# Case Report

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# Sustaining viability in a pre-gangrenous bowel with midgut volvulus

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## **ABSTRACT**

Midgut volvulus is a condition peculiar to neonates having acute abdomen. The condition is anticipated in any neonate having bilious vomitus and inability to pass stools. This being a surgical emergency does not sanction any time-consuming radiological procedures, thus, history and the clinical picture are sufficient to warrant surgical exploration. A sick neonate in the 2nd week of life presented with all signs and symptoms of midgut volvulus for which he was explored. Exploration gave the outlook of a necrotic midgut along its entire length. No haste was made in resection as it had a fatal prognosis for survival, instead, watchful waiting opted after necessary measures were taken to allow for the resumption of perfusion. Not only the baby survived to undergo a relook laparotomy showing marked improvement but also showed improvement in lab values and started passing stool and tolerating orally after a wait of three weeks post 1st laparotomy. Midgut volvulus leading to seemingly necrotic intestine should be given due consideration by relook surgery. The alternative would be total resection followed by short bowel syndrome, need for an intestinal transplant while being on TPN. This approach gives an immense advantage by giving the gut a fair chance to restore its perfusion by gut rest after de-twisting.

Kevwords: Volvulus, Ischemia, Obstruction

## INTRODUCTION

There is a proverb in the bible of pediatric surgery; every neonate having green vomiting is a midgut volvulus until proven otherwise. We have supported this saying so far because of our experience as this seems to be the commonest entity causing intestinal obstruction in a previously well neonate. The presentation is acute and unmistakably familiar. The sequel goes from reluctance to feed, irritability, distension, vomiting turning yellow to green, and then the ominous bloody stools. In this case, we are sharing the details of a patient having a non-viable gut due to ischemic compromise.

## **CASE REPORT**

An 11-days old sick neonate was brought to our setup after

being treated conservatively in two setups since the onset of symptoms that began on the 9th day of life. On presentation, the baby had bilious vomiting and bloody stool. The abdomen was distended, and tense and the child was sick with difficulty in maintaining oxygen saturation at room air. The patient was admitted, and resuscitation started promptly.

Exploration was planned alongside resuscitation. Bedside ultrasound revealed peristaltic dilated and thickened gut loops with to and fro motion. There wasn't any pathognomonic whirlpool sign but owing to the clinical scenario, midgut volvulus was the main provisional diagnosis. X-ray showed air-fluid levels and a cut-off sign depicting proximal intestinal obstruction. Parents were briefed about the grim situation and possible outcomes. On per-operative exploration, there was a torrent of

serosanguinous fluid on opening the peritoneum. The gut was murky and looked gangrenous on an initial glance which was then eviscerated and de-twisted. The midgut seemed to be involved along with its entire extent from the duodenojejunal junction to the ileocecal valve. The caliber was significant owing to bidirectional luminal occlusion that was just undone. Milking of contents was done across the ileocecal junction. At this point, the viability was in question so 100% oxygen was instituted, and warm pack douching started. After diligent attention was given, the gut seemed to improve slightly and the mesenteric vessels initially giving the impression of thrombosed non-viable vascular supply showed slight color transformation.

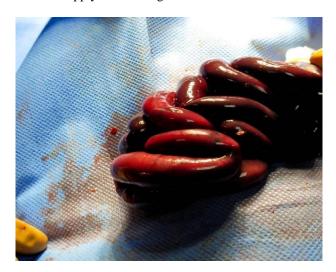


Figure 1: The evisceration of the pre-gangrenous midgut.



Figure 2: Diffuse and patchy necrosis of midgut.

