and the ring of pancreatic tissue surrounding incompletely the second portion of the duodenum (Fig. 3). Wirsung and common bile duct were normal.

Based on those imaging findings, partial annular pancreas with duodenal obstruction was diagnosed. The patient underwent duodenoduodenostomy with simple post-operative follow-up. At 6-month follow-up, she had no remaining symptoms and her weight curve was satisfying.

Discussion

Annular pancreas is a rare congenital malformation in which the duodenum is surrounded by pancreatic tissue, usually at its descending portion [1–11]. It can be partial or complete [1].

Despite the many theories that have been proposed to explain this malformation—which mainly involve ventral bud malrotation—no consensus has yet been reached regarding the exact mechanism of its pathogenesis [3].

Symptomatology is depending whether obstruction is complete or partial. In the neonatal period, it's dominated by duodenal obstruction. Thus, some cases of pancreatitis were reported [12]. The symptoms in adults are mainly associated with complications like pancreatitis, peptic ulcer, duodenal obstruction, and biliary obstruction [2,6].

Nevertheless, approximately two-thirds of individuals with annular pancreas, remain asymptomatic throughout their lifetime.



Fig. 2 – Barium X-ray. Upper gastrointestinal system was obtained and showed that the stomach, the bulb and the first and second parts of the duodenum were enlarged.

The coexistence of other congenital anomalies has been well documented [3,5,7,8]. The most commonly associated chromosomal anomaly in children is Down syndrome. In addition, significant cardiac anomalies were found, including atrioventricular canal, tetralogy of Fallot, ventricular septal defect, atrial septal defect, and cleft mitral valve. Intestinal malrotation, tracheoesophageal fistula, mobile right colon, om-

phalocele, nonrotation, duodenal atresia, and situs inversus were also observed in some series [7].

Radiological imaging is the gold standard in annular pancreas diagnosis. Sonography (US) and plain abdominal radiographs are the primary radiological exams used to screen the pediatric population [3,7,8].

Abdominal radiographs classically reveals the “double bubble” sign indicating duodenal obstruction which is not specific to annular pancreas but gather other differential diagnosis like duodenal atresia, and duodenal stenosis [3,4,7,8].

Sonography which is the first-line examination in the investigation of neonatal and children duodenal obstruction shows the gastric and duodenal distension. It also can identify pancreatic tissue encircling the second duodenal portion.

Ultrasounds have many advantages including absence of radiation exposure, and the possibility to image without sedation in young groups [3,7,8].

Although rarely performed at first intention in infants, computed tomography and MRI can be of interest in the diagnosis of annular pancreas; they show complete or incomplete pancreatic tissue encircling the duodenum. In fact, a complete ring of tissue suggests complete annular pancreas, and posterolateral extension of pancreatic tissue to the duodenum suggests incomplete annular pancreas [3].

Sometimes, in asymptomatic patients undergoing radiological screening for other symptoms, incidental annular pancreas can be discovered, which requires no treatment [3].

Prenatal diagnosis of annular pancreas has also been reported using ultrasound. It reveals the double bubble sign, which is not pathognomonic of annular pancreas. It's only suggestive of duodenal obstruction that can be caused by many other diagnoses [10]. The association with hyperchogenic periduodenal bands is highly specific.

More recently, endoscopic retrograde cholangiopancreatography, magnetic resonance cholangiopancreatography and endoscopic ultrasonography have been used as diagnostic modalities [10].

However, even if the radiological findings suggest an annular pancreas, the definitive diagnosis is established during surgery.

The definitive treatment of annular pancreas is surgery. Direct removal of the annular part is not indicated because of complications including leakage from the duodenum, pancre-



Fig. 3 – Axial (A,B) and coronal (C) thin-section enhanced abdominal CT showing the gastric and duodenal dilatation (white star), and the ring of pancreatic tissue surrounding uncompletely the second portion of the duodenum (white arrows).

atitis, pancreatic failure, and pancreatic fistula. Duodenal bypass remains the procedure of choice for relieving duodenal obstruction by duodenoduodenostomy or laparoscopic gastrojejunostomy [1,4,5,9].

Conclusion

Annular pancreas is a rare pathology to be sought in neonatal obstruction. A good knowledge of radiological semiology is essential for a good diagnostic approach. However, surgery is the only effective way to diagnose and treat this pathology.

Patient consent

The authors certify that the patient has consented to the publication of the case.

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