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Duodenum inversum mimicking mesenteric artery syndrome

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Abstract *Background.* Duodenum inversum is an often unrecognized anomaly of duodenal rotation/fixation at upper gastrointestinal (UGI) contrast study because the duodenojejunal junction appears normally located.
Objective. This anomaly is important to diagnose because it may result in obstructive gastrointestinal symptoms.
Conclusion. We describe a case of duodenum inversum mimicking superior mesenteric artery (SMA) syndrome that improved after surgical therapy.

Introduction

Duodenum inversum is an infrequent anomaly of duodenal rotation and fixation that is characterized by a "clockwise" rotation of the proximal duodenum. This anomaly may go unrecognized because the duodenojejunal junction is normally located. Although the risk of midgut volvulus is not known to be increased, the configuration of the proximal duodenum may result in obstructive symptoms. We are unaware of a prior report of duodenum inversum mimicking superior mesenteric artery syndrome.

Case report

A 16-year-old girl developed chronic symptoms of nausea, vomiting, and crampy abdominal pain, resulting in weight loss following an acute episode of abdominal pain and vomiting that required hospitalization. She experienced a feeling of massive enlargement

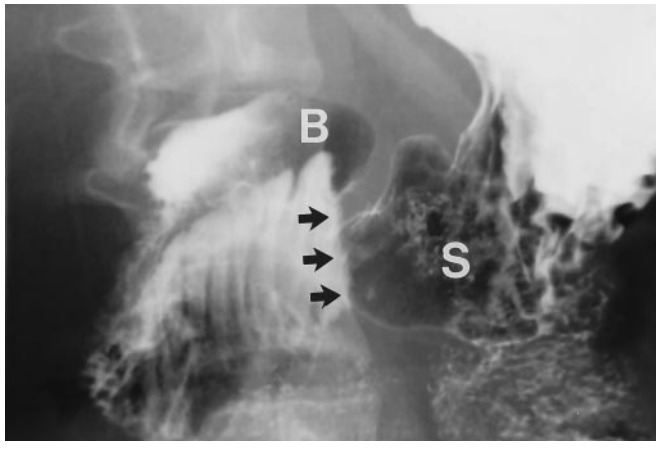

Fig. 1 Image obtained at UGI in the LPO position. There is an extrinsic linear impression on the duodenum *(arrows)* that was interpreted as "consistent with SMA syndrome." (*S* stomach, *B* duodenal bulb)

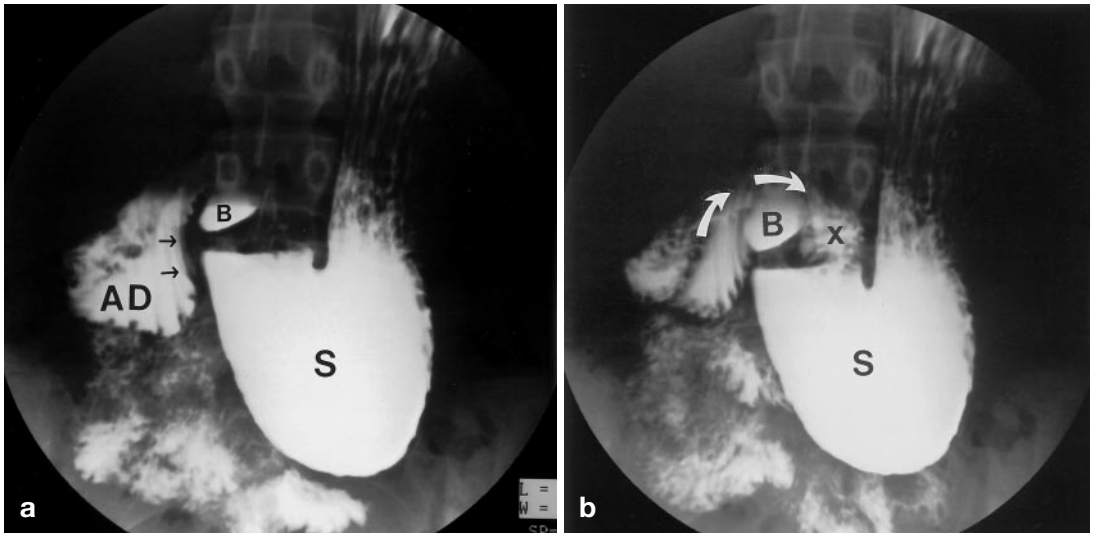

Fig. 2 a, b Images obtained at UGI in the AP upright position. **a** There is a kink in the duodenum at the junction of the second and dilated third (ascending) portions of the duodenum with a linear extrinsic impression *(arrows)* on the ascending portion (*S* stomach, *B* duodenal bulb, *AD* ascending duodenum). **b** The transverse portion of the duodenum crosses high and behind the stomach *(arrows)*. The duodenojejunal junction (marked by *x*) is over the spine near the left pedicle (*S* stomach, *B* duodenal bulb)

