

Case Report

Successful management of neonatal gastric perforation in Tripura medical college and dr. BRAM teaching hospital-a rare case report

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ABSTRACT

Gastric perforation in the newborn is a rare surgical emergency in our practice area; nevertheless, since the earlier it is diagnosed, the better the prognosis, it is a possibility that we must be aware of. Perforation would be suspected in an infant with severe abdominal distension and diagnosis is confirmed with simple abdominal X-rays, including anteroposterior and lateral projections with horizontal ray, on which pneumoperitoneum will be shown. We report the case of a neonate diagnosed with gastric perforation at 72 hours of age who underwent a successful surgical intervention and was able to go home clinically healthy 14 days later.

Keywords: Neonatal gastric perforation, Pneumoperitoneum

INTRODUCTION

Spontaneous gastric perforation in the newborn is a rare condition in our practice area; it is the most common form of non-obstructive perforation of the gastrointestinal tract in neonates and, despite being rare, must be considered as a possibility, since early diagnosis and surgical treatment increase survival rates. Gastric perforation of a neonate constitutes approximately 7% of all gastrointestinal perforations in neonates. Abdominal distension, feeding intolerance, poor activity, respiratory distress, abdominal erythema, and signs of shock are the clinical manifestation of neonatal gastric perforation, which is a life-threatening condition of neonates.^{1,2} But the exact mechanism of neonatal gastric perforation is not clear. We present one case of three-day old neonatal spontaneous gastric perforation being managed successfully in Tripura medical college and Dr. BRAM teaching hospital.

CASE REPORT

A 3days old baby was referred to emergency of Tripura medical college and Dr. BRAM teaching hospital with

the chief complain of sudden abdominal distension and not passing meconium for last 2 days. The baby was admitted in SNCU of TMC and was initially evaluated and resuscitated by the pediatrician. The baby was referred to pediatric surgery for further management. After thorough clinical examination and investigation, it was diagnosed as a case of hollow viscus perforation with sepsis for which injection meropenem and vancomycin was started. The baby was planned for emergency surgery. Intra -operatively, just after opening the abdomen, copious amount of bilious collection was noted and evacuated. The bowel loops were adherent with each other. Thorough peritoneal lavage with adhesiolysis was done very meticulously avoiding inadvertent injury to the fragile bowel loops, major vessels and bladder. The site of perforation was identified on the posterior wall near the fundus of the stomach, 2x2 cm size with blood clots in it. The perforation was repaired by modified graham's technique. The abdomen was closed in layers after securing proper hemostasis and any bilious leakage. The operation lasted for 2 hours and the baby was put on mechanical ventilator post-operatively. On post operative day 3, the baby was shifted to CPAP mode with oxygen flow at 5l/min and on day 5, the baby was weaned from

CPAP and was maintaining 100% oxygen saturation with moist oxygen inhalation at 2l/min. Expressed breast milk feeding was started through oro-gastric tube on post-operative day 7. The baby was on demand breast feeding on day 10. On post operative day 14, the baby was discharged successfully.



Figure 1: Pre-operative picture showing a 3 day old baby with huge abdominal distension and edematous scrotal pouch.

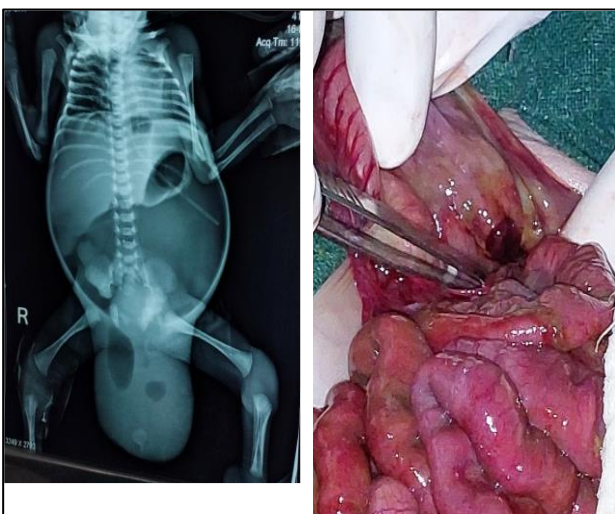


Figure 2: Pre-operative x-ray abdomen with football sign and intra-operative picture showing the perforation in the posterior gastric wall near the fundus.



Figure 3: Immediate post-op period and on post operative day 6.



Figure 4: Post operative follow-up after 2 weeks of discharge.

