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Neonatal Gastric Necrosis and Perforation Treated by Subtotal Gastrectomy and Esogastric Anastomosis: A Case Report

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Study Design A
Data Collection B
Statistical Analysis C
Data Interpretation D
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Literature Search F
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Patient: Male, 4-day-old
Final Diagnosis: Gastric perforation and necrosis
Symptoms: Acute abdominal distension • metabolic acidosis • respiratory distress
Medication: —
Clinical Procedure: —
Specialty: Pediatrics and Neonatology • Surgery

Objective: Congenital defects/diseases

Background: Gastric necrosis and perforation are rare life-threatening conditions in preterm neonates, which require urgent diagnosis and surgical intervention.

Case Report: We report a case of a 4-day-old patient with neonatal gastric necrosis. The patient presented with sudden acute abdominal distension, respiratory distress, and metabolic acidosis. The abdomen was markedly distended, tender, and tympanic with collateral circulation. An X-ray of the abdomen showed a huge pneumoperitoneum. An urgent exploratory laparotomy revealed 2 wide horizontal perforations and necrosis of the fundus and gastric body. Subtotal gastrectomy with esogastric anastomosis was done. Postoperatively, the patient was administered total parenteral nutrition and triple antibiotics and improved gradually. He passed stool and the abdomen was soft, lax, and non-distended and the wound healed. An upper gastrointestinal tract (UGIT) contrast study 1 week after the operation showed no leakage or stricture. The patient was discharged 2 months postoperatively with a bodyweight of 2 kg and was followed in the Outpatient Department (OPD). The patient survived after 80% gastric resection for necrosis of the stomach, which was a unique outcome for this major surgery.

Conclusions: Gastric perforation is a rare life-threatening condition in preterm neonates, usually managed by direct closure in layers. Exceptionally, partial gastrectomy is needed, which is a major operation, with a high mortality rate and poor outcome. We present a case of a preterm neonate who survived after 80% gastric resection for stomach necrosis.

Keywords: Infant Mortality • Infant, Premature • Perinatal Death

Full-text PDF: https://www.amjcaserep.com/abstract/index/idArt/931820

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Background

Neonatal gastric perforation is a rare life-threatening condition. It accounts for 7% of all neonatal gastrointestinal perforations [1]. Neonatal gastric perforation usually presents within the first week of life, with clinical features including abdominal distension, respiratory distress, vomiting, and lethargy/sepsis [2].

The treatment is based on urgent surgical repair of the perforation with debridement of the edges and closure of the perforation, although spontaneous healing of gastric perforation has also been observed in neonates after conservative management [3].

Mortality due to neonatal gastric necrosis and perforation is high and ranges from 27% to 83% [4], which is why early diagnosis and early surgical intervention are needed to improve prognosis [4].

Case Report

A 4-day-old preterm neonate weighing 1.02 kg was born at 29 weeks of gestational age and delivered through cesarean section. His Apgar score was 5/8, and he was admitted to the Neonatal Intensive Care Unit because of prematurity, intrauterine growth restriction, and respiratory distress syndrome and was nil per os and on non-invasive oxygen. On day 4 of life, this patient presented sudden acute abdominal distension and respiratory distress. He was intubated on mechanical ventilation with FiO2=100% to maintain SaO2 at 80-85%, and inotropes to maintain blood pressure at 62/41.

On examination, the abdomen was markedly distended, tender, and tympanic and there was abdominal collateral circulation and a right non-complicated inguinal hernia (**Figure 1**). An orogastric feeding tube (OGT) was put in place with no aspiration but only traces of blood. An abdominal X-ray showed free air in the peritoneal cavity. Cord blood gasses showed mild respiratory acidosis (pH 7.3, Pco2 8.17, Po2 14.5).

