daily. When the steroid was stopped 2 weeks later, she was well and made an uneventful recovery. However for the next 9 months she continued to have slight proteinuria and recurrences of typical Henoch-Schönlein purpuric rash and abdominal pain. She was well one year later, with no proteinuria.

An important feature in Henoch-Schönlein purpura is the presence of raised levels of IgA immune complexes¹ as well as deposition of IgA in the glomeruli and blood vessels of the skin.² In addition to infective agents drugs, food, and insect bites have been mentioned as possible antigens.²

In the present case the clinical pattern of Henoch-Schönlein purpura was characteristic; the fall in the antibody titre against *Y. enterocolitica* strongly suggests recent infection. It is possible that the Henoch-Schönlein purpura was caused by *Y. enterocolitica*.

I should like to know if others have noticed an association between *Y. enterocolitica* and Henoch-Schönlein purpura.

References

- 1 Levinsky R J, Barratt T M. IgA immune complexes in Henoch-Schönlein purpura. *Lancet* 1979; ii: 1100-3.
- 2 Meadow R. Schönlein-Henoch syndrome. *Arch Dis Child* 1979; 54: 822-4.

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Copper from cooking utensils as a cause of Indian childhood cirrhosis?

Sir,

We report 10-month-old monovular twins reared separately; one developed Indian childhood cirrhosis (ICC) and the other remained healthy.

The first twin had, since birth, been fed on cows' milk that had been boiled and stored for as long as 6 hours in copper utensils. Semi-solids were not offered until age 10 months by which time clinical examination showed a firm smooth liver 5 cm enlarged, splenomegaly of 3 cm, but no jaundice, oedema, or ascites. Liver histopathology confirmed the diagnosis of ICC. The neutral formalin fixed paraffin embedded liver biopsy was stained by Shikata's method¹ and most hepatocytes contained multiple, coarse, and darkish brown orcein staining granules representing copper-associated protein.

The second twin had been breast fed from birth to age 10 months and then for one month had received cows' milk which had been boiled and stored in steel utensils. Clinical examination was normal.

Serum copper level and urinary copper excretion were high in twin 1 with ICC compared with the normal twin

Table 1 Biochemical values in twin 1 and twin 2

Values	Twin 1	Twin 2
Bilirubin (μmol/l)	38.5	13.7
Total proteins (g/l)	67	63
Albumin (g/l)	34	40
Globulin (g/l)	33	23
Alkaline phosphatase KA/dl	21	16
AST IU/l	58	16
ALT IU/l	90	14
Hb (g/dl)	9.6	10.2
Serum copper (μmol/l)	24.0	16.9
Urinary copper (μmol/24 h)	2.56	0.54

Conversion: traditional to SI units—bilirubin: 1 mg/100 ml $\approx$ 17.1 μmol/l; serum copper: 1 μg/100 ml $\approx$ 0.157 μmol/l; urinary copper: 1 μg/24 h $\approx$ 0.0157 μmol/24 h.

Serum and urinary copper were determined by an atomic absorption spectrophotometer. Normal levels at age 1 year in our laboratory are 102.6 $\pm$ 16.3 μg/100 ml and 28.5 $\pm$ 9.3 μg/24 h.

Table 2 Copper values in cows' milk when boiled and stored in copper and steel utensils

	Copper utensil				Steel utensil			
	A	B	C	D	A	B	C	D
Copper (mg/l)	0.39	0.91	2.03	3.04	0.39	0.40	0.40	0.41

A=fresh milk sample; B=milk boiled; C=milk stored for 3 hours; D=milk stored for 6 hours.
Copper level in drinking water was 70 μg/l.

(Table 1). Table 2 shows the high copper content in milk boiled and stored in copper utensils used for twin 1 compared with the milk stored in steel utensils used for twin 2.

We have found levels of serum and hepatic copper to be high in ICC.² The source of excessive copper seems to be copper cooking utensils. A survey of the feeding pattern³ in ICC showed that milk was boiled and stored in copper utensils in 75% cases, in steel utensils in 15%, and in aluminium utensils in 9%. We conclude that the method of feeding may increase the copper intake and cause ICC.

References

- 1 Salaspuro M, Sipponen P. Demonstration of an intracellular copper-binding protein by orcein staining in long standing cholestatic liver diseases. *Gut* 1976; 17: 787-90.
- 2 Bhandari B, Mehta R, Sharda B. Hepatic and serum copper in ICC. *Indian Pediatr* 1981; 18: 661-3.
- 3 Sharda B, Bhandari B. Feeding practices in ICC. *Curr Med Pract* 1980; 24: 469-71.

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