Enteric fever: do elevated liver enzymes influence outcome?

Enteric fever is frequently associated with abnormal liver function tests [1,2], and can mimic other infections such as malaria and amoebiasis. Severe hepatic involvement with clinical features of acute hepatitis (i.e. typhoid hepatitis) is rare. We sought to compare the clinical and laboratory features and outcome of patients with enteric fever with and without biochemical liver abnormalities.

From January 1995 to December 2003, 108 patients with blood culture positive enteric fever and in whom liver function tests were also available were identified. Data extracted from in-patient records included history and physical examination, and laboratory tests including complete blood counts, serum creatinine, malaria blood smear, blood culture, hepatitis A virus IgM antibody, hepatitis B surface antigen (HBsAg), hepatitis B core IgM, anti-HCV antibody, hepatitis E virus antibody, and liver function tests including bilirubin, alanine aminotransferase (ALT), and alkaline phosphatase. Other causes of hepatitis such as alcohol, medications, malaria, and viral hepatitis were excluded.

Of 663 patients identified over the 8-year study period with blood cultures positive for either *Salmonella typhi* or *S. paratyphi*, 108 had at least one set of serum liver function tests. Seventy two (67%) patients had elevation of at least one liver-associated enzyme; 46 (64%) were males and the mean (± SD) patient age was 30 ± 13.4 years. Clinical and laboratory features and outcomes are summarised in the Table1 . Clinical features did not differ between groups.

Elevation in serum liver associated enzymes is common and have been previously reported in 50–100% of patients with enteric fever [1, 2]. Our study found a similarly high incidence of liver dysfunction (67%), and we confirmed that, in most instances, the serum bilirubin is normal and there are only modest increases in the levels of serum transaminases and alkaline phosphatase. There were no differences in the incidence of complications, length of hospitalisation, or eventual outcome in the two groups of patients.

In contrast, the occurrence of typhoid hepatitis is rare, associated with clinical jaundice and conjugated hyperbilirubinemia [2–5], clinically indistinguishable from acute viral hepatitis [3,4], and may have a mortality rate as high as 20% [5]. There were only four patients with clinical jaundice, suggesting that typhoid hepatitis is rare in our series. Both uncomplicated enteric fever and typhoid hepatitis respond well to timely and appropriate antibiotic therapy and have a good prognosis [2,4,5].

In summary, modest liver enzyme elevations can be expected in patients with enteric fever, and can easily be distinguished from acute viral hepatitis. The occurrence of mildly to moderately elevated liver associated enzymes is not associated with any difference in disease morbidity, mortality, or hospital stay compared to patients with enteric fever and normal liver biochemistries.

Table 1. **Haematologic and biochemical values in patients with *Salmonella* bacteraemia, with and without hepatitis**

Variable	*With hepatitis n = 72 (%)*	*Without hepatitis n = 36 (%)*	*p-value*
Physical examination			
Constipation	7 (10%)	2 (6%)	0.721
Bradycardia	11 (15%)	4 (11%)	0.764
Abdominal tenderness	22 (31%)	12 (33%)	0.948
Jaundice	2 (3%)	2 (6%)	0.853
Hepatomegaly	10 (14%)	4 (11%)	0.917
Splenomegaly	2 (3%)	1 (3%)	0.536
Laboratory*			
Haemoglobin (gm/dL)	12.5± 2.21	12.6 ± 1.70	0.100
Serum sodium (mmol/L)	136 ± 8	133 ± 5	0.110
Serum potassium (mmol/L)	3.8 ± 0.8	4.1 ± 0.3	0.900
Total bilirubin (mg/dL)	1.33 ± 1.6	0.60 ± 0.19	0.160
Alanine aminotransferase (IU)	95 ± 33	33 ± 11	0.001
Alkaline phosphatase (IU)	145 ± 25	67 ± 15	0.001
Outcomes			
Abdominal complication +	0	0	—
Recovery	71 (99%)	36 (100%)	—
Death	01 (1%)	00 (0%)	—
Hospital stay (days)	5 ± 1.5	4.6 ± 1.6	0.204

* Mean ± SD, + intestinal perforation or peritonitis.

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