Prolactin, cortisol and thyroxine levels and the premature infant

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Summary
The relationship of prolactin, cortisol and thyroxine values in cord and maternal plasma to fetal age and weight and to the incidence of hyaline membrane disease (HMD) was investigated in 80 neonates of whom 40 were born at more than 37 weeks' gestation. Of the 40 born at less than 36 weeks 11 developed HMD. Serum cortisol has been shown to be a differentiating factor for HMD, but cord thyroxine and prolactin levels seem to be related more to age and weight than to the occurrence of HMD. The mean weights (± SD) of the mature group, the non-HMD and HMD groups were 15.3 ± 4.2, 11.9 ± 7.7 and 9.9 ± 3.3 nmol/l. There

Results

Prolactin, cortisol and thyroxine levels seem to be related more to age and weight than to the occurrence of HMD. The mean weights (± SD) of the mature group, the non-HMD and HMD groups were 15.3 ± 4.2, 11.9 ± 7.7 and 9.9 ± 3.3 nmol/l. There was a statistically significant (P < 0.01) difference between these groups. The mean gestational age of the mature infants was 38.1 ± 1.1 weeks, while those of the non-HMD and HMD groups were 32.9 ± 1.3 and 31.5 ± 1.7 weeks respectively. Cord thyroxine values in the mature, non-HMD and HMD groups were 15.3 ± 4.2, 11.9 ± 7.7 and 9.9 ± 3.3 nmol/l. There was a statistically significant (P < 0.01) difference between these groups. The mean gestational age of the mature infants was 38.1 ± 1.1 weeks, while those of the non-HMD and HMD groups were 32.9 ± 1.3 and 31.5 ± 1.7 weeks respectively. Cord thyroxine values in the mature, non-HMD and HMD groups were 15.3 ± 4.2, 11.9 ± 7.7 and 9.9 ± 3.3 nmol/l. There was a statistically significant (P < 0.01) difference between these groups. The mean gestational age of the mature infants was 38.1 ± 1.1 weeks, while those of the non-HMD and HMD groups were 32.9 ± 1.3 and 31.5 ± 1.7 weeks respectively.
was a statistically significant difference between the mature and preterm groups ($P < 0.01$) but not between the non-HMD and HMD groups. Maternal thyroxine levels for the three groups were $13.3 \pm 14.5$, $8.8 \pm 4.7$ and $11.43 \pm 2.01$ nmol/l.

Cord cortisol levels were $19.3 \pm 9.2$, $19.2 \pm 19.2$ and $13.1 \pm 10.8$ mg/ml in the mature, non-HMD and HMD groups. There was a statistically significant difference between the mature and HMD and HMD groups ($P < 0.05$). Maternal cortisol values were $54.4 \pm 28.4$, $43.5 \pm 25.5$ and $58.6 \pm 25.4$ mg/ml in the mature, non-HMD and HMD groups.

Cord prolactin values were $281.6 \pm 134.5$, $198.0 \pm 140.7$ and $225.1 \pm 119.9$ mg/ml in the mature, non-HMD and HMD groups. There was a statistically significant difference ($P < 0.01$) between the mature group and the combined preterm group as well as between the mature and HMD groups. Maternal prolactin levels were $225.7 \pm 183.4$, $158.3 \pm 137.7$ and $141.0 \pm 87.3$ mg/ml; there were statistically significant differences between the mature group and the combined preterm group ($P < 0.04$) and between the mature and HMD groups ($P < 0.03$).

Cord blood prolactin levels have been shown by Hauth et al. $^7$ and Smith et al. $^11$ to correlate significantly with the weights of the newborn infants as well as with their gestational ages. They also showed that cord plasma prolactin levels in infants who developed HMD were low.

Our results showed that mean cord prolactin levels were lower in both preterm groups than in the mature group. However, only the differences between the mature group and the combined preterm group and between the control group and the non-HMD group reached statistical significance. The difference between the mature and HMD groups alone was not statistically significant. This shows that the lower cord prolactin levels in the preterm group are related only to prematurity (weight and age) and not specifically to HMD. These results are similar to those of Hauth et al. $^7$ and Smith et al. $^11$

Maternal prolactin levels were markedly lower in the preterm group than in the mature group. There is a significant difference between the mature group and both the HMD group and the combined preterm group, but none between the mature group and the non-HMD group. This indicates that the maternal serum prolactin level is related to prematurity as a whole, and in addition is specifically related to the respiratory distress syndrome.

When the HMD group and the non-HMD groups are compared, statistically significant differences are only seen between the cord cortisol levels in the HMD group and those in the mature group. A statistically significant increase in serum cord thyroxine and prolactin values with an increase in weight has also been demonstrated.

Although not statistically significant, there was a mean fall in cord cortisol and thyroxine levels between the HMD and non-HMD groups, with an increase in cord prolactin between these two groups.

Low serum cord cortisol values are therefore a differentiating factor for HMD, but cord thyroxine and cord prolactin levels seem to be related more to weight and gestational age than to the presence of HMD.

### Discussion

Mean weights and ages were significantly lower in the preterm group than in the mature group; furthermore, the infants with HMD weighed significantly less than the preterm infants without HMD. Mean cord serum thyroxine levels rose significantly with age and weight (preterm v. mature), but not within the preterm group. This supports the work of Fisher et al. $^16$ indicating a rise in fetal thyroxine values with weight and age. Maternal serum thyroxine values did not differ significantly between any of the groups studied.

Klein et al. $^12$ and his associates found higher cortisol levels in infants with HMD than in controls; in contrast Murphy $^3$ described significantly lower cord cortisol levels in infants with HMD than in controls.

In our study there was no difference between cord cortisol levels in the mature and the non-HMD preterm groups. However, there was a statistically significant reduction in level in the HMD group compared with the mature group. This contradicts the findings of Klein et al. $^12$ but supports those of Murphy $^3$.

There is no statistically significant relationship between maternal cortisol values.

### REFERENCES


5. Giannopoulous G. Variations in the levels of cytoplasmic glucocorticoid receptors in lungs of various species at different developmental stages. Endocrinology 1974; 94: 540-548.


