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Neonatal primary peritonitis in Nigeria

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Duggan, M. B., and Khwaja, M. S. (1975). *Archives of Disease in Childhood*, **50**, 130. **Neonatal primary peritonitis in Nigeria.** Six cases of neonatal primary peritonitis admitted to Ahmadu Bello Hospital, Zaria, between January 1972 and July 1973 are reported, of whom 4 survived. All patients had evidence of umbilical sepsis, while 2 had erythema marginatum, which has not previously been reported in this condition. The importance of peritoneal aspiration and *x*-ray of the abdomen in establishing the diagnosis is stressed, as is prevention of umbilical sepsis by increased health education.

While neonatal peritonitis as a complication of gut perforation due to obstruction following gut atresia or meconium ileus is well known, primary peritonitis in this age group is rare. Among 172 cases of neonatal peritonitis seen during 15 years in Columbus, Ohio, Fonkalsrud, Ellis, and Clatworthy (1966) recorded only 9 cases of primary peritonitis. However, Singer and Hammar (1972), writing from Salisbury, Rhodesia, found 12 cases of primary peritonitis among 32 newborn babies with peritonitis due to various causes, and it is likely that the frequency is higher in developing countries. We report here 6 babies with neonatal primary peritonitis seen during 18 months in Zaria, Northern Nigeria.

Materials and methods

Cases. 6 neonates with primary peritonitis were admitted to Ahmadu Bello University Hospital between January 1972 and July 1973. All were Hausa; sex, age, and major presenting features are given in Table I.

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Clinical. The signs on examination were variable. Not all the babies appeared ill, though all were febrile and 4 had significant tachycardia. None was clinically dehydrated or jaundiced. All showed marked abdominal distension and signs of umbilical sepsis varying from a periumbilical flare to frank purulent discharge. There was no oedema of the abdominal wall, but in 3 cases distended cutaneous veins were observed coursing upwards from the umbilical area. In 2 babies there was a curious generalized migratory skin rash, resembling erythema marginatum, which persisted for several days. In one of these babies, β-haemolytic streptococcus was grown from both peritoneal fluid and blood culture. Intra-abdominal viscera were not palpably enlarged and bowel sounds were absent in all except one patient. The main clinical signs are summarized in Table II.

Investigations. Apart from the routine investigations indicated in Table III, diagnostic peritoneal aspiration was performed in five cases, the chosen site being the right or left lower quadrant, and in all cases cloudy fluid was aspirated and a positive culture obtained in 3. Abdominal *x*-ray in 5 patients showed fluid levels in 2 and distended loops of small gut in 3, and in all 5 there was hazy fluid separating the loops of gut.

TABLE I

Presenting features

Case no.	Age (d)	Sex	Abdominal distension (d)	Obstipation (d)	Vomiting (d)
1	22	F	2	1	0
2	5	F	4	0	0
3	22	M	14	0	0
4	21	M	14	2	0
5	26	F	3	2	2
6	19	F	14	1	0

TABLE II

Main clinical signs

Case no.	Rectal temperature (°C)	Distension	Visibly distended abdominal veins	Skin rash	Obvious umbilical sepsis	Bowel sounds
1	39·4	+	0	0	+	0
2	37·8	+	+	0	+	0
3	37·8	+	+	+	+	?
4	38·4	+	0	+	+	0
5	37·8	+	+	0	+	0
6	37·8	+	0	0	+	0

Negative history and absence of the characteristic radiological signs excluded perforation of a viscus and necrotizing enterocolitis.

Management. This was conservative except when the diagnosis was uncertain. The babies were nursed in incubators, and intravenous fluids and nasogastric suction continued until peristalsis was re-established. Penicillin and streptomycin were used except where noted in Table IV. Treatment and results are summarized in Table IV.

Surgical management. In the 2 cases in which laparotomy was undertaken to establish the diagnosis, purulent peritoneal fluid was the sole pathological finding. Peritoneal toilet was performed and the abdomen closed with a drain; management thereafter being similar to that described above. However, the first baby died almost immediately; the other developed a burst abdomen on the sixth day, and later a faecal fistula, and he died 2 weeks after operation. On neither baby was a necropsy performed because of local custom.

