

CASE REPORT

Duodenal membranes: a late diagnosis evidenced by foreign bodies

G. Maldonado^{1,*}, C. Paredes¹, H. Cedeño², I.M. Salcedo², M.I. Sanchez², E. Fabre², M.V. Astudillo² and J. Gonzalez²

¹Department of Pediatric, Universidad Espíritu Santo, Samborondón, Ecuador, and ²Department of General Surgery, Hospital de Niños Dr. Roberto Gilbert Elizalde, Guayaquil, Ecuador

*Correspondence address. Km. 2.5 vía La Puntilla, Samborondón, Ecuador. Tel: +593-4-283-5630; E-mail: genesismaldonadovelez92@gmail.com

Abstract

One of the causes of congenital incomplete duodenal obstruction is the presence of duodenal membranes. This condition requires a high index of suspicion for an early and accurate diagnosis. We present two cases of duodenal obstruction with initial diagnosis of foreign bodies that were surgically intervened and where incomplete duodenal membranes were an incidental finding. The clinical course of these patients had a different pattern than expected and thus, it is imperative to use a multidisciplinary approach in this group of patients and separate them from other subtypes of duodenal obstruction.

INTRODUCTION

The duodenum develops at the third week of gestation alongside the hepatobiliary system and pancreas. During this process, it undergoes a phase in which the lumen is absent. It is between the eighth and tenth weeks of gestation that the lumen is re-established through the formation of vacuoles that results in the recanalization of the duodenum. The alteration of these mechanisms is believed to result in atresia, stenosis and duodenal membranes [1].

Duodenal obstructions are classified as complete or incomplete. Incomplete duodenal obstructions are due to the presence of membranes or diaphragms whereas complete duodenal obstructions are attributed to atresia. Also, complete obstructions are usually associated in ~50% of patients with congenital anomalies (cardiac, anorectal or genitourinary) and in up to 40%, with trisomy 21 [2].

The most frequent site of congenital duodenal obstructions is in the periampullary portion. The exiting of bile can occur proximal or distal to the site of the obstruction, resulting in dilation of the proximal duodenum, stomach and distension and

hypertrophy of the pylorus [3]. A common variation is the presentation with a 'windsock sign', seen in upper gastrointestinal (UGI) series, in which the distal duodenum dilates to the point of obstruction due to the presence of a membrane or diaphragm [4].

We report two cases where patients underwent surgery to remove foreign objects causing duodenal obstruction and where duodenal membranes were an incidental finding.

CASE REPORT

Patient #1

An 8-year-old female patient presented to the outpatient clinic of Gastroenterology with complaints of mild abdominal pain, dyspepsia, flatulence, distension in upper hemiabdomen, vomiting with remnants of food from previous days and chronic constipation with an average of two bowel movements per week. The patient had a past medical history of intestinal obstruction due to foreign bodies for which she underwent an emergency exploratory laparotomy at age 6.

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Figure 1: Evidence of megaesomach, which reaches the pelvic cavity, marked duodenal dilatation. This image is original.

The UGI series showed a distended stomach that reached the pelvic cavity (Fig. 1) as well as a marked dilatation of the duodenal bulb. The passage of contrast was evidenced up until the second portion of the duodenum. A control at 24 h showed contrast in the colon and rectum, however, contrast was still present in the stomach and duodenal bulb. These radiographic signs were suggestive of partial obstruction.

The UGI endoscopy was performed that showed normal structures until the duodenum, whose first portion was partially obstructed with food and foreign bodies (Fig. 2). The objects were removed and a mucosal protrusion was observed that limited the passage of the endoscope to the second portion of the duodenum. These findings prompted an exploratory laparotomy where duodenotomy was performed between the second and third portions of the duodenum and an incomplete duodenal membrane with a 2 mm diameter concentric orifice was found and excised (Fig. 3). A foreign body (plastic disc) (Fig. 4) of ~2 cm in diameter was also found in the second portion of the duodenum.

The patient progressed favorably with an established diagnosis of resolved partial intestinal obstruction (intra-duodenal membrane in third portion) and follow-up appointments with Gastroenterology, Surgery and Clinical Psychology.

Patient #2

A 5-year-old female patient was referred to the outpatient Gastroenterology clinic due to abdominal distension, frequent vomiting and constipation with episodes of diarrhea of 1 month of duration. Physical examination showed upper hemiabdominal distention. An abdominal x-ray showed a radiopaque rounded image in the gastric chamber suggestive of foreign body (coin) (Fig. 5). Extraction was suggested, however, the patient did not present for the follow-up appointments.



Figure 2: Foreign bodies: seed, plastic accessory, metallic object and part of mechanical pencil (eraser).

