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CASE REPORT

Dextrogastria and Malrotation of Midgut in a Neonate

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ABSTRACT

A neonate presented with bilious vomiting and hematochezia. The infantogram and upper gastrointestinal contrast study were suggestive of dextrogastria with malrotation of midgut. Laparotomy confirmed isolated dextrogastria, malrotation of the midgut and volvulus. Reverse Ladd's procedure was done..

Key words: Dextrogastria; Malrotation of midgut; Neonate

INTRODUCTION

Situs inversus totalis is reported in approximately 1:6000–1:8000 of the population [1]; situs inversus abdominus is rarer (1/4000–20,000 live births) [2] and isolated dextrogastria is anecdotal. A case of isolated dextrogastria with malrotation and volvulus of the midgut presenting as neonatal intestinal obstruction and hematochezia is described.

CASE REPORT

A 5-day-old, term, male neonate born to the second degree consanguineous parents with an uneventful perinatal history presented on day 5 of life with bilious vomiting, hematochezia, inconsolable crying, and refusal of feeds for a few hours. The general examination was unremarkable; the abdomen was soft, non-tender, and not distended and had normal bowel sounds. An infantogram showed the nasogastric tube, leading to a subhepatic fundic gas shadow to the right of the spine (Figure 1a); the cardiac shadow was normal. The dilated small bowel was spread across the spine. The upper GI contrast study delineated the stomach in the right upper abdomen below the liver shadow; the duodenojejunal flexure was just to the right of the spine (Figure 1b). At exploratory laparotomy, there were chylous ascites and midgut volvulus (180° anticlockwise). The subhepatic stomach, duodenojejunal flexure and proximal small bowel occupied the right side of the peritoneal cavity; the entire large bowel was present in the left iliac fossa (Figure 2). Obstructive Ladd's bands spanned from the cecum across the second part of the duodenum to the subhepatic region. After derotation of the midgut volvulus, a conventional Ladd's procedure (straightening of the duodenal C-loop, release of bands, and inversion appendectomy) was performed. However, at the conclusion of the surgery, repositing the bowel as in a conventional Ladd's procedure (small bowel in the right half, large bowel in the left half of the peritoneal cavity) seemed to compromise the perfusion of the gastric antrum and pylorus, probably due to a twist in its vascular supply. After various permutations, normal gastroduodenal perfusion and color were noticed with the small bowel placed to the left and large bowel to the right of spine - a "reverse" Ladd's position. She received parenteral nutrition for a week with no post-operative complications. At a year follow-up, the child is asymptomatic and thriving well. The upper GI contrast study (Figure 3) showed unimpeded flow of contrast from the stomach across to the upper small bowel.

DISCUSSION

Partial/isolated visceral transposition is rare, dextrocardia being the most common form [1]. Isolated dextrogastria is the least common and occurs as two distinct types [3]. Type I is rarer and has an incidence of <1:100,000. Here, the stomach may lie completely behind the liver and there is no diaphragmatic abnormality. In contrast, Type 2 dextrogastria is associated with eventration of diaphragm; the stomach lies above

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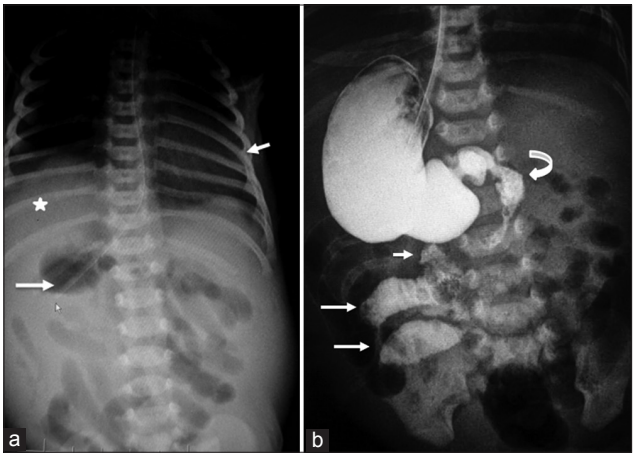

