

## **Answers to Medical Quiz**

Saeed Al Hindi

**A1.** The most likely diagnosis is necrotizing enterocolitis with bowel perforation.

**A2.** Portal air and pneumatosis intestinalis.

### **DISCUSSION**

Necrotizing enterocolitis (NEC) is the most common gastrointestinal emergency in the premature infant. Although NEC is most commonly observed in premature infants, 10% of affected patients are born at term<sup>1</sup>. Its incidence varies between 0.3 and 2.4 infants per 1000 births and 7-11% amongst infants of less than 1500 grams. Male and female are equally affected<sup>2</sup>.

Presentations of necrotizing enterocolitis cases vary and may include feeding intolerance, abdominal distension, bloody stools, apnea, lethargy, temperature instability or hypoperfusion<sup>3</sup>. The abdominal X-ray is the best diagnostic tool in the evaluation of NEC. Pneumatosis intestinalis (air in the bowel wall), when present, is diagnostic of NEC. It is thought to be due to the production of gas from bacterial fermentation of substrate. Portal venous air is seen in about one third of the cases, and has been associated with a worse prognosis in some studies. Pneumoperitoneum in a supine or lateral X-ray might be apparent in cases of intestinal perforation<sup>4,5</sup>.

Common laboratory abnormalities in necrotizing enterocolitis patients include thrombocytopenia, leukocytosis, electrolytes imbalance, metabolic acidosis, hypoxia or hypercapnia. NEC is associated with bacteremia in approximately 30% of the cases, and a blood culture should be obtained before antibiotics are started<sup>5</sup>.

Bell and coworkers have proposed a clinical staging classification to describe NEC severity as follow:

Stage I: Suspect: Infant with suggestive clinical signs but X-ray non-diagnostic.  
Stage II: Definite: Infant with pneumatosis intestinalis. (IIA: mildly ill - IIB: moderately ill (acidosis, thrombocytopenia or ascites). Stage III: Advanced. (IIIA: Critical with impending perforation - IIIB: Critical with proven perforation)<sup>3,5</sup>.

The pathogenesis of NEC remains unknown. Several factors appear to play either a primary or a secondary role: infectious agents, enteral alimentation, mesenteric ischemia and prematurity. NEC occurs mostly in fed infants (90%). This might be due to an increased metabolic demand of the intestine during nutrient absorption, leading to tissue hypoxia and subsequent mucosal injury<sup>3</sup>. NEC have been associated with Klebsiella, E. coli, Clostridia, coagulase negative Staphylococcus, rotavirus, and coronavirus<sup>3</sup>.

Treatment of NEC should be undertaken immediately and includes the following: Nasogastric tube suction and intubation, Prompt intravenous broad spectrum antibiotic therapy, maintain perfusion and early parenteral nutrition<sup>6</sup>. The surgical management of NEC remains controversial. Surgery is indicated if bowel perforation is suspected or if progressive clinical deterioration occurs despite medical management. Surgical options include laparotomy with resection and enterostomy or peritoneal drain placement, allowing abdominal decompression, with a subsequent open procedure required in only half of these patients<sup>4</sup>. NEC mortality ranges from 9 to 28% and is due to refractory shock, disseminated intra-vascular coagulation, multiple organ failure, sepsis, extensive bowel necrosis and complication of short bowel syndrome<sup>7</sup>.

## CONCLUSION

**Necrotizing enterocolitis is the most common gastrointestinal emergency in preterm infants. Cases of NEC are usually presented with feature of sepsis. Several factors appear to play either a primary or a secondary role in pathogenesis of NEC including infectious agents, enteral alimentation, mesenteric ischemia and prematurity. Diagnosis of NEC requires septic work-up and abdominal X-ray. The treatment is mainly medical support and surgical intervention in cases of bowel perforation or failure of medical therapy.**

## REFERENCES

1. Reber KM, Nankervis CA. Necrotizing Enterocolitis: Preventative Strategies. *Clin Perinatol* 2004; 31(1):157-67.
2. Lin HC, Su BH, Chen AC, et al. Oral Probiotics Reduce the Incidence and Severity of Necrotizing Enterocolitis in Very Low Birth Weight Infants. *Pediatrics* 2005; 115(1):1-4.
3. Hsueh W, Caplan MS, Qu XW, et al. Neonatal Necrotizing Enterocolitis: Clinical Considerations and Pathogenetic Concepts. *Pediatr Dev Pathol* 2003; 6(1):6-23.
4. Sharma R, Tepas JJ, Hudak ML, et al. Portal Venous Gas and Surgical Outcome of Neonatal Necrotizing Enterocolitis. *J Pediatr Surg* 2005; 40(2):371-6.
5. Rees CM, Hall NJ, Eaton S, et al. Surgical Strategies for Necrotising Enterocolitis: a Survey of Practice in the United Kingdom. *Arch Dis Child Fetal Neonatal Ed* 2005; 90(2):F152-5.
6. Amin HJ, Zamora SA, McMillan DD, et al. Arginine Supplementation Prevents Necrotizing Enterocolitis in the Premature infant. *J Pediatr* 2002; 140(4):425-31.
7. Hintz SR, Kendrick DE, Stoll BJ, et al. NICHD Neonatal Research Network. Neurodevelopmental and Growth Outcomes of Extremely Low Birth Weight Infants after Necrotizing Enterocolitis. *Pediatrics* 2005; 115(3):696-703.