

Neonatal appendicitis: A rare presentation of necrotising enterocolitis in a term infant

Subash Rao, Nandita Saxena, Kumar Salvii, Vishwas Chavan

From Consultant, Department of Pediatrics and Pediatric Surgery, Fortis Hiranandani Hospital, Navi Mumbai, Maharashtra, India

ABSTRACT

Appendicitis is one of the rare causes of acute abdomen in the neonatal age group. We describe one such case in a term baby and discuss its pathogenesis as one of the presentations of Necrotising Enterocolitis.

Key words: Neonatal appendicitis, Necrotising enterocolitis, Peritonitis

Neonatal appendicitis (NA) is an uncommon condition with a reported incidence of 0.04–0.2% [1]. The pathogenesis still remains to be elucidated but likely causes implicated are necrotising enterocolitis (NEC), Hirschsprung's disease (HD), and meconium ileus to name a few [2-5]. Clinical signs and radiological investigations often fail to pin-point the diagnosis of this condition and, hence, there is often a delay in surgical management leading to complicated presentations [6-8]. We present such a case of neonatal perforated appendicitis in a term baby. We affirm that a high index of suspicion is needed to make a prompt diagnosis so that surgical management is not delayed. We also discuss how acquired causes may play a role in its pathogenesis.

CASE HISTORY

A 25-day-old 3.2 kg male baby was brought with complaints of passing bloody and sticky stools for 3 days. This was associated with 2–3 episodes of non-bilious vomiting and poor feeding for 1 day. The baby was taking bottle feeds due to lactation failure in the mother. However, the sterilization practice was sub-standard. The birth history and early neonatal period were unremarkable.

The general examination revealed a sick baby with pallor, fever, and tachycardia. There was generalized abdominal distension with tenderness and a lumpish feel in the right lower quadrant. On laboratory investigations, a complete blood count showed anemia (10.6 g/dl), leukocytosis (16600/mm³) with toxic granules, and normal platelets. The C-reactive protein was 75 U/ml. The stool examination had blood, mucous, and occasional leucocytes.

An erect abdominal X-ray showed air-fluid levels in the upper abdomen and paucity of gas in the lower abdomen.

A differential diagnosis of NEC with septic ileus or intestinal obstruction was considered at this stage and the baby was kept nil by mouth and started on parenteral antibiotics. An abdominal ultrasonography (USG) revealed telescoping of bowel loops (Target Sign) in the right iliac fossa with maintained vascularity – suggestive of ileocolic intussusception.

Hence, with this diagnosis, USG-guided hydrostatic reduction of the intussusception was tried in the operating room. However, it was not successful and exploratory laparotomy was performed. Intraoperatively, there was organized pus in the right iliac fossa with an inflamed perforated appendix. The small bowel was congested but no gangrene was present (Fig. 1). The pus and interbowel adhesions were cleared and appendectomy was done. Since HD could not be ruled out in the emergent situation, a diverting ileostomy was done. Postoperatively, the child recovered uneventfully. Histopathology showed features of appendicitis with adequate ganglion cells. Subsequently, a full thickness rectal biopsy done after 2 months ruled out HD and the ileostomy was successfully closed. The child is at present thriving well 6 months later.


DISCUSSION

NA is a rare cause of acute abdomen in an infant. The theories of etiopathogenesis include: HD [2], NEC due to prematurity [3-5], and meconium ileus. The appendix as a site of involvement in NEC has been reported in a few studies to date [3-5].

In our case, however, the baby was a term delivery. Hence, NEC which is related to prematurity may not have been the probable

Correspondence to: Dr. Nandita Saxena, Consultant, Department of Pediatrics and Pediatric Surgery, Fortis Hiranandani Hospital, Navi Mumbai, Maharashtra, India. E-mail: drnanditasaxena@gmail.com

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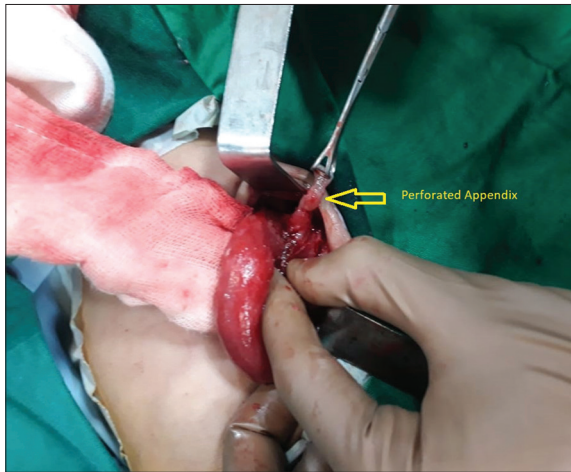


Figure 1: Intra-operative photo of inflamed perforated appendix

cause. Other recent studies have also seen the incidence of NA to be more in term babies. In the meta-analysis by Raveenthiran *et al.* [6], it is suggested that NA may be a localized form of NEC as it has many overlapping pathogenic mechanisms with NEC. However, the study found that NA presented more in term rather than preterm babies as was in our case.

Our baby had improper feeding practices with substandard hygiene. This could have led to a localized infective enterocolitis. The localized appendicular involvement can be explained by: Blockage of the appendicular lumen by the relatively formed top feed stools and a generalized colonic involvement which complicated early in the region of the appendix causing acute abdomen. Further studies are needed to substantiate these theories.

A review of the literature emphasizes the complicated nature of presentation of NEC affecting the appendix which requires definitive surgery only for the treatment [6-10]. The complicated presentation could be attributed to thin mucosal wall and the narrow lumen of the appendix more likely to perforate earlier or a delay in the diagnosis of this rare condition [7]. Hence, a high degree of suspicion of NA should be kept in term neonates presenting with features of NEC with a surgical abdomen.

Radiological investigations have a limited role in establishing a diagnosis due to the rarity of this entity and should be looked at with caution [6,9]. As was in our case, the finding of intussusception on USG misguided us to attempt reduction which most certainly failed. A CECT of the abdomen would have probably helped in the diagnosis. Mortality of patients with NA has been suggested as high as 23–28% [6]. This has been mainly due to the delay in diagnosis [10]. Hence, a sound knowledge of this entity and early laparotomy would significantly help to reduce the high death rate of NA.

CONCLUSION

NA is difficult to diagnose clinically and radiologically. It can be suspected in a term baby with NEC. Acquired extrinsic factors may be involved in its etiology. Even though it is a rare condition, it should be suspected in all cases of acute abdomen

with NEC so that prompt surgical management can improve outcomes.

DECLARATIONS

Availability of Data and Material

All authors declare that all data and materials as well as software application or custom code support their published claims and comply with field standards. These can be made available on request to the reviewers.

Authors' Contributions

All authors whose names appear on the submission; Subash Rao – Made substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data; or the creation of new software used in the work; Nandita Saxena – Drafted the work or revised it critically for important intellectual content; Kumar Salvii – Approved the version to be published; and Vishwas Chavan – Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Ethics Approval

The approval was obtained from the ethics committee.

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