infection.[2 3] Perinatal transmission, however, occurs in up to 30% of infants born to Hepatitis B e negative mothers.[2 3]

Our main finding is that by virtue of passive-active immunisation, breast fed infants are not at higher risk of contracting infection than formula fed infants. The possibility that hepatitis B virus is present in breast milk is a controversial point,[1 2 5] but it is beyond doubt that the virus may be ingested through blood or serum exuding from cracked nipples,[6] which is a common occurrence, and it was therefore suggested that breast feeding of infants born to hepatitis B surface antigen positive mothers should be avoided.[2 6] We suggest, however, that passive-active immunisation allows these infants to enjoy breast feeding, the nutritional, immunological, and psychological advantages of which are well known. In addition, breast feeding may help to lessen the guilt usually felt by these mothers.

Since mothers who are hepatitis B e positive are most infective, these conclusions may apply only in populations with low percentages of these mothers. Moreover, it is undoubtedly true that breast fed infants who do not seroconvert (less than 5%) may remain at high risk from contracting infection, especially when their mothers are hepatitis B e positive.[2 3]

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References

1 Beasley RP, Stevens CE, Shiao IS, Meng HC. Evidence against breast-feeding as a mechanism for vertical transmission of hepatitis B. *Lancet* 1975;**ii**:740–1.
2 Lee AKY, Ip HMH, Wong VCW. Mechanisms of maternal-fetal transmission of hepatitis B virus. *J Infect Dis* 1978;**138**: 668–71.
3 Beasley RP, Hwang LY. Postnatal infectivity of hepatitis B surface antigen-carrier mothers. *J Infect Dis* 1983;**147**:185–90.
4 Wong CVW, Ip HMH, Reesink HW, *et al.* Prevention of the HBsAg carrier state in newborn infants of mothers who are chronic carriers of HBsAg and HBeAg by administration of hepatitis-B vaccine and hepatitis-B immunoglobulin. Double-blind randomised placebo-controlled study. *Lancet* 1984;**i**: 921–6.
5 Boxall EH. Breast-feeding and hepatitis B. *Lancet* 1975;**ii**:979.
6 Krugman S. Vertical transmission of hepatitis B and breast-feeding. *Lancet* 1975;**ii**:916.

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Urinary kallikrein excretion in children of parents with essential hypertension

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SUMMARY Twelve hour urinary kallikrein excretion was measured in 18 healthy children of parents with essential hypertension and in 47 healthy children of parents without this disorder. No statistically significant difference was observed between the two groups of children.

Several investigations conducted in recent years have suggested that the kallikrein-kinin system has a role in a wide range of physiopathological processes. Clinical research originally concentrated on hypertensive conditions because of the very potent pharmacological action of kinins on vascular smooth muscle. It has been suggested that this system may regulate the control of blood pressure and circulatory homeostasis. Low urinary kallikrein excretion may be a pathogenetic factor in essential hypertension in adults,[1] and familial aggregation of urinary kallikrein values has been reported.[2]

The study of urinary kallikrein excretion in children is therefore important in elucidating the mechansim of the development of essential hypertension in later life. The aim of the present study was to investigate whether children who have parents with essential hypertension have lower urinary kallikrein excretion than control children.

Subjects and methods

Sixty five healthy normotensive children aged 7 to 15 years, from different families, were studied in the outpatient department at Niigata University Medical Hospital. Children with organic diseases were excluded from this study. A 12 hour overnight urine specimen was collected, and aliquots were stored at −20°C until assay. Urinary kallikrein was estimated

in undialised urine samples by the method of Morita *et al*,[3 4] using the synthetic fluorogenic substrate L-prolyl-L-phenylalanyl-L-arginine-4-methylcoumaryl-7-amide (pro-phe-arg-MCA) (obtained from the Peptide Institute, Protein Research Foundation, Japan). The assay method is as follows. One hundred µl urine and 20 µl 10 mM pro-phe-arg-MCA solution dissolved in dimethylformamide were added to 2·0 ml of 0·1 M Tris-HCl buffer, pH 8·0, containing 0·15 M sodium chloride. The amount of fluorogenic amino-4-methylcoumarine (AMC) liberated was measured using a fluorescence spectrophotometer with excitation at 380 nm and emission at 460 nm. Relative fluorescence was obtained for 10 µM of a solution of AMC in 0·1% dimethylsulfoxide. Results obtained by this method correlated well with those obtained by the bioassay method and with kinin-forming activity determined by kinin radioimmunoassay.[5] The 12 hour urinary kallikrein excretion was corrected for the individual body surface area obtained from the formula for Japanese children.[4]

