Malrotation with Distal Duodenal Necrosis in a Neonate

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Abstract

Malrotation with midgut volvulus often results in gangrene of midgut with relative sparing of duodenum. An extremely unusual case of Malrotation with isolated necrosis of distal duodenum is described with brief review of literature. Isolated duodenal necrosis in association with malrotation is very rare; it increases the complexity of surgery and prolongs hospital stay.

Keywords

- Duodenum
- Gangrene
- Malrotation
- Volvulus

Introduction

That malrotation is a common surgical emergency in neonates with bilious vomiting resulting in ischaemic complication of the midgut is well known[1]; but it being associated with isolated gangrene of duodenum has not been described in literature. Duodenum usually, gets spared in this mesenteric vascular accident because of its different vascular supply. A case with isolated distal duodenal necrosis in a neonate with malrotation is described.

Case report

Fifteen-day-old male weighing 2950 gr presented with repeated bilious vomiting. There were no other symptoms including abdominal distension, fever or bleeding per rectum. He was born full term by a normal vaginal delivery; and had a normal antenatal history. On examination, the patient was dehydrated, afebrile and anicteric. Abdomen was non-distended and soft to palpate. Complete blood count, serum electrolytes, Creatinine and Liver function tests were normal. Abdominal Xray showed prominent gastric shadow with distal

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paucity of gas. On insertion of nasogastric tube, bilious aspirates were observed. Patient had turned up to our hospital with an abdominal sonogram which was inconclusive of normally reported anatomy of superior mesenteric artery and vein and an upper gastrointestinal contrast study which confirmed the diagnosis of malrotation.

Patient underwent emergency laparotomy and Ladd's procedure which revealed malrotation with midgut volvulus; and during straightening of duodenum an isolated distal duodenal gangrene was found **Figure 1**.

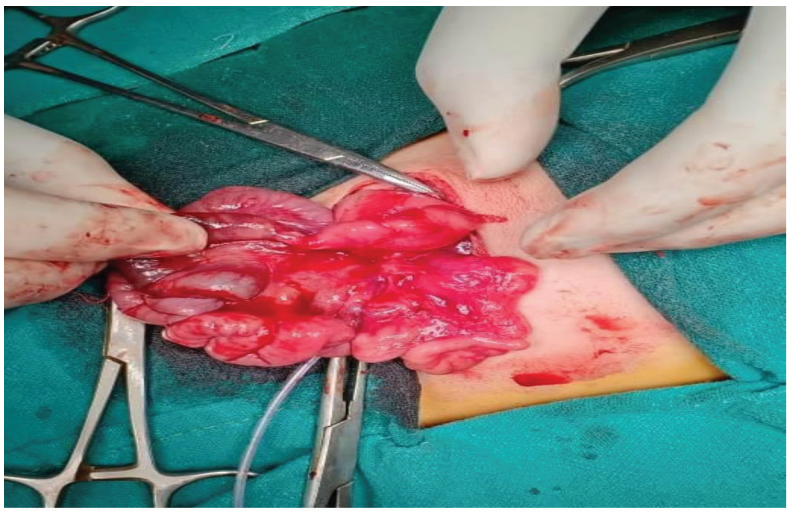

Figure 1: isolated distal duodenal gangrene

The rest of the gut including first and second part of the duodenum was normal. Gangrenous distal duodenal segment was excised and duodeno-jejunostomy was done taking due care of its vascularity. Common bile duct and pancreas were kept untouched, free flow of bile was confirmed during anastomosis. Intra and post- operative period were uneventful; Naso-gastric aspirates were significant during the first week and took time to settle. On the tenth post-operative day, gastro intestinal contrast study showed free flow of dye down the gastrointestinal tract **Figure 2** following which nasogastric aspirates lessened after 2 weeks of surgery.

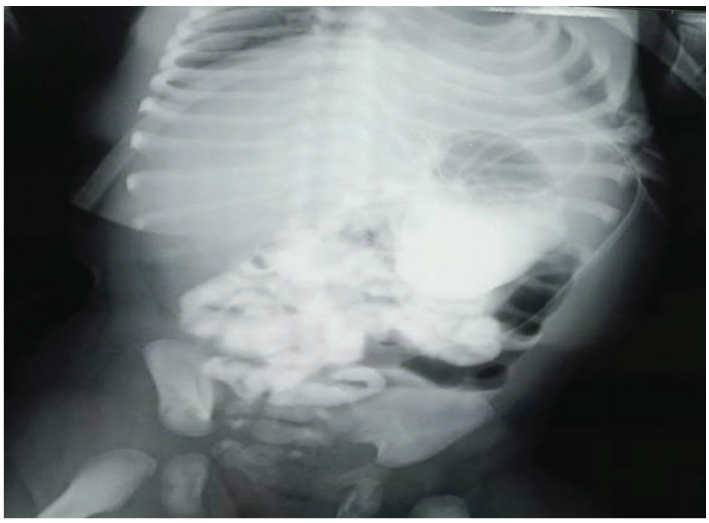

Figure 2: gastro intestinal contrast study

The baby tolerated feeding well and was discharged subsequently.