The diagnosis of viscous perforation was made, and as the baby was unstable, a bedside peritoneal drain (size 10 Fr) was inserted under local anesthesia. This revealed a gush of gas without fecal material and deflated the distended abdomen. Peritoneal wash revealed light grayish fluid with no bile. On day 1 after drainage (D5 of life), the patient started to have mild abdominal distension and an abdominal X-ray showed recurrence of the pneumoperitoneum. A 12 Fr peritoneal tube was re-inserted for irrigation with normal saline, where all air came out with a minimal amount of fluid, but the abdominal X-ray showed persistence of pneumoperitoneum. An upper gastrointestinal

Figure 1. Clinical aspect with abdominal distension.

Figure 2. Contrast study with opacification of the peritoneal cavity through gastric perforation.

(UGIT) contrast study was done, which showed rapid passage of contrast in the peritoneal cavity (**Figure 2**). An urgent exploratory laparotomy was done and revealed a large gastric perforation extending from the greater curvature to the antrum, with necrotic edges (**Figure 3**). Debridement of necrotic tissue and closure of the gastric perforation in 2 layers was done using interrupted Vicryl sutures through all coats for the first layer, followed by a second seromuscular layer of Vicryl sutures.

On day 3 after surgery (D8 of life), the patient has a recurrence of the abdominal distension, an X-ray abdomen showed

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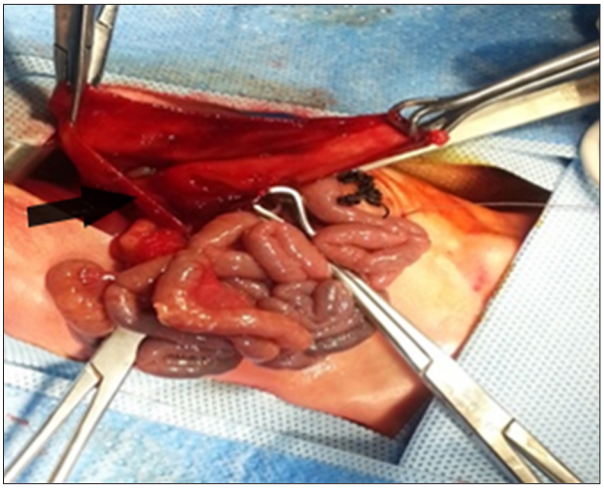

Figure 3. Huge gastric perforation with ischemic necrosis of the gastric wall (arrow).

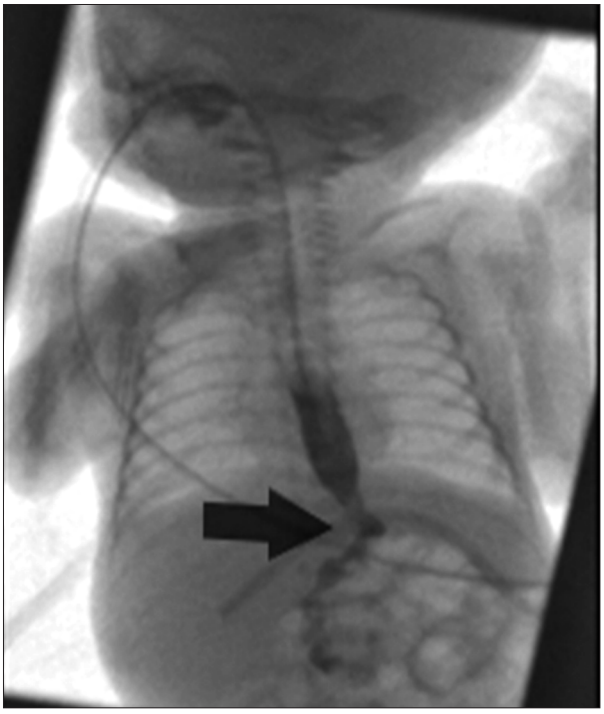

Figure 4. Postoperative upper GIT study shows eso-antral anastomosis without leak or stricture (arrow).

pneumoperitoneum, and a Gastrografin study showed a gastric leak.