All children were divided into two age matched groups as follows. The first group of 18 had parents with essential hypertension (either one or both parents) requiring medication. The second group of 47 had parents with no history of this disorder. Essential hypertension was defined as over 150 mm Hg systolic blood pressure or 90 mm Hg diastolic pressure, or both. Results were expressed as the mean (SD) and were analysed using unpaired *t* tests.

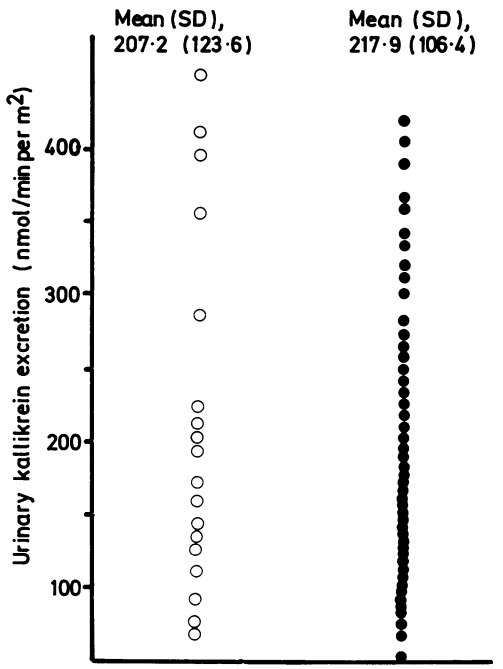

Figure *Twelve hour urinary kallikrein excretion in children of parents with essential hypertension (open circles) and in children of parents without this disorder (closed circles).*

Results

The 12 hour urinary kallikrein excretion for both groups are shown in the Figure. The values in children of parents with essential hypertension were not significantly different from those in children of normotensive parents (207 (123·6), range 72·1 to 454·0 nmol/min per m^2 *v* 217·9 (106·4), range 54·3 to 424·1 nmol/min per m^2 respectively).

Discussion

Since urinary kallikrein excretion corrected for the body surface area does not change in children aged between 6 and 15 years,[4] the two groups in the present study may be compared directly. Low urinary kallikrein excretion has been reported in essential hypertension in adults.[1] Zinner *et al*[2] reported familial aggregation of kallikrein concentration in spot urine specimens in normotensive children. These findings suggest that low urinary kallikrein excretion may be a pathogenetic factor in the development of hypertension in adult life. We failed, however, to observe a significant difference in kallikrein excretion between children of hypertensive or normotensive parents, suggesting that low urinary kallikrein excretion related to essential hypertension in adults may be acquired.

References

1 Margolius HS, Geller R, Pisano JJ, Sjoerdsma A. Altered urinary kallikrein excretion in human hypertension. *Lancet* 1971;**ii**:1063–5.

2 Zinner SH, Margolius HS, Rosner B, Kass EH. Stability of blood pressure rank and urinary kallikrein concentration in childhood: an eight-year follow up. *Circulation* 1978;**58**:908–15.

3 Morita T, Kato H, Iwanaga S, Takada K, Kimura T, Sakakibara S. New fluorogenic substrate for α-thrombin, factor Xa, kallikrein, and urokinase. *J Biochem* 1977;**82**:1495–8.

4 Uchiyama M, Otsuka T, Shibuya Y, Sakai K. Urinary kallikrein excretion in relation to urinary electrolyte excretion, urine flow, blood pressure and age in normal children. *IRCS Medical Science* 1984;**12**:657–8.

5 Kato H, Adachi N, Iwanaga S, *et al*. A new fluorogenic substrate method for the estimation of kallikrein in urine. *J Biochem* 1980;**87**:1127–32.

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