Discussion

Malrotation is estimated to occur in 0.5%-1% of live-births, and usually 1in 6000 live-births have clinical symptoms.[1, 2] Ninety percent present during infancy but symptoms can occur at any age.

A narrow-based mesentery, an essential component of malrotation, is the main reason for an increased risk of midgut twisting and the consequent obstruction and necrosis. Malrotation is often cited as an extrinsic cause of congenital duodenal obstruction, which is one of the most common causes of neonatal intestinal obstruction accounting for almost 50% of cases.[3]

Presenting complains may range from intermittent bilious vomiting to acute bowel obstruction. Blood tinged gastric aspirate and bleeding per rectum should raise the alarm as it suggests bowel ischaemia due to mid gut volvulus.[3, 4]

Midgut volvulus occurs in 40-80% of children with malrotation[5] and often leads to compression of superior mesenteric artery; if left twisted for a longer period of time, it results in gangrene of jejunum and ileum. Distal duodenal necrosis as observed in this case is rare. This could be attributed to the unique blood supply of duodenum **Figure 3** from Gastroduodenal, Supraduodenal , Superior and Inferior Pancreaticoduodenal arteries and the plexus which branches from these vessels form around the duodenum.

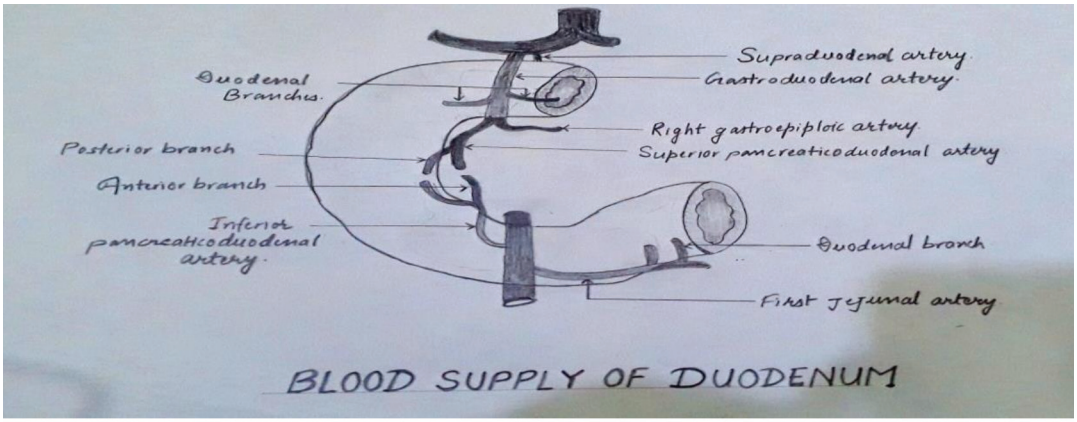

Figure 3: blood supply of duodenum

So, even if flow in Superior mesenteric vessel is impeded, duodenum remains perfused through these rich collaterals. What then caused distal duodenal necrosis in our patient is not evident. We believe that persistent dilatation due to distal obstruction compounded by the effects of adhesive bands locally led to increased intraluminal pressure causing ischaemia which progressed to segmental gangrene when not relieved in time. There were no other gangrenous patches in bowel loops to suggest necrotizing enterocolitis. Other possible causes described in association with duodenal necrosis are necrotizing pancreatitis, trauma, ingested corrosive solutions, vasculitis, and high jejunal loop obstruction[6-8]; although distal duodenum showed features of necrosis, abdomen was soft and non-distended to palpation. This was possibly due to the relative posterior position of the involved portion of the duodenum in relation to the peritoneal cavity.

Duodenal necrosis has been reported to be extremely rare and only a few isolated case reports could be found during literature search[6-8]; No neonatal duodenal necrosis or necrosis involving only the distal duodenum could be found. Arserito et. al. described duodenal necrosis in a 12-year-old child with closed loop obstruction[7]and because it involved the entire duodenum, establishing gastrointestinal and biliopancreatic continuity was difficult in the reported case. Our patient had isolated distal duodenal necrosis sparing the second part of duodenum and the necrosed duodenal segment had clear margins, distinct from pancreas which made its resection and subsequent duodeno-jejunostomy easier. Naso-gastric bilious aspirates took time to settle before feeds could be started in our patient.

Conclusion

To conclude, Duodenal Necrosis is rarely seen in neonates in association with malrotation; it is a high-risk condition increasing the complexity of surgery and prolongs the post-operative stay of patients.

Ethical Consideration

The study received ethical clearance for publication from INDIRA GANDHI INSTITUTE OF MEDICAL SCIENCES: PATNA 14 on 13/08/2019.

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Conflict of interests

There are no conflicts of interest.

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