Complications. One baby was initially oliguric with a blood urea of 100 mg/dl, falling to 30 mg within 2 days. This baby (Case 5) was readmitted 2 months later with obvious intestinal obstruction, and at laparotomy dense adhesions were found causing a secondary jejunal stenosis. Jejunostomy was performed and

TABLE III

Investigations

Case no.	Haemoglobin (g/dl)	White blood count (/mm³)	Peritoneal aspiration performed	Bacteriology	
				Peritioneal aspirate culture	Blood culture
1	10·9	5 900	+ Laparotomy	β Haemolytic streptococcus	Negative
2	No result	No result	+	Klebsiella	Negative
3	9·8	10 400	+	β Haemolytic streptococcus	β Haemolytic streptococcus
4	10·6	37 300	+	No result	Negative
5	7·9	No result	+	Not cultured	Negative
6	No result	No result	Laparotomy	*Pseudomonas pyocyanea*	Negative

TABLE IV

Treatment and outcome

Case no.	Antibiotics	Management	Result
1	Penicillin, kanamycin	Laparotomy	Collapsed and died day 1
2	Penicillin, streptomycin	Conservative	Recovered
3	Penicillin, streptomycin	Conservative	Recovered
4	Penicillin, streptomycin	Conservative	Recovered
5	Penicillin, streptomycin	Conservative	Recovered
6	Ampicillin	Laparotomy	Burst abdomen, faecal fistula; died 14th postoperative day

she recovered. Otherwise the 4 medically treated patients recovered uneventfully and the 2 operated patients died.

Discussion

Primary peritonitis in older children presents a very different picture being associated with fulminating diarrhoea, abdominal pain, and hypovolaemic shock (Fogel, Karpa, and Luxenberg, 1964). It is more common in girls and has been associated with ascending infection of the female genital tract (Golden and Shaw, 1972), though Fowler (1971) considers the earlier theory of transmural spread of infection from the gut lumen worth reappraisal. There is also a recognized association with nephrotic syndrome and hepatic cirrhosis, where lowered immunity and ascites are predisposing factors (Golden and Shaw, 1972; Harken and Shochat, 1973).

The relevance of diminished immunity in the neonate has not been studied, but since early days (Thore, 1846) umbilical phlebitis and resultant haematogenous infection have been considered important. Singer and Hammar (1972) found evidence of umbilical sepsis in 8 out of 12 African newborns with primary peritonitis. All our patients had umbilical sepsis, and though local traditional practice involves cautery rather than fomentations, there is still risk of infection.

Germain, Jezequel, and Coutel (1968) discussed the clinical and radiological differential diagnosis of neonatal peritonitis, stating that in meconium peritonitis early presentation with vomiting, distension, and failure to pass meconium is the rule together with characteristic *x*-ray finding of intraperitoneal calcification. In the other types of neonatal peritonitis vomiting and distension are of later onset, and on *x*-ray, pneumoperitoneum is constantly observed after gut perforation, while in primary peritonitis, the *x*-ray appearance of intra-abdominal fluid—especially if there are no fluid levels, may mimic ascites or haemoperitoneum.

The practice of diagnostic aspiration is widely recommended by Fowler (1971), Singer and Hammar (1972), Fogel *et al.* (1964), and Germain *et al.* (1968), though the latter suggest caution if meconium peritonitis is suspected because of the danger of puncturing an adherent loop of gut. Fowler (1971) recommends, in addition, Gram staining the peritoneal aspirate and adjusting management accordingly.

The interesting association of erythema marginatum with primary peritonitis does not appear to have been described. Erythema marginatum, one of the major signs of rheumatic fever, is a skin rash associated with streptococcal infection. This association was proven in one patient since β-haemolytic streptococcus was grown from both blood and peritoneal fluid.

Conservative management of primary peritonitis is generally recommended (Germain *et al.*, 1968; Singer and Hammar, 1972; Fonkalsrud *et al.*, 1966; Fowler, 1971) if perforation can be confidently excluded. Fonkalsrud *et al.* (1966) stressed the importance of general resuscitation including temperature control and central venous pressure monitoring where possible. Though Singer and Hammar (1972) found hypothermia a problem in their Rhodesian babies, it was not a factor in the present series, probably because the babies were locally born.

Choice of antibiotic will depend on the organism expected. In our small series the 4 surviving patients were treated with penicillin and streptomycin, but this simple treatment is probably only justified where resistant organisms are rare and drug costs a constant problem. The use of chloramphenicol or tetracycline, as suggested in 1966 by Fonkalsrud, would be replaced now by a combination of penicillin and kanamycin or gentamicin, and constant watch kept for new organisms or changing sensitivities (Davies *et al.*, 1972).

Finally, in writing from a developing country where umbilical sepsis is common and often lethal, one must emphasize prevention and the importance of instructing mothers in simple methods of cord care.

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