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Case Report

Gastric pneumatosis in the preterm neonate: incidental finding or NEC spectrum

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ABSTRACT

Gastric pneumatosis is a condition defined as air within the wall of the stomach, however, is an extremely rare sign during neonatal period. Due to an association of this entity with Necrotizing enterocolitis (NEC) which is a fulminant condition with high morbidity and mortality in neonates, finding gastric pneumatosis especially in a premature neonate should alert the clinician. Other causes have also been identified like gastric outlet obstruction or displaced nasogastric or orogastric tube in stomach wall. This entity should not be confused with free air in abdomen and can be managed conservatively. We herein present a case of a premature neonate with a finding of gastric pneumatosis and culture-proven sepsis who was managed conservatively.

Keywords: Gastric pneumatosis, Gastric emphysema, Necrotizing enterocolitis, Neonate, Non-invasive mechanical ventilation, Preterm

INTRODUCTION

Pneumatosis intestinalis, can occur in any part of the gastrointestinal tract, from the oesophagus to the rectum and commonly associated with fulminant NEC especially in premature neonates.[1,2] Gastric pneumatosis, defined as air within the wall of the stomach, however, is an extremely rare sign during neonatal period and could be a rare manifestation of necrotizing enterocolitis in premature babies or other predisposing anomalies like proximal intestinal obstruction.[3,4] The clinical course and outcome of a neonate with gastric pneumatosis associated with suspected NEC is reported along with a brief review of the literature. The findings illustrate that gastric pneumatosis can be the presenting feature of fulminant NEC.

CASE REPORT

A Male neonate was delivered vaginally at 35 weeks, weighing 1950 gms to a young 26 years old primiparous lady following spontaneous labour but premature rupture of membranes. Mother was healthy without any risk factors and her antenatal period was reported uneventful. There were no signs of chorioamnionitis and no antibiotics were used in labour. Liquor was said to be clear. Resuscitation included facemask oxygen. Apgar scores were 6 and 9 at 1 and 5 min, respectively. The neonate did not need any ventilatory support, supplemental oxygen or inotropes. However, in few hours, baby started having respiratory distress with intercostal retractions although, pre and post ductal saturations were acceptable (96% respectively). Considering these danger signs and history of premature rupture of membranes, baby was immediately shifted to neonatal intensive care unit (NICU) with respiratory and cardiac monitoring. Samples for blood culture, urine culture, complete hemogram and C-reactive protein (CRP) were taken along with relevant X-ray radiograph. Chest X-ray was consistent with congenital pneumonia while abdominal X-ray was unremarkable. Baby was started on injection ampicillin and gentamycin. Baby was

given supplemental oxygen support via. Nasal cannula and he maintained saturation between 92-93%. Expressed breast milk feeds were started after stabilization at ~24 hours. Blood picture showed raised total leukocyte count and C-reactive protein, though, platelet counts were normal. Blood cultures were positive for Klebsiella and further treatment commenced based on sensitivity. Initially the baby was showing downhill response for 48 hours and respiratory support was switched to Non-invasive mechanical ventilation (nIMV) and inotropic (dopamine) support was also needed. Pediatric surgery consult was also taken in view of mild abdominal distension though passing normal stools and clear nasogastric aspirates.

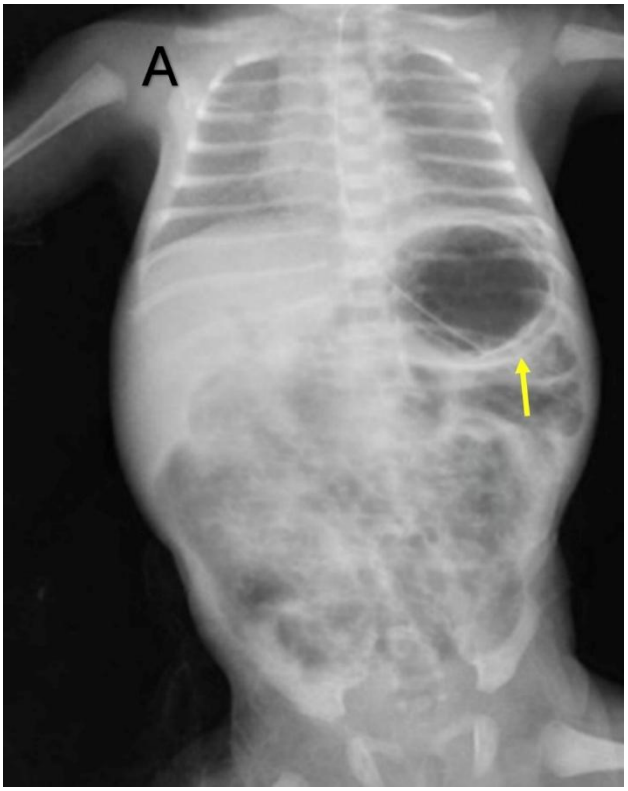

Figure 1: X-ray showing gastric pneumatosis where yellow arrow indicates a thin curvilinear rim of intramural gas in the wall of stomach.

The abdominal radiograph showed fairly sizeable curvilinear gastric pneumatosis, mildly distended small bowel loops but without pneumatosis and hepatobiliary gas Figure 1. The lateral film was useful in ruling out the possibility of pneumoperitoneum. Metronidazole was added to the ongoing antibiotic therapy in suspected necrotizing enterocolitis. In view of this fresh radiographic finding the enteral feeding was stopped and decision was taken to keep the baby on conservative management.