DISCUSSION

Neonatal gastric perforations predominately affect premature infants and low birth weight baby, but it can

also occur in healthy term infants. Differential diagnoses include necrotizing enterocolitis, septicemia, intestinal obstruction, spontaneous pneumoperitoneum without gastrointestinal perforation, and others. Radiographic confirmation of a massive pneumoperitoneum in the absence of a gastric gas bubble, bowel air-fluid levels, or pneumatosis intestinalis are suggestive of gastric perforation. Some authors have considered a congenital defect of the musculature of the perforation site as a possible cause.^{3,4} However, experimental studies suggest that gastric distension could make these muscular changes.^{5,6} Chen et al confirmed with a pathologic report that the presence of musculature of the perforated gastric wall is also noted in some neonates.⁵ Stomach wall local ischemia combined with high gastric acidity is also considered to be a significant etiologic factor in neonatal gastric perforation.^{7,8} However, necrotizing enterocolitis, which is caused by hypoxia-induced ischemic bowel-wall change, has seldom been reported in neonates with gastric perforation. Hence some authors reject the theory of hypoxia-induced ischemia.⁶ Also, associated gastrointestinal anomalies could increase gastric pressure caused by distal gastrointestinal anomalies. This mechanism could possibly be the cause of neonatal gastric perforation.⁶ Up to 20.6% of neonatal gastric perforation patients have associated gastrointestinal anomalies. Intestinal malrotation and Meckel's diverticulum are the most common anomalies. However, asymptomatic malrotation and Meckel's diverticulum can be commonly seen in the healthy population.⁹ Moreover, most of the associated gastrointestinal anomalies are unlikely to cause obstruction or produce enough pressure to lead to gastric perforation.² Idiopathic hypertrophic pyloric stenosis, characterized by an acquired narrowing of the pylorus, is also a common condition in infants.¹⁰ This anomaly also could increase gastric pressure by obstruction of the gastric outlet, but no reported case has been associated with this. A report of a barotrauma gastric perforation case explained the perforation site in terms of Laplace's law. The greatest wall tension occurs in the body of the stomach, because the wall tension increases exponentially as a function of the radius. Moreover, the lesser curvature is fixed by the celiac trunk, left gastric artery, and gastroesophageal junction; so the lesser curvature is the weakest point of the wall tension.¹¹ But the most common site of neonatal gastric perforation is the great curvature, with the lesser curvature being the second most common site.^{1,2,5} Obstruction and increasing gastric pressure could lead to gastric perforation, but not enough to explain the cause of the perforation. The appropriate surgical intervention remains unchanged over time. Many authors have insisted on a variety of causes of gastric perforation, but have all recommended prompt surgical laparotomy as the best way to save a life. Gastrorrhaphy with or without gastrostomy is the most commonly performed techniques. As for the associated gastrointestinal anomalies, concurrent or delayed surgical correction should be considered based on the patients' specific situation.^{2,5,9} Male sex, prematurity hyponatremia (serum sodium <130 mmol/L), and metabolic acidosis

(pH<7.3) was regarded as poor prognostic factors for survival.^{1,2,12} Chen et al reaffirmed that preterm neonates had significantly higher death rates than did full-term neonates.⁹ But Byun et al reported that the time between symptoms and surgical intervention is the only prognostic factor for survival.² Yang et al reported after analyzing 66 neonatal stomach perforation cases, WBC had a significant effect on overall survival.⁵ Despite an increasing number of cases, the etiology may be difficult to determine. Recently, several factors, including prematurity and concomitant gastrointestinal lesions, have been implicated as contributing factors. Also, a number of other theories have been proposed to explain these events, including hypoxic stress leading to gastric ischemia by selective shunting of blood away from the splanchnic vascular bed, sepsis, and mechanical rupture of the stomach secondary to increased gastric pressure due to lack of coordination or immaturity of the vomiting mechanism in infants. The use of positive pressure ventilation or nasal continuous positive airway pressure without decompression of the stomach and treatment with steroid therapy for bronchopulmonary dysplasia are other possible causes. Suggestions for a good outcome are early diagnosis, vigorous resuscitation, and prompt surgical exploration.

CONCLUSION

Neonatal gastric perforation, which is a rare entity with very high mortality and complication rates, initial management is directed towards stabilization of the patient. The proper therapeutic regimen includes fluid and electrolyte replacement, antibiotics, and prompt surgical intervention. Recent reviews have suggested that early diagnosis of neonatal gastric perforation can affect the outcome favourably. In neonatal gastric perforation patients, the short time interval between the diagnosis and the surgical intervention, evaluation of the associated anomalies, and appropriate correction of anomalies may determine the good prognosis of the patients.

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