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Diagnosis of congenital antral web by ultrasound

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Abstract. Historically, the first case of congenital prepyloric membrane in an infant was documented in 1933 [1]. Since then cases have been reported only sporadically in the literature [2–8]. This is a case of congenital antral web which was identified by real-time ultrasonography, confirmed by barium meal study, and proven at gastrotomy.

Case report

An 18-day-old, third-born, boy was admitted to the Lenox Hill Hospital, New York, New York with nonbilious, "projectile" vomiting. The vomiting was intermittent, but progressive in frequency for the duration of 1 week. Stools were normal. By physical exam, the baby's abdomen was normal. No pyloric "olive" was palpated. Laboratory tests were unremarkable. Conventional radiographs of the chest and abdomen were normal. However, the baby had been vomiting prior to the abdominal plain film. Nevertheless, the clinical suspicion was pyloric stenosis and the patient was referred for abdominal sonography.

Abdominal real-time ultrasound using a 5 mHz transducer (ATL, Ultramark 8) revealed a dilated stomach containing echogenic debris which demonstrated gravitational dependence. Of note, 2 linear echogenic structures were demonstrated on the lesser and greater curvatures in the prepyloric region consistent with an antral web (Fig. 1). These findings remained constant on all views, despite changes in recumbancy. Proximal dilatation of the stomach with delay in gastric emptying was seen. The pylorus was normal.

For confirmation of the ultrasound findings, upper gastrointestinal series was performed. Barium meal study revealed 2 persistent "knife-like" filling defects in the gastric antrum corresponding to the echogenic leaflets seen by ultrasound 1–2 cm from the pylorus (Fig. 2). This was consistent with the diagnosis of an antral web. There was marked dilatation of the stomach proximally, as seen by ultrasound, with delayed passage of barium through a thin aperture. Again, the pylorus was normal.

At gastrotomy the presence of an antral web was proven. The lesion was corrected by complete excision. The baby tolerated the surgery well and recovered with an uncomplicated postoperative course.

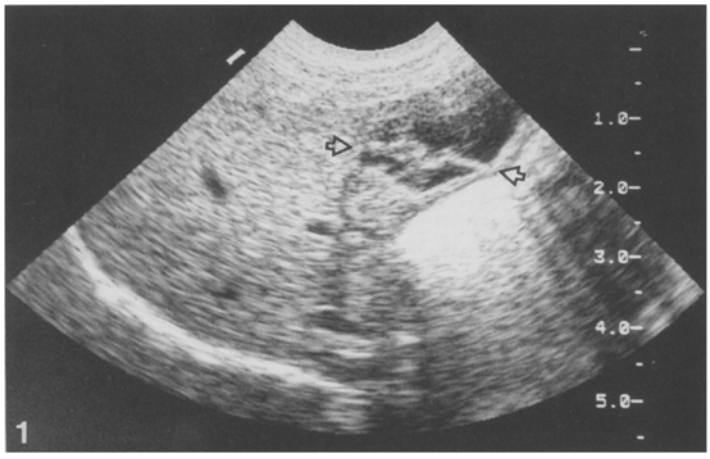
Discussion

Parsons and Barling first characterized the prepyloric membrane in 1933 as follows: "... the mucous membrane at the pyloric orifice passes inwards and forms a sort of diaphragm pierced by a small opening, but without any hypertrophy of the pyloric ring sphincter or pyloric canal" [1].

They described a case of a 5-month-old girl who had been vomiting since 2 weeks of age. At surgery, the stomach was hypertrophied and dilated. The pyloric sphincter was normal. Since then, sporadic pediatric cases of congenital antral web have appeared in the English literature [2–6, 8].

Age distribution of pediatric patients with congenital webs has ranged between 2 days to 7 months [1–6, 8]. Clinically, patients have presented with vomiting, spitting, regurgitation, or failure to thrive [1–6].

The diagnostic study of choice in the past has been the barium meal study. The findings on barium meal study have been well documented [2–7]. Recently, cases of antral web have been described in the sonography literature where the barium meal study was misleading and the ultrasound was diagnostic [8]. In these cases sonography was advantageous in that it allowed for direct visualization of the antral web, thereby leading to correct diagnosis. The ultrasound findings in our case included the following: 1) 2 *persistent,* echogenic structures extending centrally from the lesser and greater curvatures in the prepyloric region representing the mucosal diaphragm itself, 2) gastric dilatation proximal to the echogenic leaflets, 3) delay in gastric emptying beyond the site of the echogenic web, and 4) a normal pylorus. The differential diagnosis includes redundant gastric mucosa; however, mucosal redundancy alone cannot account for the findings of gastric outlet obstruction. Pyloric stenosis and pylorospasm are other diagnostic considerations when dealing with gastric outlet obstruction. This emphasizes the utility of establishing a sonographically normal pylorus and directly visualizing the persistent echogenic antral web itself. A peristaltic wave can mimic a congenital antral web. However, peristalsis can easily be distinguished by its transient nature. The congenital antral web is the diagnosis which explains all of the findings: direct visualization of the echogenic web itself and the secondary findings of gastric outlet obstruction with the transition point at the



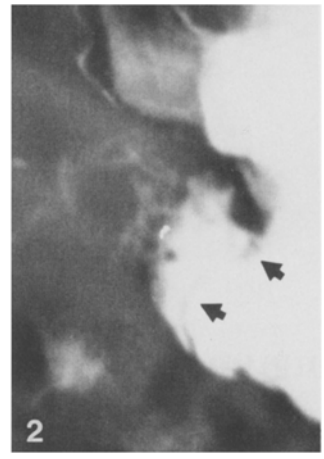


Fig. 1. Echogenic leaflets of the antral mucosal diaphragm *(open arrows)* with a "pinhole" central aperture

Fig. 2. "Knife-like" antral filling defects *(black arrows)* confirming the ultrasound findings

site of the lesion. A pitfall to keep in mind is not to misinterpret the "pseudobulb" of antral web as the true duodenal bulb.

Pathologically, the congenital antral web has been described as consisting of a layer of mucosa with a well-defined smooth muscle component and no significant presence of inflammatory cells or fibrosis [7], obviating against this being an acquired lesion. The embryology of the congenital antral web is not clear. In the past, it was postulated that this anomaly was a defect of recanalization, as is the case with duodenal atresia [4]. However, the stomach does not go through a solid phase as does the duodenum. Although the embryology is not clear, the histologic findings support the idea that this is a congenital lesion, perhaps due to an intrauterine insult leading to focal ischemia, as opposed to the acquired, post-inflammatory web seen in the adult population.

Treatment of the congenital antral web has mainly been surgical with gastrotomy and excision of the lesion.

In conclusion, the congenital antral web remains a rare but important cause for gastric outlet obstruction in the neonate and infant. This paper summarizes the sonographic findings in a case of congenital antral web.

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