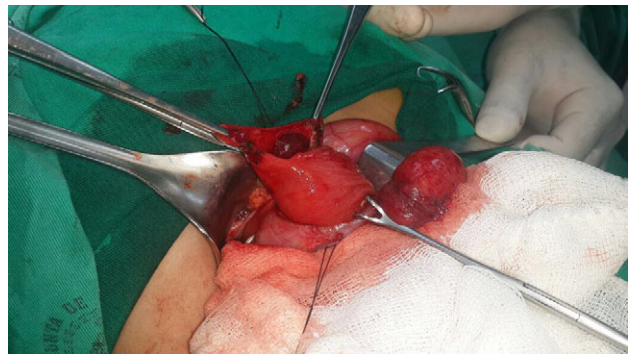


Figure 3: Duodenal membrane excision. This image is original.



Figure 4: Plastic object of ~2 cm in diameter. This image is original.

One month later, the patient presented to the emergency department complaining of pain in the right flank and abdominal distension that had increased in the last 24 h. Physical examination was notable for an abdominal circumference of 59 cm, with bowel sounds present. A barium enema showed free air in the abdominal cavity (subdiaphragmatic), arial distention of the bowel, interloop edema, absence of air at rectal ampulla and persistence of rounded radiopaque image at the right flank (Fig. 6). Surgical intervention is decided due to diagnosis of acute abdomen accompanied by subdiaphragmatic free air.

An exploratory laparotomy was performed where an explosive air release upon dissection of the omentum was evident. Approximately 300 ml of free fluid was quantified in the abdominal cavity and hypertrophy of the duodenum was observed in its first and second portions. The foreign body was

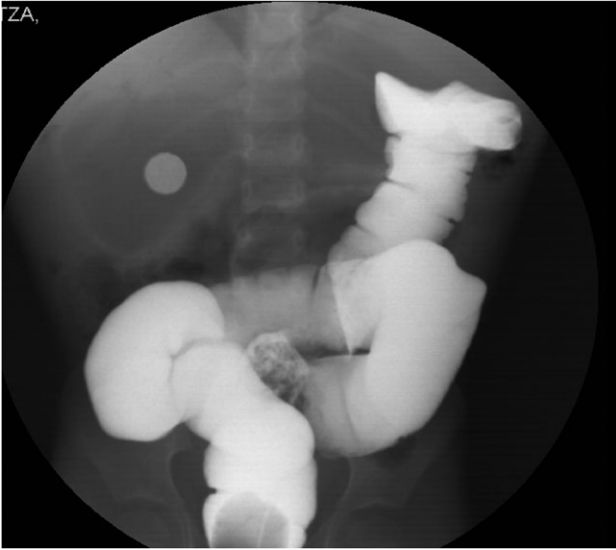


Figure 5: Radiography of the colon by enema barite contrast, presence of rounded image radiopaque projected to gastric chamber (foreign body: coin). This image is original.



Figure 6: Abdomen radiography. This image is original.

removed with no complications (Fig. 7). Remarkably, an incomplete duodenal membrane was identified at the proximal third portion of the duodenum, which was then resected (Figs 8 and 9). The presence of intestinal pneumatosis was notable and despite a thorough examination of the bowel to justify the finding, no perforation was evident (Fig. 10).

The patient progressed favorably and is currently being followed up by the services of Gastroenterology, Surgery, Nutrition and Pediatrics.



Figure 7: Coin found in the third portion of the duodenum. This image is original.

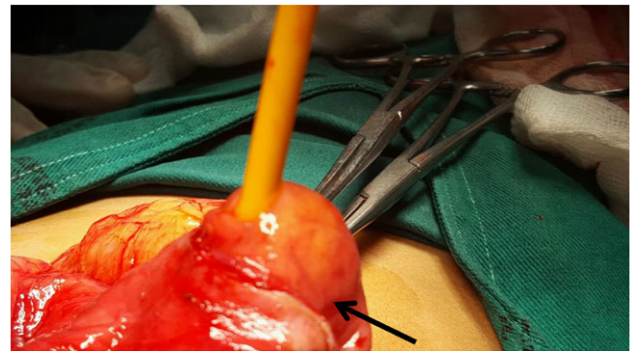


Figure 8: Use of Nelaton No. 14 for the release of duodenal membrane. This image is original.

