LIVER DAMAGE IN FATAL GASTRO-ENTERITIS

C. ISAACSON, M.B., B.CH. (RAND), D.C.P. (LOND.), D.PATH.; and A. SCHMAMAN, M.B., B.CH. (RAND)

South African Institute for Medical Research and Baragwanath Hospital, Johannesburg

There is little recorded in the literature on liver damage in fatal gastro-enteritis. Various authors have described fatty change,[1] necrosis,[2] hepatitis[3] and even cirrhosis.[4]

In view of the varied opinions expressed, it was felt that a systematic histopathological study of the livers of subjects dying of gastro-enteritis would be of some interest.

MATERIAL AND METHODS

The material examined was obtained from 22 consecutive autopsies on Bantu children dying from the effects of gastro-enteritis. Several blocks of liver were examined histologically, and numerous sections of the common bile duct were also examined. These included a study of the lymphoid tissue and lymphatics in the porta hepatis. In addition an attempt was made to culture pathogenic organisms from postmortem tissue.

RESULTS

The findings are summarized in Table I. The ages of the subjects varied from 2 weeks to 36 months, a period in which the ravages of severe malnutrition, associated with bowel and respiratory infections, result in a high mortality in the Bantu paediatric population. There were 15 females and 7 males. Salmonellae were isolated in 9 cases. *B.proteus* or *E.coli* were cultured in 10 cases, but, since phage-typing was not carried out, the significance of these organisms could not be determined. Sixteen cases showed varying degrees of hepatic steatosis, a common finding in

TABLE I. SUMMARY OF FINDINGS IN GASTRO-ENTERITIS

Case	*Age in months*	*Sex*	*Fatty change*	*Organisms isolated*	*Clinical jaundice*	*Intrahepatic cholestasis*	*Cellular infiltrate in portal tracts*	*Focal necrosis of liver*
1	1	M	Absent	*E. coli*	—	+	—	+
2	2	F	Mild	Salmonella	—	—	—	+
3	10	F	Mild	*B. proteus. E. coli*	—	—	+	—
4	16	F	Marked	Salmonella	—	—	+++	+
5	4	F	Marked	Salmonella	—	+	+	—
6	16	M	Gross	Salmonella	+	+	+	+
7	18	M	Mild	—	—	—	+	—
8	11	M	Moderate	Salmonella	—	—	+	—
9	3	M	Moderate	Salmonella	+	+	+++	+
10	14	F	Gross	*B. proteus. E. coli*	—	—	++	—
11	12	F	Marked	Salmonella	—	—	+	+
12	18	F	Slight	*E. coli*	—	—	++	—
13	3	M	Absent	—	—	—	—	—
14	17	F	Absent	*E. coli. B. proteus*	—	—	+	—
15	8	F	Mild	Salmonella	—	—	+	—
16	24	F	Marked	*B. proteus.* Coliform	—	+	+	—
17	12	F	Absent	Salmonella	—	—	—	—
18	9	F	Marked	Proteus and coliform	—	+	++	—
19	36	F	Gross	—	—	—	+	—
20	½	M	Absent	*B. proteus. E. coli*	—	—	—	—
21	11	F	Moderate	*B. proteus. E. coli*	—	—	+++	—
22	4	F	Moderate	*E. coli*	—	—	+++	—

