ACUTE GASTRIC PERFORATION IN NEONATAL PERIOD

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SUMMARY: Gastric perforation is a rare abdominal catastrophe with a high mortality, usually occurring in neonatal intensive care unit setting (1).

We report a premature neonate with extensive gastric perforation located in the greater curvature. As a result of necrosis in the rims of rupture, significant gastric resection was performed.

Key Words: Gastric perforation, newborn.

INTRODUCTION

Although gastric perforation is infrequent, it occurs more often in children than adults (1, 2), and usually occurs in the neonatal intensive care unit setting.

A three-day premature girl with 31 weeks gestational age was admitted with hyaline membrane disease (HMD) in neonatal intensive care unit (NICU). Her birth weight was 1880 gr. Since she had respiratory distress, cyanosis and hypoxemia and respiratory acidosis, assisted ventilation was applied. She did not receive perinatal steroid therapy. At third day of admission her abdomen became distended and needs for ventilatory support were increased. We performed an abdominal radiograph which confirmed the presence of massive free air under diaphragm (Figure 1).

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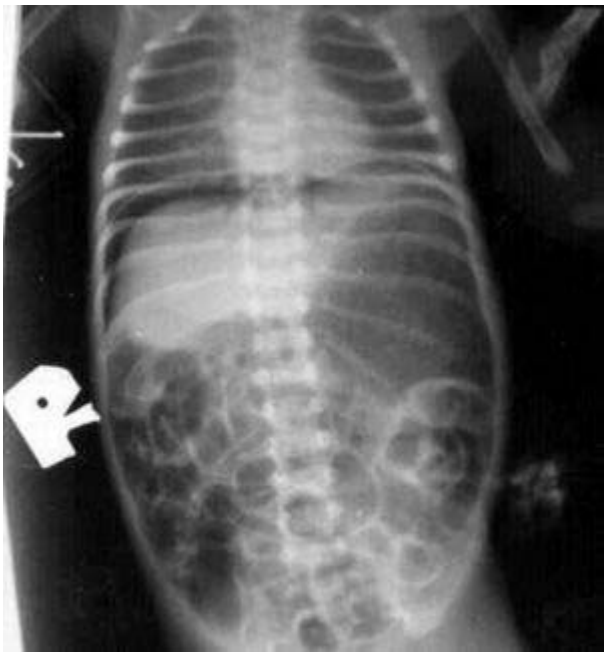
Laparotomy revealed extensive gastric perforation located along greater curvature of the stomach that was amenable to repair because there was extensive necrosis in the rims of rupture. Significant portion of the stomach was resected. There was no obstruction in the intestines. She received wide spectrum antibiotics. Blood culture was negative. Microscopic examination showed hemorrhages with intensive lymphocytic and eosinophilic infiltration with necrosis. There was no defect in the muscular wall of the greater curvature of the stomach.

DISCUSSION

Three mechanisms have been proposed for stomach perforation: traumatic, ischemic and spontaneous. The specific etiology of a gastric perforation may be difficult to determine because infants are usually sick and actual pathology yields few clues. Most gastric perforations are due to iatrogenic trauma (2, 3).

Figure 1: An abdominal radiograph which confirmed the presence of massive free air under diaphragm.



The most common injury is caused by vigorous nasogastric or orogastric tube placement. Perforation is usually along the greater curvature and appears as a puncture wound or a short laceration. Traumatic gastric perforation may develop as a result of severe gastric distention during the course of positive pressure ventilation during bag-mask resuscitation or mechanical ventilation for respiratory failure (4, 5). In this case the nature of perforation and absence history of bag-mask ventilation in previous day ruled out the traumatic causes.

The mechanism of ischemic perforation has been difficult to elucidate because these cases of perforation are associated with conditions of severe physiologic stress such as extreme prematurity, sepsis and neonatal asphyxia. Ischemic gastric perforations have been noted in conjunction with necrotizing enterocolitis. Because gastric stress ulcers have been reported in a variety of critically ill infants, it has been proposed that these perforations result from the transmural necrosis of such ulcers (2, 4). In our case there were many risk factors such as prematurity with gestational age 31 weeks, birth in another center and improper interfacility transport with some degree of hypoxia and this entity was presumably in conjunction with necrotizing enterocolitis.

Spontaneous gastric perforations have been reported in otherwise healthy infants, usually within the first week of life particularly in between the first 2 and 7 days of life (6-8). The term spontaneous suggests a cause separate from necrotizing enterocolitis or ischemia, trauma from gastric intubation, distal intestinal obstruction or accidental insufflation of the stomach during assisted ventilation. Although perinatal stress and prematurity are common associations, no predisposing factors can be identified in at least 20% of patients (6).

One hypothesis is that spontaneous perforations are due to the congenital defects in the muscular wall of the stomach (9, 10). However similar pathologic findings have not been noted in other reports.

Gastro duodenal perforation has been associated with postnatal steroid therapy to prevent or treat BPD (6, 11). Most infants are being fed normally up to the time of perforation. The pathologic and clinical features are most consistent with mechanical over distention rather than ischemia as the cause of perforation.

Signs and symptoms of gastric perforation are usually those of an acute abdominal catastrophe associated with sepsis and respiratory failure. The abdominal examination is remarkable for significant abdominal distention capable of compromising ventilatory support. Vomiting is an inconsistent feature. Radiographic confirmation of massive pneumoperitoneum is suggestive and contrast studies to confirm the diagnosis are not indicated. Signs of hypovolemic shock and sepsis complete the clinical picture. Gastric perforation in a newborn infant represents an immediate surgical emergency. Because of the large size and proximal nature of the perforation, these infants may have rapidly progressive pneumoperitioneum with associated cardiopulmonary compromise (9). Prior to definitive surgical intervention, during the evaluation and resuscitation of the infant, needle decompression of the abdomen with large IV catheter may be required. A nasogastric tube should be placed while prompt resuscitation is undertaken. In infants with extremly low birth weight who have isolated perforations, peritoneal drainage alone may suffice. Persistence of free air or continued acidosis and evidence of peritonitis may mandate surgical exploration (13). Surgical repair of most perforations consist of debridement and two layer closure of the stomach. A gas-

trostomy may be warranted. Significant gastric resections should be avoided. The tear often involves the posterior wall of the stomach along the greater curvature making division of the gastrocolic omentum and exploration of the posterior gastric wall necessary even if a disruption is also found on the anterior wall. Multiple areas of injury must be excluded.

Post operative vigorous supportive therapy coupled with the use of broad spectrum antibiotics administered intravenously is necessary. The most important factors affecting survival appear to be the interval between the onset of symptoms and the start of definitive therapy, the extent of peritoneal contamination, the degree of prematurity and the severity of other associated consequences of asphyxia. Due to the associated problems of sepsis and respiratory failure often found in premature infants, mortality rates of gastric perforations are high, ranging from 45% to 58% (1, 2, 14).

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