A re-exploratory laparotomy was done and revealed 2 new wide horizontal perforations with extension of the necrosis to nearly all of the fundus and gastric body. The tissue was to friable and necrotic sutures, and a subtotal gastrectomy was performed for ischemic necrosis of the gastric wall. The fundus and most of the body of the stomach were necrotic, preserving only the antrum after esogastric anastomosis.

Postoperatively, the patient was on total parenteral nutrition and triple antibiotics (Meropenem, Vancomycin, and Metronidazole) and improved gradually. He passed stool on the third day after surgery and the abdomen was soft, lax, and non-distended. There is no discharge from the peritoneal drain and the wound was clean and healed.

A UGIT contrast study was done on day 7 after surgery (D15 of life) and showed no leak or structure (**Figure 4**). Infusion feeding was started through the orogastric tube and intake slowly increased until reaching full feeding at 1 month of age. Bolus feeding started gradually, with a goal of 10 cc/kg/h.

The patient was discharged 2 months postoperatively with a body weight of 2 kg and length of 45 cm (-3DS) and was followed in the Outpatient Department postoperatively at 3 months, 6 months, and 1 year. He had a delay in gaining weight and was operated on for a right-side inguinal hernia at age 1 year.

Discussion

Gastric necrosis and perforation are rare conditions in neonates, as among more than 84 000 live births only 7 cases were identified [5]. Gastric perforation is more common in preterm neonates and most commonly occurs from the 2nd to the 7th days [6]. The patient presented in this case report was premature and the perforation occurred on the 4th day of life.

Several theories have been advanced to explain neonatal gastric perforation [8].

Even though the stomach is well vascularized, spontaneous perforations and necrosis do occur [3]. Most defects are proximal, linear tears along the greater curvature, with an average of 0.5 to 8 cm in length [8]. Respiratory distress and sudden abdominal distension have been reported as the predominant symptoms [9]. Feeding intolerance, signs of hypovolemia, and decreased perfusion are commonly associated with this condition [9].

Most cases are diagnosed by abdominal X-ray showing pneumoperitoneum, but definitive diagnosis is usually made intraoperatively by visualizing the perforation site and area of necrosis; perforations are most commonly linear tears seen on the greater curvature [10]. In the present case, the perforation was from the greater curvature to the antrum, with necrotic edges.

Factors associated with poor prognosis including male sex, hyponatremia, and metabolic acidosis [7]. However, reviewers in recent decades have suggested that early diagnosis of neonatal gastric perforation and advances in neonatal intensive care can improve the prognosis [11].

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Rapid surgical intervention with the repair of the gastric tear is the suggested management, as mortality will be higher in case of delayed surgery [1]. A study done in 2014 showed that survival outcomes of preterm infants and low-birth-weight infants were not inferior to those of full-term patients [1].

The goals of treatment in neonatal gastric necrosis include debridement of necrotic tissue with primary repair of the perforation in 2 layers by interrupted absorbable sutures in most cases [12]. The same was done in our case in the first attempt but with postoperative leak due to extension of necrosis

There are few reported cases of gastric perforation requiring a total or subtotal gastrectomy; only 3 survivors within the first 2 weeks of life were reported in an earlier study [12]. In a systematic review of 8 treated cases of neonatal gastric perforation, the survival rate was 73% and 60% of them had only primary repair of the perforation as gastric surgery [11].

Conclusions

Gastric perforation and necrosis are rare life-threatening conditions in neonates, which require urgent surgical intervention. This intervention includes debridement of necrotic tissue with primary closure of the perforation in layers. In rare cases of extended necrosis, partial gastrectomy with esogastric anastomosis is indicated.

This was a case of a preterm infant who survived after 80% gastric resection for stomach necrosis. Prompt diagnosis and surgical treatment, as well as high-quality pre- and postoperative care, are needed to improve the prognosis.

Declaration of Figures' Authenticity

All figures submitted have been created by the authors and we confirm that the images are original with no duplication and have not been previously published in whole or in part.

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