

# Neonatal Ruptured Appendicitis: Report of A Rare Case

\*C. O. BODE, \*\*M. T. C. EGRI-OKWAI, \*S. D. ADEYEMI, \*\*\*A. A. E. BANJO, \*\*E. IROHA, \*\*E. A. DISU

\* Paediatric Surgery Unit, Department of Surgery,

\*\*Neonatal Unit, Department of Paediatrics,

\*\*\*Morbid Anatomy Department;

College of Medicine, University of Lagos,

Idi-Araba, Lagos, Nigeria.

Correspondence to: Dr. C. O. Bode

*Perforated appendicitis is acknowledged a very rare condition in the newborn, with just about a hundred cases reported in the world literature till date. The instructive case of a low birth weight, premature baby with neonatal necrotising enterocolitis (NNEC) which subsequently involved the appendix resulting in perforation is presented to highlight the aetiological relationship with NNEC.*

**KEY WORDS:** Neonatal appendicitis; necrotising enterocolitis; appendicular perforation; peritonitis.

Appendicitis is rare in the newborn, often presenting with rupture and peritonitis<sup>1</sup>, usually as a result of local involvement of the appendix in neonatal necrotising enterocolitis (NNEC).

As far as we are aware, this is the first such case from this part of the world. Features of NNEC were noted in the patient and the need for prompt surgical intervention in order to minimise the reportedly high attendant mortality of this condition is advocated.

## Case Report

A 1.8 kg preterm male baby was admitted via the Children's Emergency Room of the Lagos University Teaching Hospital on the second day of life for prematurity, low birth weight and birth asphyxia in December 1994. The baby was the second of a set of twins delivered after a 30-week gestation and referred from a private hospital in Lagos. He was ill, refused feeds and had a few episodes of bilious vomiting at presentation. Admission diagnosis was NNEC.

He had a leucocytosis of  $17,000/\text{mm}^3$  and *Klebsiella* was cultured from the blood. Initial treatment consisted of Cefazidime, Metronidazole and Gentamicin. The patient however developed jaundice and abdominal distension with hypoactive bowel sounds in the second week of life. Two days later, a shiny anterior abdominal mass was noticed in the right iliac fossa. Plain abdominal radiographs revealed several air/fluid levels and pneumoperitoneum. A pre-operative diagnosis of bowel perforation from NNEC was made.

At exploratory laparotomy under local anaesthesia, a ruptured appendix with pyo-pneumoperitoneum was noted. Appendectomy was performed and the peritoneum

copiously lavaged with saline. Delayed primary closure was employed for the wound.

The baby responded well to the initial antibiotic regimen which was maintained post-operatively. He also had blood transfusion to correct sepsis-induced anaemia. Wound sepsis and partial dehiscence complicated the post-operative phase.

Peritoneal fluid and appendix stump cultures yielded *Escherichia coli* resistant to 3rd generation cephalosporins and Augmentin but, curiously, sensitive to Ampicillin. Histopathology of the appendix was reported as Acute Necrotising Appendicitis with peritonitis (Figure 1).

Figure 1: H & E x100

Sections of Appendix showing necrosis of the entire wall thickness with infiltrate of acute inflammatory cells.

# Discussion

Compared to its common occurrence in older children, perforated appendix is rare in neonates<sup>2, 3</sup>. Several large studies on appendicitis in the paediatric age group and many others on neonatal peritonitis failed to identify perforated appendicitis in the newborn<sup>4-6</sup>. Bartlett in a review of childhood appendicitis over a fifteen year period in Boston saw only one neonate with this condition<sup>7</sup>. The subject first gained prominence in medical literature in 1960 when Schaupp<sup>8</sup> reviewed five neonates with this condition, along with 19 autopsy cases, making a total of 24 reported cases. The next two decades witnessed the addition of about twenty more case reports to the world literature and this figure has only reached a mere 100 by 1992<sup>9</sup>. The present case is the first to be reported from this subregion to the best of our knowledge.

Obstructive causes of appendicitis are all rare in neonates because of their wide, conical appendiceal base<sup>10</sup>. Rather, recent literature increasingly supports the notion that neonatal perforated appendix is inexorably linked to neonatal necrotising enterocolitis (NNEC)<sup>9</sup>. Bax<sup>3</sup> stated that perforated appendix in the newborn, in most cases, is a localised NNEC involvement of the vermiform appendix. A few other cases have been attributed to complications of Hirschsprung's disease and meconium plug syndrome from unrelieved large bowel obstruction, a view yet to gain universal acceptance<sup>3, 11, 12</sup>.