Figure 1: (a) Infantogram showing levocardia (short arrow) and the nasogastric tube, leading to a fundal gas shadow (long arrow) in the right upper abdomen below the liver (*). (b) Pre-operative UGI contrast study - note the normal sized, reverse J-shaped stomach, and reverse duodenal C-loop (curved arrow). The duodenojejunal junction (short arrow) and proximal jejunal loops (long arrow) are to the right of midline

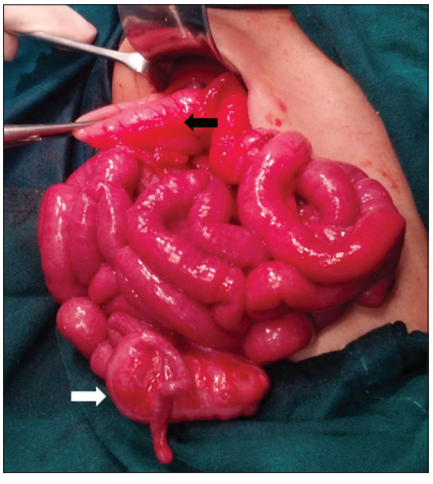

Figure 2: Operative photograph (right supraumbilical incision) showing the subhepatic stomach (black arrow points to greater curvature) and mobile ileocecal region (white arrow)

the liver and may simulate an abscess, hydropneumothorax, right-sided hiatus hernia, or other right basal pulmonary pathology [4,5]. Embryologically, failure of foregut to rotate normally leads to Type I dextrogastria, if there is associated maldescent of midgut coils from the thoracic cavity, an associated eventration (Type II) results. This neonate had a Type 1 dextrogastria.

Isolated dextrogastria is usually asymptomatic and incidentally detected. However, vomiting, bilious, or non-bilious prompt a search for associated gastroduodenal obstruction due to intrinsic (e.g., web, diaphragm) or extrinsic causes (e.g., eventration and gastric volvulus/proximal small bowel obstruction/malrotation of midgut and volvulus, mesenteric

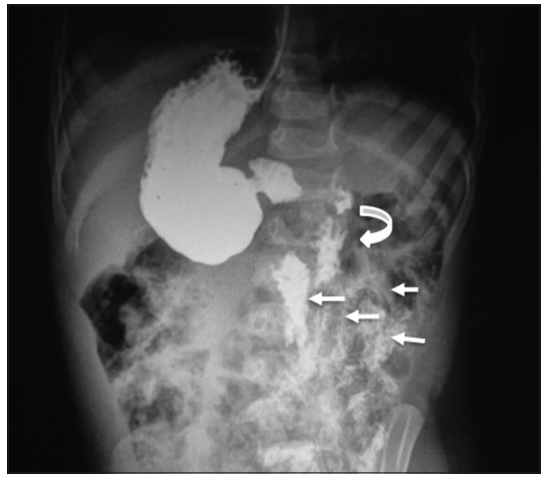

Figure 3: Follow-up UGI contrast study - the reverse duodenal C drops (curved arrow) lead to the duodenojejunal junction and proximal jejunal loops (arrows) placed to the left of midline in a “reverse” Ladd’s position

defect, and internal herniation). The bilious vomiting and hematochezia, in this case, were due to associated malrotation of midgut with volvulus. The coexistence of rotational abnormalities of the foregut and midgut has been reported only thrice in English literature before [6-8], all in older infants but none in neonatal period.

The distal gastric unit (gastric antrum, pyloric canal, and proximal duodenum) is supplied by an anastomotic arcade between the suprapyloric branches of the right gastric artery and supraduodenal branch of the gastroduodenal artery - both from the celiac artery [9]. A conceivable twist of this supply might explain the compromise in vascularity of the antropyloric region during repositing of the bowel as in conventional Ladd’s procedure. We have adopted a modification of the conventional Ladd’s procedure to preserve vascularity and perfusion of the stomach and small bowel. The uneventful post-operative clinical course and imaging vindicates the stand.

To conclude, Isolated dextrocardia with malrotation of the midgut is yet another differential diagnosis of symptomatic neonatal proximal small bowel obstruction. The diagnosis was clinched with the contrast study and managed with a “reverse” Ladd’s procedure.

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