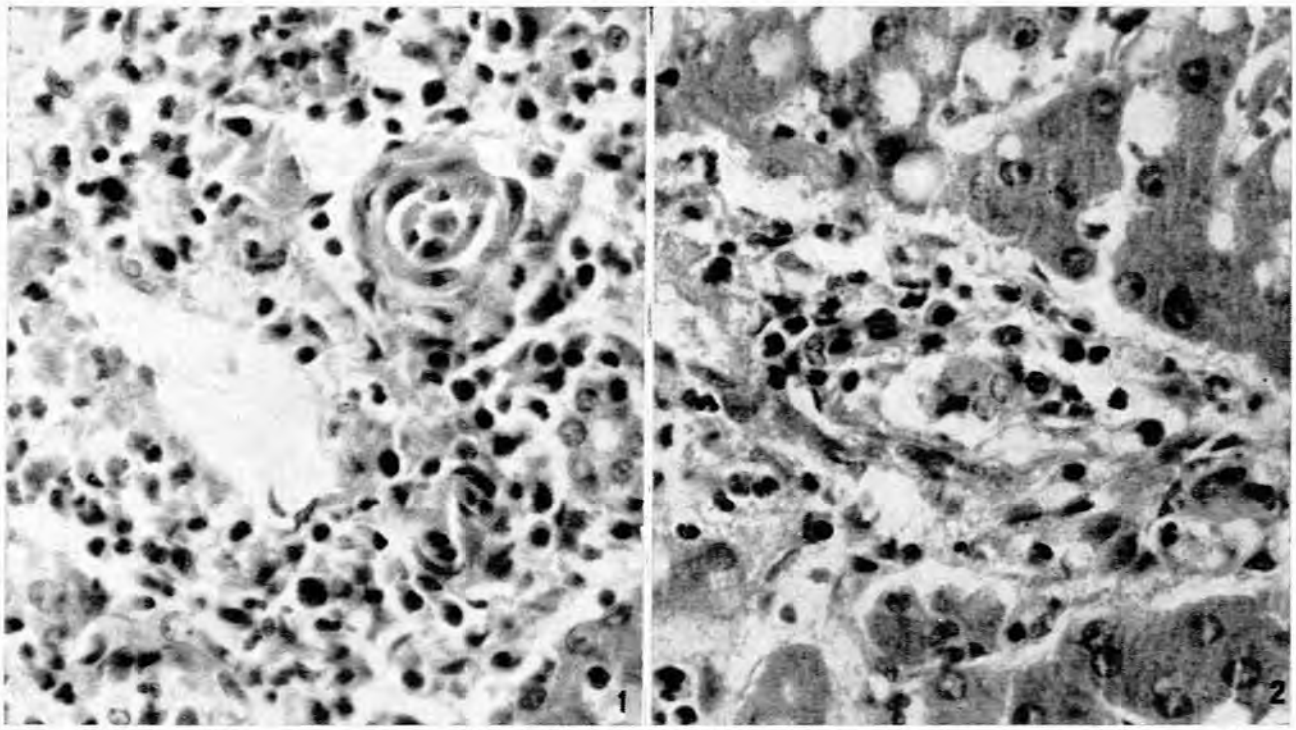

Fig. 1. Section of liver showing heavy cellular infiltrate round portal venule. The bile ducts are normal (haematoxylin and eosin × 600).
Fig. 2. Cellular infiltrate extending from lumen of portal venule through wall into surrounding fibrous tissue (haematoxylin and eosin × 600).

this age group in which kwashiorkor is so prevalent. It was thus impossible to separate the effects of gastro-enteritis from those of malnutrition in the pathogenesis of the fatty liver. A similar situation existed with regard to bile stasis. The 2 cases that showed clinical jaundice also had fatty livers, and of the 6 cases with histological intrahepatic cholestasis, 5 had hepatic steatosis. There is little doubt that the fatty liver by itself can, on occasion, produce bile stasis and clinical jaundice.

Several cases had infiltrates of varying severity in the portal tracts. The infiltrating cells were generally an admixture of lymphocytes and neutrophils, and were present in large numbers in only 4 cases. Mild cellular infiltration of the portal tracts is a frequent autopsy finding in Bantu subjects dying of diseases other than gastro-enteritis, but a heavy infiltrate probably represents the effect of the gastro-enteritis. In such instances the inflammatory cells were spread diffusely in the portal fibrous tissue. It was possible in some cases to see the infiltrate spreading out from the lumen of the portal vein through the wall into the surrounding tissue (Figs. 1 and 2). Involvement of bile ducts was never observed.

Six cases showed focal necrosis, and this was distributed at random in the lobule. In general, the areas of necrosis were small and infiltrated by neutrophils (Fig. 3).