The patient presented in this report was admitted and initially managed as NNEC based on clinical features. When NNEC is complicated by bowel perforation, abdominal distension, peritonitis and pneumoperitoneum may feature as noted in this patient<sup>13</sup>. The histopathology in the baby was also in keeping with localised, full thickness ischaemic necrosis classically described in isolated organ involvement of the appendix in NNEC<sup>3</sup>. As care of premature babies, low birth weight babies and others predisposed to NNEC improves in our subregion, it is likely that more cases of NNEC-related perforated appendix may be seen.

Management of the neonate with perforated appendix is no different from others with peritonitis, since in most cases, the diagnosis is often made only at laparotomy. It is therefore imperative that the previously described signs of peritonitis be identified early in the course of the disease. A vigorous resuscitation regimen of intravenous fluids, broad spectrum antibiotics and nasogastric decompression should then be instituted in preparation for a laparotomy. Speed is of utmost essence in these cases as the mortality of neonatal perforated appendix is very high. While Schaupp's<sup>8</sup> report revealed a mortality rate of 88%, the diagnosis was often made at post-mortem. Mortality rate was 81% in Parson's<sup>2</sup> review of 31 cases. In a review of 32 children with appendicitis in the first two years of life by Grosfeld<sup>14</sup>, all the three deaths occurred in neonates.

The dearth of qualified paediatric anaesthetist with neonatal experience should not prolong the surgical inter-

vention time. Skill and experience in the use of local anaesthesia in this age group is an advantage in the successful management of cases such as the one presented here<sup>15</sup>.

# References

1. Koops B. L., Battaglia F. C. The newborn infant. In: Kemp C. H., Silver H. K., O'Brien D. (eds.) *Current Pediatric Diagnosis and Treatment*. 8th Edition. Lange, California 1984; 41-95.
2. Parsons J. M., Miscall B. G., McSherry C. K. Appendicitis in the newborn infant. *Surgery* 1970; **67**: 841-3.
3. Bax N. M. A., Pearse R. G., Dommering N., Molemaar J. C. Perforated appendix in the neonatal period. *J. Pediatr. Surg.* 1980; **15**: 200-202.
4. Fonkalsrud E. W., Ellis D. G., Clatworthy H. W. Neonatal peritonitis. *J. Pediatr. Surg.* 1966; **1**: 227-239.
5. Schwartz M. Z. Management of perforated appendicitis in children. *Ann. Surg.* 1933; **197**: 407-411.
6. Lloyd J. K. The aetiology of gastrointestinal perforation in the newborn. *J. Pediatr. Surg.* 1969; **4**: 77-83.
7. Bartlett R. H., Eraklis A. J., Wilkinson R. H. Appendicitis in infancy. *Surg. Gynecol. Obstet.* 1970; **130**: 99-104.
8. Schaupp W., Clausen B. G., Perrier P. K. Appendicitis during the first month of life. *Surgery* 1960; **48**: 805.
9. Gryboski J. D. Disease of the colon, rectum and anus in children. In: Kirsner J. D., Shorter R. G. (Eds.) *Diseases of the colon, rectum and anal canal*. 5th edition. Williams and Wilkins, Baltimore 1992; 595-687.
10. Condon E. E. Appendicitis. In: Sabiston D. C. Jr. (Ed.) *Textbook of Surgery*. 13th edition. Saunders, Philadelphia 1992; 967-982.
11. Martins L. W., Perrin E. V. Neonatal perforation of the appendix in association with Hirschsprung's disease. *Ann. Surg.* 1967; **166**: 799-802.
12. Gastrin U., Josephson S. Appendiceal peritonitis and megacolon in the neonatal period. *Acta Chir. Scand.* 1970; **136**: 153-155.
13. deLorimier A. A. Necrotising enterocolitis. In: Way L. W. (ed.) *Current Surgical Diagnosis and Treatment*. 8th edition. Appleton and Lange, Connecticut 1990; 1114-1115.
14. Grosfeld J. L., Weinberger M., Clatworthy H. W. Jr. Acute appendicitis in the first two years of life. *J. Pediatr. Surg.* 1973; **8**: 285-292.
15. Adeyemi S. D. Newborn Surgery under Local Anaesthesia. In: Rickham P. P., Hecker W. C. H., Prevel J. (eds.) *Progress in Pediatric Surgery*. Baltimore-Munich: Urban and Schwarzenberg 1982; **13**: 17-23.