Clinical Brief

Incomplete Duodenal Obstruction in a Newborn

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Abstract. A case of newborn with incomplete duodenal obstruction caused by superior mesenteric artery syndrome has been presented with this report. A full term, 1-day-old baby girl was referred to our hospital because of recurrent bilious vomiting since birth and upper gastrointestinal barium study revealed the incomplete obstruction at the 3rd part of the duodenum with a vertical abrupt cutoff. The diagnosis of superior mesenteric artery syndrome was made with ultrasonography and duodenojejunostomy was carried out. Although it is extremely rare, superior mesenteric artery syndrome should also be considered as one of the rare cause of incomplete duodenal obstruction in newborn period.
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Superior mesentric artery syndrome (SMA) first described in 1861 by Von Rokitansky, is characterized by complete or incomplete obstruction of the third portion of the duodenum between the superior mesenteric artery and the mid abdominal aorta.[1] Although it is an uncommon clinical condition in children and especially in newborns, superior mesenteric artery syndrome should also be considered as one of the rare cause of incomplete duodenal obstruction. The authors aimed to discuss the pathogenesis, diagnostic and therapeutic management of the superior mesenteric artery syndrome in a newborn.

CASE REPORT

A full term, 2600 g, 1-day-old female newborn was referred to our hospital because of recurrent bilious vomiting since birth. Prenatal ultrasound revealed polyhydramnios but no significant gastrointestinal abnormality. On admission, the abdomen was found slightly distended but neither tenderness nor a mass was detected. A large amount of bilious gastric secretion was drained with nasogastric tube. All laboratory findings and other system examinations were normal. Abdominal plain X-ray showed incomplete duodenal obstruction with air distal to the suspected obstruction (Fig. 1).

Upper gastrointestinal (GI) contrast study revealed marked dilatation of the C-loop of the duodenum and antiperistaltic flow of barium (Fig. 2). Vertical cutoff of the barium just in front of the vertebral column was detected. In addition, barium was still found in stomach on the 12th hour abdominal plain X-ray. The aortomesenteric angle was estimated approximately about 15 degrees with routine preoperative ultrasound study (Fig. 3). After initial treatment with antibiotics and fluid resuscitation,

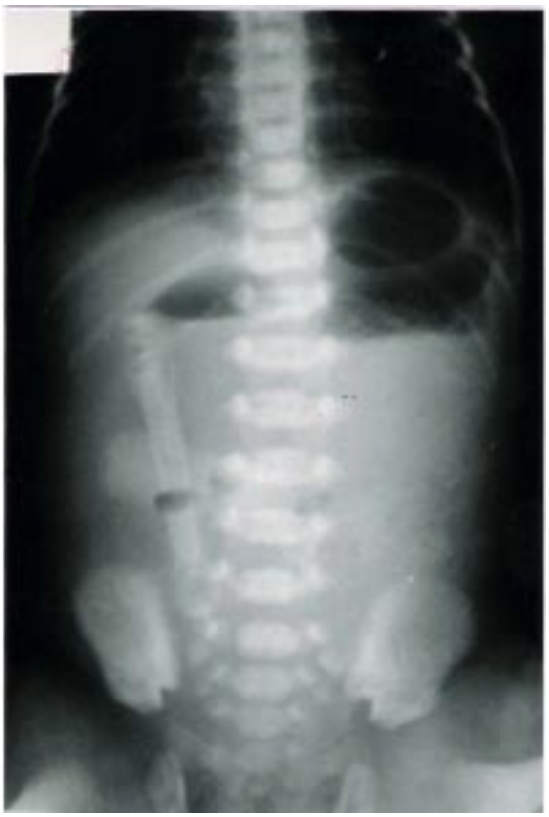

Fig. 1. Preoperative babygram showing incomplete duodenal obstruction with the existence of gas distal to the obstruction.

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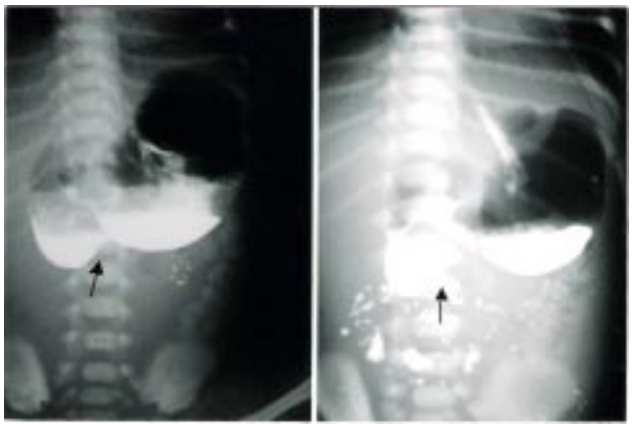

Fig. 2. A marked dilatation of the C-loop of the duodenum and vertical cut off just (arrow) in front of the vertebral column presumably due to compression of the duodenum by the superior mesenteric artery. Right picture shows the passage after half an hour and left one after 4 hours of the initial digestion of barium.