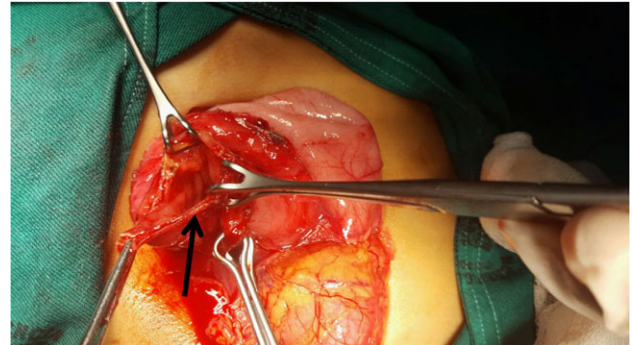


Figure 9: Incomplete duodenal membrane excision. This image is original.

DISCUSSION

The presence of duodenal membranes, an entity usually identified in early stages of life, is clinically characterized by postprandial vomits of rancid and bilious food contents, accompanied by upper hemiabdominal distention with visible peristalsis and borborygmos. Developmental delay is an important parameter and it is associated to conditions such as Down syndrome, prematurity, situs inversus and coexisting extrinsic abnormalities [5–12]. These associations were not evident in the cases presented.

In the medical literature, ~100 cases of duodenal membranes have been reported up to 2008, with an incidence of 1 in 40 000 children. The most common localization of this condition is in the second portion of the duodenum, representing ~85–90% of all cases; the third and fourth portions of the duodenum represent 20 and 10% of all cases, respectively [3, 13–15]. There are no

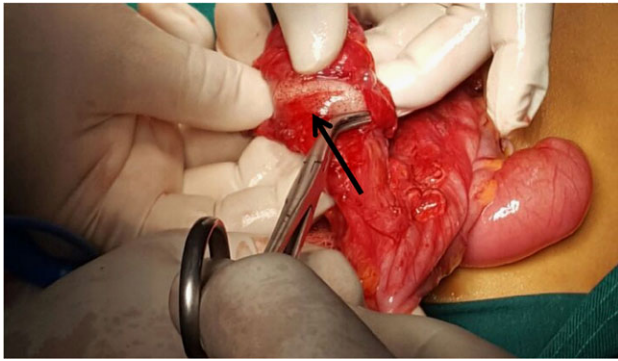


Figure 10: Surgical finding: Intestinal pneumatosis. This image is original.

reported cases of incidental findings of duodenal membranes in cases of obstruction due to the ingestion of foreign bodies. In our case, it is noteworthy that these membranes were discovered during the removal of foreign bodies at the duodenum and that the age of presentation and late detection were highly unusual. There are reported cases of duodenal membranes in patients of 5, 6, 8 and 19 months [16, 17] and cases in adults are very infrequent [18].

The most common characteristic of duodenal obstruction is vomiting. Other etiologies that share this manifestation are gastroenteritis, gastroesophageal reflux, gastrointestinal infections and overfeeding. All these entities were ruled out in our patients. Angotti et al. [19] have suggested to rule out duodenal webbing in cases of intestinal malrotation as a cause of duodenal obstruction. UGI series allow the identification of the site of the obstruction and an abdominal x-ray can show the 'double bubble sign' [20], which was seen in the x-ray of our patients. Also, pneumoperitoneum was present in patient #2 and we believe it was due to a perforation of the duodenum that was sealed by the omentum. Endoscopy and ultrasound are other diagnostic tools useful to assess duodenal integrity and associated lesions, the most common signs being the 'double bubble' sign and 'windsock' sign [21, 22]. Polyhydramnios is also a sign suggestive of duodenal obstruction [23, 24]. Duodenal membranes may also be an incidental finding in gastrointestinal examination with UGI series: retention of barium in the duodenum for more than 6 h is suggestive of its presence [3, 25].

The surgical management is based on duodenotomy with duodenal membrane excision. Vater's ampulla and the gastric fundus must be identified with the use of a tube in the stomach prior to the excision (Figs 3 and 6).

What is noteworthy of this case report is that our patients did not present symptoms of duodenal obstruction at an early age and manifested itself later in life with chronic vomiting and developmental delay. A high index of suspicion is necessary to diagnose such anomalies when they present beyond the usual age and with an atypical clinical presentation.

CONCLUSION

Intestinal obstruction due to the presence of duodenal membranes is a diagnosis typically made during the first months of life. We report two cases in which the diagnosis of duodenal membranes was made while treating for obstruction due to foreign objects in older children. It is remarkable since the age of presentation of our patients was unusual. We believe it is important to use a multidisciplinary approach in the management of this condition and that the presence of duodenal

membranes should be ruled out in cases of intestinal obstruction, even if the age of presentation is not the usual.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

FUNDING

The authors declare no funding interests.

ETHICAL APPROVAL

The Ethics Committee of the Hospital de Niños Roberto Gilbert has granted the authorization of the creation of this case report.

CONSENT

The patient's family has signed a patient consent form and it is under the author's possession.

GUARANTOR

There is no guarantor in this case report.

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