were given once daily for 1 week and then twice daily with meals.

Within 3 days of starting therapy her bizarre manifestations of pica had disappeared completely. An estimate of nutritional intake obtained from her mother indicated that this had approximately doubled during the same time interval, to achieve a daily caloric intake of at least 1200 calories. Between 24 and 30 months of age she gained 7.0 cm in height and 1474 g in weight, compared with 2.9 cm and 936 g, respectively, in the preceding 6-month period. At 30 months of age her height had increased to the 25th centile and her weight to the 10th. The zinc concentration of a 1 cm length of her hair adjacent to the scalp was 127 p.p.m. at 26 months of age, after 2 months of zinc therapy.

Comment

The association of poor appetite, low growth centiles, and a low hair zinc level suggested a possible diagnosis of zinc deficiency (Hambidge *et al.*, 1972); the response to dietary zinc supplementation gave further support to this diagnosis. Though the possibility of a placebo effect cannot be discounted, this is considered unlikely in view of her young age and her parents' obvious scepticism when this therapy was offered for their daughter. The quantity of zinc administered each day was small, less than 0.5 mg/kg body weight, and comparable to calculated daily dietary intakes (Schlage and Wortberg, 1972).

In older children with low hair zinc levels, impairment of taste acuity has been documented (Hambidge *et al.*, 1972). At the age of 2 years the subject of the present report was too young to permit satisfactory objective assessment of her taste acuity. In this context, however, it is of possible significance that her mother spontaneously remarked on her preference for salt and sugar within days of starting zinc therapy.

The factors responsible for zinc deficiency in this subject have not been determined, but there is evidence (Hambidge *et al.*, 1972) to suggest that such a deficiency may not be rare in this age group. The dramatic cessation of her metal-eating habits, which followed almost immediately after starting dietary zinc supplementation, suggests that the possibility of zinc deficiency should be considered in other infants and children exhibiting manifestations of pica.

Summary

A 2-year-old girl had a 6-month history of pica, manifested by 'metal-eating'. A diagnosis of zinc deficiency was suggested by a history of poor appetite, declining growth centiles, and a low hair zinc level. 3 days after starting oral zinc sulphate

($\text{ZnSO}_4 \times 7\text{H}_2\text{O}$ 10 mg/day) she had no further evidence of pica, and it is concluded that this was probably a symptom of zinc deficiency.

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K. MICHAEL HAMBIDGE,* and ARNOLD SILVERMAN
Department of Pediatrics, University of Colorado
Medical Center, Denver, Colorado, U.S.A.

*Correspondence to Dr. K. M. Hambidge, Department of Pediatrics, University of Colorado Medical Center, 4200 East Ninth Avenue, Denver, Colorado 80220, U.S.A.

Sore bottoms in the newborn

The occurrence of a sore bottom is relatively common during the first 14 days of life. This study investigated factors which might influence a baby's susceptibility to this condition.

The factors were sex, skin and hair colouring, type of feed, whether bottle or breast fed, and birthweight.

Details of survey

The survey was carried out from 1 February to 31 May during both 1970 and 1971, the two series involving 50 cases of sore bottoms from 1011 babies.

In the first series 32 cases of sore bottoms were reported out of 375 live births in the old maternity unit known as The Gables. A new maternity unit was opened in the autumn of 1970, and in the second series taken in 1971, 18 cases were reported from the 636 live births in this new unit who were not 48-hour discharges.

All the babies in this study were being nursed normally in the wards with their mothers. No babies being nursed in the special care units were included. None of the babies ever wore plastic pants. Two cases of

TABLE
Colour incidence in babies with sore bottoms

	Asian	Negro	Dark European	Medium European	Fair European	Total
1970 (old maternity unit)	1	1	3	10	11	26
1971 (new maternity unit)	1	0	0	11	6	18
Total observed cases	2	1	3	21	17	44
Calculated expected no. cases	2.4	0.7	15.5	15.8	9.6	44

χ^2 test (4) = 15.7, $P < 0.01$.

infected stools with a coliform growth were reported, one was an Asian baby and one a fair European baby. Skin swabs were not taken as in the study by Brookes, Hubbert, and Sarkany (1971).

The sore bottoms were first reported by the nursing staff between the third and tenth day, most frequent reports being for the fifth and sixth days. Sore bottom was defined as an area of erythema surrounding the anal region, usually at least 5 cm across when first reported, and only in a few cases did this develop into perianal excoriation. The condition usually lasted for 2 or 3 days, clearing after treatment by exposure. Full details for each of the factors were not obtained in all of the cases, so each factor had to be analysed separately, hence the impression of inconsistency in some of the figures.

