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Neonatal Appendicitis: A Rare Cause of Surgical Emergency in Preterm Babies

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Neonatal appendicitis is a rare condition. The clinical diagnosis is difficult and majority of cases are diagnosed on laparotomy. This condition is associated with very high morbidity and mortality. We are reporting two cases of neonatal appendicitis in preterm babies managed in our neonatal intensive care unit (NICU) during the last one year.

Case Report

Case 1: A first of dizygotic twins, was born at 31 weeks of gestation to a primigravida who had pregnancy-induced hypertension. The infant weighed 1360 g (appropriate-for-dates) and did not suffer from any birth asphyxia. He passed small quantities of meconium during the first 3 days, but thereafter passed stools only once during the next six days; and that too after glycerine enema. The baby developed

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significant abdominal distension on day 6. Plain radiograph of abdomen showed dilated loops of small bowel. Screening tests for septicemia, occult blood and reducing sugar in stools were negative. The infant was managed conservatively and on day nine a well defined soft lump of the size of 4×2 cm was felt in the right iliac fossa with overlying abdominal wall showing erythema. A gastrograffin enema done at this stage was inconclusive. An abdominal ultrasound study on day 11 revealed that the lump comprised of a mass of bowel loops. The general condition of the baby deteriorated despite antibiotics, parenteral fluids and plasma infusion. The clinical diagnosis of a distal mechanical obstruction with necrotizing enterocolitis (NEC) was considered and an exploratory laparotomy was done on day 12. It revealed an appendicular lump with abscess formation. The appendix was intact but grossly inflamed. There was no evidence of Hirschsprung's disease, NEC, malrotation or intestinal obstruction. Pus was drained and appendectomy was performed. A drain was put in the right iliac fossa. Post-operatively, bowel sounds did not return for five days. Constipation and abdominal distension persisted. Wound infection developed on 5th postoperative day. Pus from the appendicular abscess grew a mixture of Group D Streptococci and Klebsiella. Blood culture grew Klebsiella with identical antibiotic sensitivity. Streptococcus was sensitive to cephaloridine and chloramphenicol, while Klebsiella was sensitive to gentamicin and amikacin. Despite intensive management with appropriate antibiotics (cephaloridine and amikacin), metronidazole, fresh plasma and blood, the child continued to worsen and expired on the 23rd day of life.

Case 2: A male child, was born to a

fourth gravida at 30 weeks of gestation. Baby was delivered by emergency cesarean section for fetal distress. The child at birth weighed 1250 g (appropriate-for-dates) and had severe birth asphyxia. Apgar scores at 1, 5 and 10 min were 1, 4 and 9, respectively. He was resuscitated by bag and mask ventilation followed by intubation and intermittent positive pressure ventilation. Baby was started on 10% dextrose infusion (70 ml/kg/d) after transferring to NICU. He was detected to have asymptomatic hypoglycemia at 6 hours and 25 hours (blood sugars 11 and 23 mg/dl, respectively). These episodes were managed with miniboluses of 2 ml/kg of 10% dextrose. On day three, nasogastric feeds with expressed breast milk (2 ml every two hours) were started. After three feeds he vomited and was noticed to have abdominal distension. There was no lump palpable in the abdomen. Bowel sounds were normal. Laboratory tests for neonatal septicemia were negative. Skiagram for abdomen showed dilated bowel loops. The oral feeds were withheld for 24 hours after which abdominal distension subsided. Nasogastric feeds in small amounts were reintroduced. After 6 hours, he again developed abdominal distension and periumbilical erythema. Nasogastric feeds were stopped and X-ray abdomen was taken, which revealed gas under the diaphragm (*Fig. 1*). Laparotomy was done on day 5 with a clinical diagnosis of NEC with perforation. Appendicular perforation was found on laparotomy. There were no evidences of necrotizing enterocolitis, Hirschsprung's disease or meconium plug. The post-operative period was uneventful. Child received total parenteral nutrition for seven days after which nasogastric feeds were gradually introduced. He was discharged at 5 weeks of age with a weight of 1620 g. The baby is