Ladd's procedure was performed and due to the impression of reperfusion after said maneuvers, it was decided to go for the patch, drain and wait approach to the ischemic gut and close the abdomen after placing drains. After the surgery, the child was kept nil per oral, there was

minimal drain output, PPN started from the peripheral cannula, and the child was observed for abdominal girth and hemodynamic status. Since the baby had static distension and had bilious aspirates, a relook was mandated. The secondary lap showed some pregangrenous areas and improvement in some parts of the gut. There wasn't any focal resectable lesion, so it was decided for the continuity of care in the same approach. After the second look surgery, peripherally inserted central cannulation was done and TPN started. The child had clinical improvement, so a clear pedialyte solution trial was given. There was some increase in aspirates, so the feed was withheld temporarily. The child is still admitted to NICU under our care and has improved drastically in contrast to the initial dismal presentation.

The lab values had tremendous improvement with C-reactive protein (CRP) declining from 200 to 40. The gastric aspirates and drain output subsided to almost nonexistent. The patient is passing stool regularly and had moderate abdominal distension that is soft. The reinstating of oral feeds is expected soon.



Figure 3: Thrombosed vessels of the mesentery.



Figure 4: Remarkable color change after douching with warm saline.

#### **DISCUSSION**

Midgut volvulus is an acute condition that occurs spontaneously in well babies with no significant history.<sup>1</sup> The embryological basis of this intestinal twist is malrotation and improper peritoneal reflections that lead to gut-twisting on its axis and compromising the continuity of the gut and more importantly its vascular supply.2 If intervention is done early the outcome is promising. In certain cases, a focal area has non-viability that being the pivot of the axis of rotation therefore resection followed by anastomosis deals with the gangrenous midsection. In cases where the presentation was delayed significantly, or complete occlusion of supply occurred with volvulus the whole of the midgut seems affected. In these circumstances, the whole gut resection would leave the patient unable to survive. Though fancy modalities like intestinal transplantation and gut lengthening procedures are there in literature these ideal options aren't always available. Due to the delayed intervention being the cause there is accompanying hemodynamic instability, which renders the neonate unable to combat and these patients usually succumb to the loss and have exponentially high mortality.

The patch, drain and wait technique reserved for intestinal ischemia owing to birth defects or consequential to that has proved to be beneficial in selected cases. The gut rest is given after de-twisting is done along with widening of mesentery with Ladd's procedure. The microcirculation re-perfusing the apparent dusky gut allows the regeneration of the gut in terms of functions and physiology. The angiogenesis, collateral formation, and slow regeneration allow the gut to gradually resume its role and overcome the trauma.

We have found scarcity in literature having this result with the restoration of the gut after apparent necrosis. It was, therefore, worthwhile to publish our success in this approach.<sup>3,4</sup>

The drain placement is crucial as it may reveal any occult perforation or any perforation that may occur down the line due to the thin intestinal wall giving away. Nasogastric decompression with active and passive drainage allows succus entericus to be diverted and thus keep the midgut as less flooded with secretions as possible. A complete gut rest improves the regenerative capacity of a compromised gut. Moreover, Amano et al reported that full-thickness small intestinal necrosis with midgut volvulus distributed in a patchy fashion is reversible with moderate blood flow. A section of the nonviable intestinal tissue preserved during surgery was able to regenerate and restore normal functioning over one month. This concluded that intestinal resumption may be dependent on blood flow.

Total parenteral nutrition in the given scenario helps to build the basic health of the child but in some centers, there may be a lack of expertise of intensivists or anesthetists to pass central line in which case PICC line or partial parenteral nutrition supplemented with just aminovel may be beneficial.

Here it should be stressed that re-look laparotomy even though having no addition to already ongoing treatment may contribute by gross inspection of the intestine and further decision making.<sup>5-8</sup> In some centers, glycine and sodium pyruvate have shown promising results in gut restoration to its optimal condition.<sup>9</sup> Also, per-operative assessment through histopathological review and pulse oximetry is a prognostic indicator.<sup>10</sup>

#### **CONCLUSION**

The neonatal intestine has tremendous regenerative capacities if microcirculation is re-established, and strategies are employed to rehabilitate the general well-being of the neonate.

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