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Case Report

Gastric Perforation in a Premature Neonate: A Case Report and Review of Literature

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Abstract
Gastric perforation (GP) in neonates is a rare but an important clinical entity. Although there have been improvements in neonatal intensive care, this disease continues to have a poor prognosis with high mortality rate. Delay in diagnosis and treatment in these sick babies may have catastrophic consequences including death. Herein a premature neonate with gastric perforation is presented in order to review the presentation, imaging findings and management of this rather rare entity. It is also aimed in this study to conduct a review of relevant literature on this subject.

Keywords: Gastric Perforation; Neonate

Introduction
Gastric perforation (GP) in neonates is a rare clinical entity accounting for 7.8% of all gastrointestinal perforations [1]. Despite the improvements in neonatal intensive care, this disease has a poor prognosis with high mortality rate up to 83% [2]. Literature on this subject is scarce. In this study we presented a premature neonate with gastric perforation in order to review the presentation, imaging findings and management of this rather rare entity and conducted a review of relevant literature on this subject.

Case Report
A male baby was born to a 21-year-old gravida 1, para 1 mother as one of the twins at 34 weeks’ gestation by emergent cesarean section due to fetal distress and maternal infection. His birth weight was 1400 gr. Prenatal history revealed a threatened abortion and maternal chorioamnionitis. After delivery, because of respiratory distress, surfactant was administered together with endotracheal tube positive pressure ventilation. The medical history also revealed that the baby was given triple dosages of clarithromycin together with a single dose of paracetamol. Nasogastric feeds including maternal milk were started on the 2nd day of life with a dosage of 1 ml 8 times a day. On day 7, the baby developed an abdominal distension and vomiting. General condition of the baby deteriorated, he became lethargic, tachycardia and tachypnea developed. Abdominal X-ray demonstrated bilateral subdiaphragmatic free air collection revealing a massive pneumoperitoneum (Figure 1). Laboratory results revealed leucocytopenia, slight anemia with a fall in platelet count (WBC: 2.3 x10^3/μL, Hb: 12.6 gr/dL, Hct: 35.3%, platelet: 42 x 10^3/μL), hyperbilirubinemia (total bilirubin: 5.71 mg/dL), severe hyponatremia (107 mmol/L) with a deep metabolic acidosis (pH < 7.3). An aggressive fluid and electrolyte replacement therapy was started and empiric antibiotics including ampicillin, amikacin and metronidazole were administered. Preoperative platelet replacement was also performed in order to increase the thrombocyte count. Emergent laparotomy was performed and a perforation with a diameter of 2.5 cm was detected at the

fundus of the stomach (Figure 2). Abdominal cavity was contaminated with intestinal contents and the intestines were otherwise normal. After excision of the devitalised stomach tissue, gastrorrhaphy was performed in 2 layers and a nasogastric tube was inserted for drainage. Mechanical cleaning of the abdominal cavity with isotonic saline and drainage of the abdominal cavity was performed and a penrose drain was inserted near the fundic site of repair. Baby’s general condition gradually deteriorated and he was transferred to the NICU but he unfortunately passed away on the first postoperative day despite all the resuscitative measures.

**Figure 1:** X-ray showing gross pneumoperitoneum, nasogastric tube inside the stomach and an inserted umbilical venous catheter.

**Figure 2:** Operative view showing a perforation at fundus of the stomach.
Discussion

GP in neonates is rare with an incidence of 7.8% of all gastrointestinal perforations [1]. Delay in diagnosis and treatment in these sick babies may have catastrophic consequences including death. The etiology of GP in neonates is unclear and several theories have been suggested to describe the etiopathogenesis of GP. These are congenital absence of muscular structures of the stomach as suggested by Herbut [3], high gastric acid production [4], abdominal trauma [5], ischemia of the stomach due to asphyxia [6], lack of intestinal pacemaker cells [7], lack of C-KIT mast cells [8], vigorous respiratory resuscitative measures, ventilatory use, increased intragastric pressure, anatomical abnormalities of stomach, steroid use [6,9-11] and medication with ibuprofen and paracetamol [12]. The clinical profile of our case fits within the spectrum of GP having prematurity, perinatologic stress factors including maternal chorioamnionitis and respiratory distress necessitating surfactant usage and medication with paracetamol.

The most common clinical findings are abdominal distension with sudden onset and rapidly progressing respiratory distress [13]. These findings are typically seen in the first week of life as seen in the presented case. In fact, it has been stated that gastric perforation is the most common cause of pneumoperitoneum during the first week of life [13]. Radiologic findings in these cases include air collection under diaphragm and absence of gastric air together with displacement of intraabdominal organs [14]. The presented case in this study showed these typical radiologic signs as well.

Although factors predicting the survival in patients with GP are unclear, it has been suggested that mortality was significantly higher in premature neonates, in babies with low birth weight, in male cases, in sick children with severe metabolic acidosis (pH < 7.3) [9,15]. It has also been reported that perforations ≥ 1.5 cm in diameter were associated with high mortality [12]. All these factors were found in the presented case and unfortunately he passed away on the first postoperative day.

Conclusion

In conclusion, in order to improve the outcomes of babies with GP, early detection and prompt surgical intervention are essential. In a neonate especially preterm or low birth weight having progressive abdominal distension and pneumoperitoneum on X-ray during the first week of life, GP should be kept in mind. The health providers dealing with such kinds of patients should promptly consult to a pediatric surgeon and a rapid and aggressive management including fluid and electrolyte replacement, systemic triple antibiotherapy and urgent surgical intervention is recommended. It is anticipated that with this approach more lives of sick premature children will be saved.

Bibliography


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