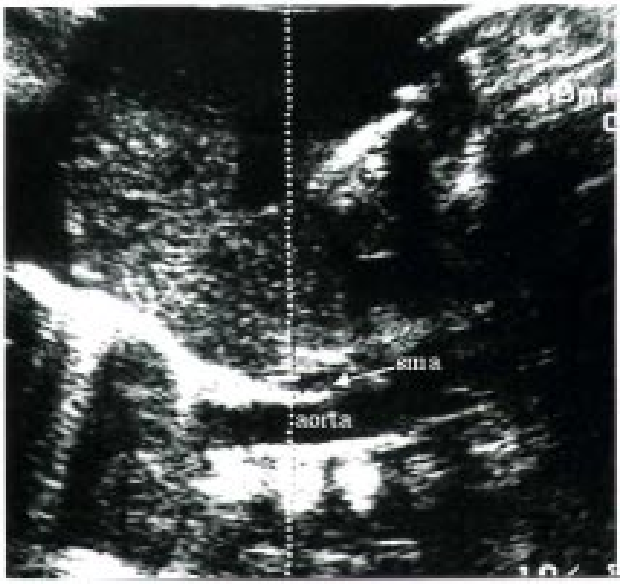

Fig. 3. Ultrasound study of upper gastrointestinal system revealed the narrowing of aortomesenteric angle. It was found approximately about 15 degrees.

she underwent abdominal surgery with the prediagnosis of incomplete obstruction at the 3rd portion of the duodenum.

In laparotomy, she was found to have duodenum obstructed at the 3rd part as a result of aortomesenteric compression. Aortomesenteric angle was detected as significantly narrowed. Pancreas was normal and no internal pathology was detected with the examination of proximal and distal lumen of obstructed duodenum using 10 fr nasogastric tube. After mobilization of duodenum, a duodenojejunostomy was performed to bypass the obstruction. The postoperative course was uneventful and she started to defecate on the 3rd post operative day.

DISCUSSION

The SMA usually forms an angle of approximately 45 degree (range, 38-56) with the abdominal aorta, and the third part of the duedonum crosses caudal to the origin of the SMA, coursing between the SMA and aorta. The main pathogenesis of the SMA syndrome is attributed to the factors that sharply narrow this aortomesenteric angle to 6-25 degree.[2, 3] Various factors were shown leading this narrowing of the angle such as anatomical abnormalities regarding the mesenteric attachments of the duodenum to the posterior abdominal wall, high insertion of duodenum at the ligament of Treitz, low origin of the SMA and reduced aortomesenteric distance.[2-5] The pathogenesis of this syndrome has also been postulated to loss of retroperitoneal fat causing a reduction in the angle, leading the vascular compression of duodenum. This mechanism explains the cases of SMA syndrome appear following the burn injuries, major surgical procedures, cast immobilization and severe traumatic brain and spine injuries.[6] In addition, familial cases have also been reported in the literature.[7]

This reality of various pathogenesis mechanisms leading SMA syndrome is able to explain the heterogeneous clinical pictures of this syndrome. The patients with SMA syndrome often present with recurrent episodes of postprandial pain, epigastric discomfort and chronic voluminous vomiting and sometimes with incomplete duodenal obstruction findings usually in older children and adolescents.[8] However, SMA syndrome has rarely been described in infants.[8-11] For example, in a report of twenty patients only two of them were infants.[5] Actually, SMA syndrome resulting from the anatomic congenital factors is more likely to come into light with earlier and with more severe clinical findings. Therefore, the finding of duodenal obstruction may be more common in infancy like the present case. However, incomplete duodenal obstruction has some well-known reasons in newborn period such as duodenal stenosis, duodenal web or annular pancreas, so that the early diagnosis of SMA syndrome in infancy is more difficult if it is not considered preoperatively.[12]

Although many causes of bowel obstruction in the newborn can be readily diagnosed with physical examination and plain radiological studies, having a high index of suspicion and considering all potential obstruction causes are crucial in pediatric surgery. So, the preoperative confirmation of SMA syndrome usually requires additional radiographic studies such as upper GI series, hypotonic duodenography, ultrasound and CT scanning.

Upper GI study with barium is a diagnostic tool frequently used prior to the newborn surgery with incomplete duodenal obstructions. Thus, the findings of SMA syndrome in upper GI study are very important. It reveals the characteristic dilatation of the first and second

parts of the duodenum, with an abrupt vertical or linear cutoff in the third part with normal mucosal folds.[13] Very little barium is seen to pass into jejunum during the early part of the examination. And, other finding includes delay of 4-6 hours in gastroduodenojejunal transit. We have found all these features in the upper GI study of the newborn in the present case (Fig. 2). On the other hand, we examined the case preoperatively with ultrasound study which is noninvasive and helpful in searching the associated anomalies. The authors detected the narrowing of the angle with abdominal ultrasound study (Fig. 3) but it was not possible to measure the aortomesenteric distance.

Conservative management, consisting of frequent and small feedings has been successful at times and should be tried initially, particularly in late cases. If conservative management fails, an explorative laparotomy with duodenojejunal bypass or lysis of Treitz ligament is indicated.[14] We also managed the case with duodenojejunostomy and the postoperative survey was excellent. Laparoscopic duodenojejunostomy for the management of SMA has also been described in the literature.[14, 15]

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