Over the next 72 hours, the baby gradually improved and weaned off from respiratory support. During that time abdominal distension was settled down. Initial feeds were started through nasogastric tube and gradually increased. Pre-feed aspirates before each feed were minimal and stools were normal. Following Blood and urine cultures were negative. C-reactive protein came down significantly. Antibiotics were stopped. Repeat X-ray showed absence of gas and absolute resolution from gastric wall. Figure 2 Subsequent course was unremarkable and baby got discharged from intensive care unit on day 7.

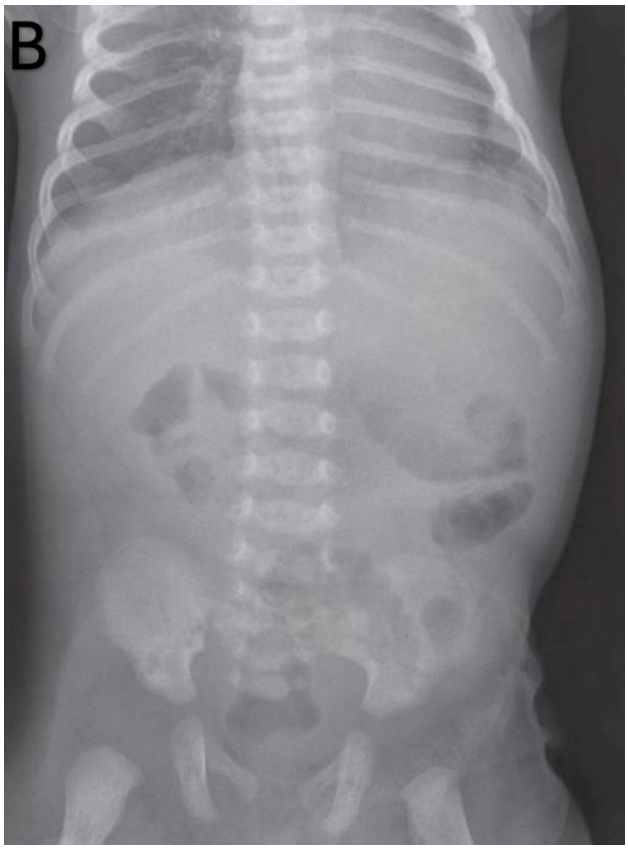

Figure 2: X-ray showing resolution of gastric pneumatosis by day 6.

DISCUSSION

Pneumatosis intestinalis (PI), is characterised by accumulation of gas in bowel wall after bacterial translocation and overgrowth. It represents stage II of modified bell's staging of this condition.[5] This is a radiologic pathognomonic sign of NEC. Although pneumatosis intestinalis can occur anywhere from oesophagus to rectum, gastric pneumatosis is rare and is limited to the stomach. Gastric pneumatosis, although extremely rare, is often seen in fulminant necrotizing enterocolitis where generalized pneumatosis may also involve the gastric musculature.[1,2,6] There have been rare cases of sepsis due gas producing organisms like *E. coli*, Proteus, klebsiella spp., Clostridium spp, *Staphylococcus aureus*, Enterobacter, etc. leading to this condition.[7] In the case of the index newborn, sepsis was most likely the causes of gastric pneumatosis. The condition was managed conservatively by decompressing the stomach and shifting to high-flow nasal canulae.

In the literature gastric PI is subdivided into emphysematous gastritis and gastric emphysema. Emphysematous gastritis is comparatively rare variation that includes inflammatory or infective conditions of the gastric wall with radiographic evidence of intramural gas of infectious origin and systemic toxicity.[2,8] This entity typically presents with prematurity and NEC.[9] The pathogenesis of gastric emphysema is thought to be due to high intragastric pressure that may cause micro-perforations in gastric mucosa and air percolates into gastric wall. This is associated with obstructive conditions affecting the gastric outlet or the proximal intestine.[4]

The intramural gas in gastric pneumatosis may be cystic or curvilinear. Cystic distribution is usually associated with gastric outlet obstructions such as pyloric stenosis, while linear distribution typically stems from mucosal trauma.[1,10] Emphysematous gastritis usually presents with appearance similar to the pneumatosis seen in NEC. In case, features of sepsis including positive cultures, high TLC and C-reactive protein values as well as abdominal distension have raised some concerns about the possibility of NEC. These features of sepsis and fairly sizeable curvilinear gastric pneumatosis, mildly distended small bowel loops on abdominal radiograph may suggest emphysematous gastritis with infective etiology.[11]

In summary, gas within the stomach wall is rare. In newborn, it is usually associated with NEC or gastric outlet obstruction. Differential diagnosis is mainly based on associated clinical findings. The radiographic and clinical findings in the present case illustrate that gastric pneumatosis can be the presenting feature of fulminant NEC.

CONCLUSION

Gastric pneumatosis is a rarely reported condition. In our patient, features of sepsis including positive cultures, high TLC, C-reactive protein values as well as abdominal distension and presence of gastric pneumatosis, mildly distended small bowel loops on abdominal radiograph raised concerns about the possibility of NEC. Prompt recognition and evaluation of this condition are essential for making the diagnosis. Conservative management strategies, including the use of a nasogastric tube for decompression, the withholding of feeding and broad-spectrum antibiotics in view of sepsis, successfully managed the condition in our patient.

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