In an attempt to demonstrate an ascending cholangitis, the common bile duct was examined at numerous levels. There was no evidence in any of the subjects that infection reached the liver *via* the biliary tract. The lymph nodes of the porta hepatis showed some degree of cellular infiltration and reactive hyperplasia in 10 cases.

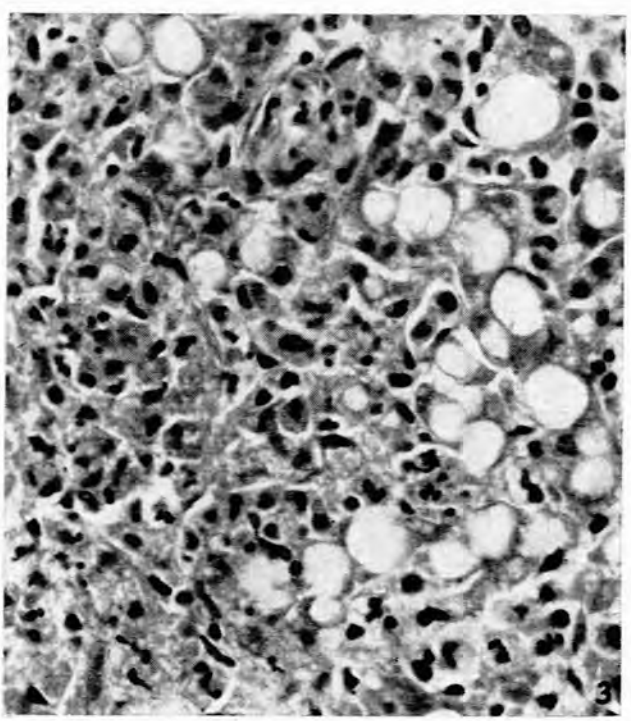

Fig. 3. Area of hepatic-cell necrosis with neutrophil infiltration and fatty change in surrounding liver cells (haematoxylin and eosin × 80).

DISCUSSION

Bonham-Carter,[1] in a study of the liver in fatal cases of diarrhoea and vomiting in infants, described fatty change and fibrosis starting in the portal areas, and foci of miliary necrosis. Since the undernourished infant contracts gastro-enteritis easily, it is possible that the fatty change and portal-tract fibrosis may have been the result of malnutrition, although in this population, where kwashiorkor and fatty liver are commonplace, portal-tract fibrosis and cirrhosis do not appear to be an end-result.[5]

Wainwright[3] described a form of hepatitis associated with jaundice and infantile diarrhoea. The main features were periportal necrosis of parenchymal cells with an infiltration of inflammatory cells and a proliferation of bile canaliculi and fibroblasts. He felt that the hepatitis was caused by a toxin reaching the liver through the blood stream, and suggested a possible relationship between this form of hepatitis and congenital biliary cirrhosis.

Because fatty change in the liver is virtually a constant finding in kwashiorkor, hepatic steatosis could not be used as an indication of liver damage in gastro-enteritis. In fact, the only finding of significance in our cases was the presence of miliary areas of necrosis; these were present in little more than 25% of cases. Mild clinical jaundice or intrahepatic cholestasis is frequently seen in hepatic steatosis, and this could not be shown to result from an ascending cholangitis as has been suggested by Parker.[6] In fact we were never able to demonstrate involvement of the liver *via* the biliary channels, and in cases where the cellular infiltrate in the portal areas was marked, the infection seemed to have reached the liver by way of the portal vein. The infiltrate in the portal tracts was in general not very heavy, but occasionally consisted of large numbers of neutrophils.

CONCLUSIONS

In the majority of cases of fatal gastro-enteritis there are no characteristic findings in the liver. Hepatic steatosis and intrahepatic cholestasis may result from malnutrition and cannot be attributed to the gastro-enteritis. Heavy cellular infiltration in the portal tracts is seen in a proportion of cases, and in such circumstances the infection appears to reach the liver *via* the portal tracts and not the bile ducts. In a small number of subjects areas of miliary necrosis of the liver may be observed.

SUMMARY

The liver lesions in 22 consecutive fatal cases of gastro-enteritis in children are described and the possible pathogenesis discussed.

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