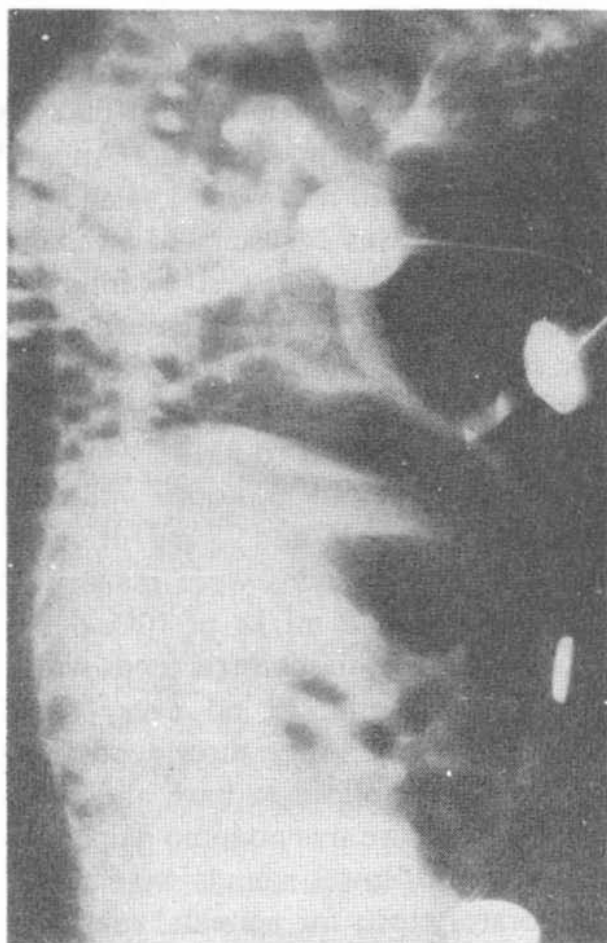


Fig. 1. Lateral skiagram of abdomen showing gas under the diaphragm in Case 2.

under follow up and is doing well at 18 months of age.

Discussion

Ever since Diers(1) in 1908 reported the first case of neonatal appendicitis, there have been around 110 reported cases(2). These include neonatal appendicitis associated with inguinal or umbilical hernia, necrotizing enterocolitis, meconium plug and Hirschsprung's disease(3-5). If one excludes appendicitis associated with other diseases, the isolated cases of neonatal appendicitis number approximately 35 cases. Rarity of this condition has been explained on the basis of persistence of a

wide based funnel shaped fetal appendix, so that it does not get obstructed easily(6). Low residue milk diet, recumbency and low rates of viral respiratory and intestinal infections also account for the rarity of this condition.

Most cases are reported in premature male infants(7). Of the 35 cases of isolated neonatal appendicitis, 23 were males and 12 were females. Their birth weights ranged from 1200-4200 g. Both our cases were preterm males. Our second case is the smallest reported case so far. Signs and symptoms of neonatal appendicitis are similar to those seen in necrotizing enterocolitis(8,9) (Table I). Abdominal distension is the commonest manifestation(10,11). Lump in the right iliac fossa and abdominal wall erythema are uncommon and have been reported in 6 and 8 cases, respectively. Lump was detected in the right iliac fossa in one of our cases (Case 1) while localized erythema of abdominal wall overlying the right iliac fossa was seen in both the cases.

Neonatal appendicitis is a serious condition with an overall mortality rate of 40-80%(12,13). Perforation occurred in 79.4% and mortality in these patients was high as 95%(12). A relatively a high incidence of

TABLE I—Clinical Features (%) of Neonatal Necrotizing Enterocolitis (NEC) and Appendicitis(8,9)

Features	NEC	Appendicitis
Abdominal distension	85	78
Lethargy	9	24
Blood in stools	28	17
Vomiting	28	63
Abdominal mass	5	13
Erythema and edema over the right lower quadrant	24	22
Septic shock	24	—

perforation and mortality appears to be related to failure to understand the significance of symptoms in preterm neonates resulting in delayed diagnosis. The diagnosis was established on necropsy in 56% of reported cases. In others, diagnosis was established only on laparotomy, and in none of the reported cases the diagnosis was suspected clinically. This condition should be seriously considered in the differential diagnosis of necrotizing enterocolitis. Neonates with a lump or erythema in the right iliac fossa, signs of intestinal perforation or peritonitis during early neonatal period should be suspected to have appendicitis. An early diagnosis and timely surgical intervention can reduce mortality in this otherwise uniformly fatal condition.

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Local Tetanus Initially Mistaken as Compressive Thoracic Myelopathy: A Case Report with Electrophysiological Findings

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Tetanus is an acute and often fatal disease caused by an exotoxin in a wound and characterised by generalized increased

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