Results

Sex. In 1970 in the old unit 375 babies were born, 188 males (50%) and 187 females (50%). Of the 32 cases reported, 20 were male (74%) and 7 were female (26%), a significant excess of males ($P < 0.05$). In 1971 in the new unit 799 babies were born, 412 males (51.6%) and 387 females (48.4%). Of the 18 cases reported, 10 were male (59%) and 7 were female (41%). Here the sex difference is not significant.

Skin and hair colouring. The baby's general colouring of skin and hair was classified into the following groups. The figures show the frequency of their occurrence in the 1011 liveborn babies of this study: Negroid 1.6%, Asian 5.4%, dark European (black hair and skin showing some slight pigmentation) 35.2%, medium European (dark or brown hair and white skin) 36.0%, and fair European (blonde or red hair with white skin) 21.8%.

The babies who developed sore bottoms were classified according to their colour (see Table). From these figures the number of babies in each group who might be expected to develop sore bottoms can be calculated, and these figures were compared with

the number of babies who developed sore bottoms (Table).

The major contribution to the χ^2 test came from the dark Europeans who were far fewer than expected, and from the fair Europeans who were far more than expected. We therefore concluded that fair European babies are significantly more likely to develop a sore bottom than dark European babies.

Feeding. At the old unit, the babies were fed on National Dried Milk which was prepared in the milk kitchen. On two occasions this was noted not to be mixing well, and both these times were connected with an increase in reported cases of sore bottoms. On the second occasion half the babies were changed to Ostermilk, but this did not alter the incidence of sore bottoms. Two babies on Ostermilk developed the condition. In the new unit all the babies are fed on prepacked Cow and Gate milk.

In these altering conditions no assessment of the different types of feed was made, but figures were analysed between breast-fed babies and bottle-fed babies.

1970 (old unit). Out of 26 cases of sore bottoms, 24 babies were bottle fed and 2 were breast fed. At that time, approximately 35% of babies in the old unit were being breast fed.

1971 (new unit). Out of 17 cases of sore bottoms, 15 were bottle fed and 2 were breast fed. At that time, approximately 27% of babies in the new unit were being breast fed.

By pooling the data from both units, we found breast-fed babies were significantly less likely to develop sore bottoms ($P < 0.02$).

Birthweight. The distribution of birthweights among the babies with sore bottoms did not differ significantly from that of the babies without sore bottoms.

Discussion and conclusions

From these studies the most significant finding was that 'fair' babies seemed more prone to develop a sore bottom than 'dark' European babies. Very few Asian or Negroid babies developed a sore bottom, but in this study there were too few to come to any conclusion. It should be stressed that particular attention was paid to these babies, as it is sometimes difficult to detect an early sore bottom on account of the pigmentation.

The second most significant factor was that bottle-fed babies were more likely to develop a sore bottom than breast-fed babies. It has been suggested that those mothers who breast fed are those mothers who might have given better 'mothering care' to their babies, so the conclusion that bottle feeding increases the incidence of sore bottoms might be open to debate.

The lower incidence from a larger number of babies in the new unit is very significant ($P < 0.00003$). Several factors may have contributed to this. Prepacked feeds of Cow and Gate milk were introduced. The improved layout of the unit enabled nurses to spend more time showing mothers how to care for their babies. The new crib trolleys made changing by the mothers easier. Only towelling napkins were used in the new unit, in contrast to the two types of paper napkins and towelling napkins that were used in the old unit. There was very little change in senior staff and

nursery nurses, and no change in the method of reporting in the second series.

My impression that male babies are more likely to develop a sore bottom was not borne out by the second analysis. The result on the combined figures was of doubtful significance ($P < 0.05$) and a larger series may be necessary to settle this point.

Birthweight was found not to influence the incidence of sore bottoms.

Summary

In a survey carried out in two series of babies from a total of 1011, 50 cases of sore bottoms were reported. The 'fair' babies were found to be more likely to develop the condition than the 'dark' babies; and bottle-fed babies were more likely to develop a sore bottom than breast-fed babies.

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ELIZABETH GRANTHAM

Department of Paediatrics, Peterborough District Hospital, Thorpe Road, Peterborough PE3 6DA.