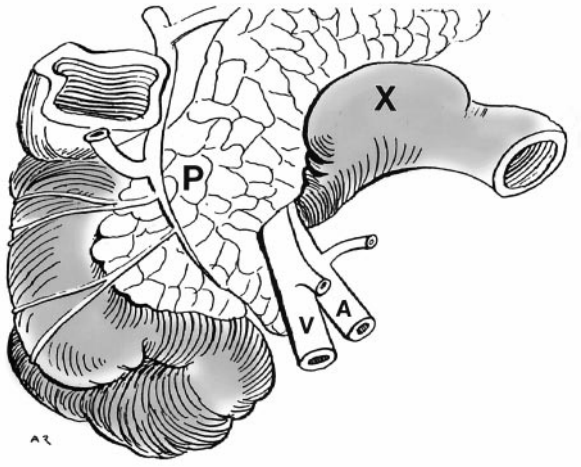

Fig. 3 Schematic diagram of the duodenum *(highlighted in grey)* viewed from the front with the stomach removed. The proximal duodenum folds back on itself and then crosses more cephalad than normal behind the pancreas *(P)* and superior mesenteric artery (A) and vein *(V)* where it is fixated at the duodenojejunal junction (X) by the ligament of Treitz. (Reprinted with permission from Fallon M [1])

of the left side of her abdomen after each meal. Esophagogastroduodenoscopy with biopsies demonstrated only a large amount of bile in the stomach and mild focal duodenitis. A complete chemistry profile including amylase/lipase and hepatobiliary laboratory values was normal, and no infectious etiology was found. An upper gastrointestinal (UGI) barium-contrast study was performed (Fig. 1) and interpreted as "consistent with superior mesenteric artery (SMA) syndrome."

A 9-month trial of medical management consisting of nasojejunal tube feedings, ranitidine, and omeprazole was started. Although the patient gained a significant amount of weight, her symptoms did not improve and the findings at UGI were unchanged. The patient then opted for surgical exploration for possible repositioning or bypass of the "obstructed" duodenum. Preoperatively, a final UGI barium-contrast study was performed. On this study, an anomaly of the proximal duodenum that has been described as "duodenum inversum" was appreciated (Fig. 2).

At surgery, the duodenum was found to have an abnormal attachment to the retroperitoneum with mesenteric fixation bands causing a kink at the junction of the second and third portions of the duodenum. The third portion of the duodenum was dilated and folded behind the second portion, as seen at UGI. The duodenum then coursed behind the stomach around the head of the pancreas, with the duodenojejunal junction and ligament of Treitz located more medial than normal over the spine. The cecum was mobile but located in the right lower quadrant. The base of the mesentery was broad. The duodenum was mobilized and a partial Ladd's procedure performed. Postoperatively, the patient's symptoms resolved and she has remained asymptomatic at 6 months, follow-up.

Discussion

Duodenum inversum refers to an unusual configuration of the duodenum in which the proximal duodenum folds back on itself and then crosses more cephalad than normal behind the pancreas, where it is fixated in a near-normal location (Fig. 3). Because the duodenojejunal junction appears normally located at UGI, the configuration of the proximal duodenum often goes unrecognized, as occurred in this case.

There are few reports in the literature of duodenum inversum. The configuration of the proximal duodenum may appear kinked on itself as in this case or to have a

"clockwise rotation" [1–3]. The entity may be confused with normal proximal duodenal redundancy in which the proximal duodenum forms a loop to the right of the spine but the duodenum courses across the spine at a normal level and is fixated normally at the duodenojejunal junction [1, 2].

Duodenum inversum can be considered a variant of duodenal rotation/fixation without the implication of potential midgut volvulus secondary to a shortened base of the mesentery [1, 2]. Duodenum inversum, however, has been associated with obstructive symptoms as occurred in this case [1]. At surgery, duodenum inversum may be reported as "malrotation."

Our case is the only report in the literature to our knowledge of this anomaly mimicking SMA sydrome. The etiology of the medial linear extrinsic impression on the duodenum seen at UGI, in this case mimicking SMA syndrome, is not certain. We postulate that it results from head of the pancreas where the duodenum courses upward to the right of the spine.

References

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