Correspondence

Serum Magnesium Levels

Sirs,

In their article, on *Serum Magnesium in Congenital Biliary Atresia*, Kobayashi and Shiraki (1967) reported that the serum magnesium concentration of children was greatly reduced in cases of congenital biliary atresia, but to a lesser extent in other hepatic diseases, including neonatal hepatitis. Consequently, they suggested that the serum magnesium level was of use in differentiating congenital biliary atresia from neonatal hepatitis. This short study was undertaken to investigate whether or not cases of biliary atresia in Singapore showed a similar trend.

Both total and ultrafiltrable serum magnesium were measured. Blood was obtained by femoral vein puncture and allowed to clot under paraffin. The ultrafiltrate of serum was obtained by a modification of the method of Munday and Mahy (1964). The serum contained in a cellulose bag was centrifuged for 2 to 4 hours at 800 g. in an atmosphere of 5% CO₂ and 95% O₂ at 36–38° C. Magnesium was estimated fluorometrically by the 8-hydroxyquinoline method; the estimation was carried out on the ultramicro scale (O'Brien and Ibbott, 1962).

The normal values for total and ultrafiltrable magnesium were obtained from 12 healthy, non-fasting children. From January to March 1968, 5 children with congenital biliary atresia were admitted to the children's ward, and by the courtesy of the Department of Paediatrics, University of Singapore, blood was obtained from them and serum magnesium determined. The patients were aged from 4 months to 1 year; 4 were confirmed to be cases of atresia at laparotomy and 1 at necropsy. The results are summarized in the Table. Compared with normal values, the mean total and the mean ultrafiltrable magnesium as well as the mean percentage of the ultrafiltrable fraction were all greater; the differences, however, were not statistically significant.

The present findings from 5 cases of congenital biliary atresia indicate no depression of the serum magnesium. Other published reports do not invariably associate hepatic dysfunctions with a low serum magnesium. Blumgarten and Rohdenburg (1927), for instance, found increased serum magnesium in cases of biliary tract affections. Haury and Cantarow (1942) also obtained similar results. In their review on magnesium, Hasselman and Van Kampen (1958) postulated that increased blood breakdown could cause an increase in serum magnesium, since the erythrocyte contains

twice as much as the serum. It is possible that in cases of biliary obstruction, the raised serum magnesium may be due to the release of the mineral from red cells, as there is evidence that bile salts can haemolyse the more fragile red cells (Lichtman, 1953).

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TABLE

Total and Ultrafiltrable Serum Magnesium
(mEq/litre)

	Total Mg.	Ultrafiltrable Mg.	% Ultrafiltrable Mg.
a: Normal Values			
Mean	1.64	1.08	65.67
SD	0.247	0.190	7.99
SE	0.071	0.055	2.31
b: Values in Biliary Atresia			
Mean	1.89	1.33	70.00
SD	0.248	0.320	13.23
SE	0.111	0.143	5.92
Probability that a = b			
	between 0.1 & 0.05	between 0.1 & 0.05	between 0.5 & 0.4