

Necrotising enterocolitis

Clinical features

Necrotising enterocolitis (NEC) is the commonest neonatal gastrointestinal emergency, with an incidence of 7/1000 births in VLBW infants, but only 0.5/100 births over 2500g birthweight.

It is a disease process involving transmural necrosis and bacterial invasion of the bowel wall, most commonly with gram negative or clostridial organisms. The most commonly affected site is the terminal ileum, but any part of the bowel from stomach to rectum can be affected. Over 90% of babies will have received enteral feeds prior to onset; onset is later in preterm infants. In term infants there are usually hypoxic or ischaemic predisposing factors (such as congenital heart disease, birth asphyxia or twin-twin transfusion).

Onset is often acute, occasionally insidious, with non-specific features compatible with sepsis together with abdominal distension, bilestained aspirates and blood per rectum. Although prognosis is dependent on the amount of bowel affected and co-morbidities, aggressive supportive therapy is essential.

Diagnosis

- Clinical suspicion in any baby with a picture of systemic sepsis with abdominal features.
- Non-specific radiological features (may also be seen in septic ileus)
 - Bowel loop distension
 - Bowel wall thickening
 - Featureless abdomen
- Specific radiological features
 - Pneumatosis intestinalis (intramural gas, which can appear as curvilinear shadows parallel to bowel gas, or a foamy appearance of the bowel wall)
 - Hepatic portal venous gas
 - Pneumoperitoneum (see below)
 - Sentinel loop (fixed dilated or abnormal loop on two successive X-rays)
- In established NEC, there may be evidence of systemic inflammation, with raised CRP, thrombocytopenia, abnormal WBC count, metabolic acidosis, deranged blood glucose and circulatory collapse.

Gastrointestinal perforation

Gastrointestinal perforation can be found as part of NEC, or as an isolated finding (which may not be associated with systemic illness). Radiologically, both will show free peritoneal gas with the following features:

- Anterior radiolucent 'football' on supine film

- Wrigler's sign (air on both sides of the bowel wall)
- Outlining of the falciform ligament in front of the liver

Confirmation with a right side up horizontal beam film, or if the baby is very sick, a horizontal 'shoot-through' film.

Stabilisation for transfer

Airway

The vast majority of babies with NEC require intubation, ventilation and analgesia at some point – it is best to move in early with this support

Breathing

Avoid nasal CPAP. Otherwise standard ventilation to maintain normal blood gases. IN babies with marked abdominal distension or tenderness, high ventilation pressures, adequate analgesia and paralysis may be needed.

Circulation

Major circulatory disturbance is common. It is easy to underestimate volume losses into the abdomen. Volume requirements of 80 mls/kg are not unknown in severe cases. Preferred initial resuscitation is with normal saline; blood, 4.5% albumin, FFP or cryoprecipitate may be needed according to results and clinical response. Maintenance fluids should only be restricted once circulatory stability is attained. Nasogastric losses should be replaced with normal saline. Correction of acidosis with bicarbonate may improve circulatory status. Inotropes are frequently required; dopamine is a good first choice, dobutamine may be given second line (both of these can be given through peripheral lines).

Urgency of transfer

At diagnosis of NEC, discussion with a tertiary centre is advisable. For those without perforation, first line treatment is aggressive medical management. If this can be provided locally, transfer is not required, otherwise transfer immediately to a Level 3 centre. With perforation, or failure to respond to medical management, discussion with a surgical consultant is required, with a view to urgent transfer if indicated.

Feeds – stop enteral feeds

NG tube – largest appropriate (8 or 10 FG)

Antibiotics

Penicillin, gentamicin & metronidazole, or local antibiotics effective against likely enteric organisms (gram-negatives, clostridia and enterococci) or patient's proven flora.

Special

NEC is a painful condition and analgesia up to 40 mcg/kg/hr of morphine may be required, with additional boluses for movement or handling.

A peritoneal drain may be lifesaving with a tense pneumoperitoneum compromising ventilation. This should not be used in the absence of radiological evidence of free gas in the peritoneal cavity. Discuss procedure with consultant surgeon if there is time.

Transfer

If the baby requires transfer, an experienced transfer team is generally required.

Information to parents

The baby with NEC is critically ill, with a mortality risk of 20-25%. The need for medical management or surgery will be assessed by the receiving team. Surgery may involve bowel resection, stoma formation, but if there is total bowel necrosis there may be an 'open and close' laparotomy. Even after successful surgery there is a risk of short gut, malabsorption or intestinal failure.

Consent

Although the surgeon performing the operation ideally obtains consent, in the critically ill baby it may be useful to obtain provisional assent/consent, especially if the parents will have difficulty in getting to the surgical centre. In this case, ensure that contact numbers are obtained to allow telephone consent to be obtained.