Diminished Plasma 17-Ketosteroid Concentration in Pregnancy.* (21238)

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Measurements of urinary 17-ketosteroid excretion in healthy pregnant women have indicated that there is little or no increase in the excretion of these metabolites during human gestation(1). Women with hypoadrenocorticism, who have essentially no urinary 17-ketosteroids prior to pregnancy, show a progressive increase in the urinary excretion of these steroids. This increase is especially marked in the last 3 months of pregnancy. By term their urine excretion values are equivalent to what is found in the non-pregnant female without hypoadrenocorticism, and after delivery urinary 17-ketosteroid excretion again falls off to negligible amounts(2-4). Thus by difference it might be postulated that there is a lessened production of 17-ketosteroids by the mother's own adrenal cortex during the course of normal pregnancy. To throw light on this possibility measurements have been made of plasma neutral 17-ketosteroid concentrations in pregnant women at term.

Methods. Blood samples were obtained from normal, pregnant females at term who had just been admitted to the delivery floor of the Syracuse Memorial Hospital. In nearly all cases the patients delivered within 24 hours of admission. Control specimens were obtained from normal, adult members of the medical, technical and nursing staff of the hospital. Blood samples were drawn without respect to time of day. Oxalate was used as an anticoagulant, and the plasma was separated by centrifugation, after which samples were stored at 0° F. until analyzed. Plasma neutral 17-ketosteroids were determined by a method which has been reported elsewhere(5). The results were expressed as μg of 17-ketosteroids per 100 ml of plasma, dehydroepiandrosterone acetate being used as a standard.

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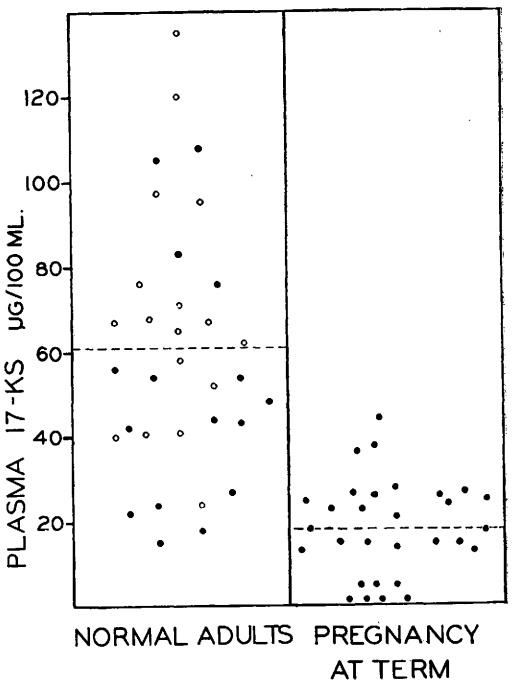

FIG. 1. Plasma 17-ketosteroid values on normal adults compared with pregnant women at term. Open circles = men. Closed circles = women. Dotted lines = mean values.

Results. Fig. 1 shows the plasma 17-ketosteroid concentration data obtained on the control and experimental groups. The control group, consisting of 17 men and 16 women showed a mean value of 61 μg per 100 ml (S. E.† = 5). Due to the spread of values in the population sample tested, there was found to be no significant difference between the data on men and non-pregnant women ($P > .05$).

Data on 30 pregnant women at term showed a mean value of 18 μg 17-ketosteroids per 100 ml plasma (S.E. = 2). This mean was significantly lower than the mean value of the controls ($P < .001$).

Discussion. The finding of diminished

† S.E. = Standard Error of the Mean.

plasma 17-ketosteroid concentration in late pregnancy, together with urine excretion data previously referred to(1-4), suggest that there is a slackening off during pregnancy of 17-ketosteroid production by the maternal adrenal cortex. Recent studies of concentration gradient of 17-ketosteroids between cord and maternal plasmas have shown there were consistently higher values in cord plasma than in plasma samples taken at same time from the mother(6). We have also become aware of a simultaneous study by Migeon, who found that cord plasma shows the same dehydroepiandrosterone and androsterone values as the normal adult, whereas dehydroepiandrosterone concentration in maternal plasma is lower than in non-pregnant adults(7). Our findings lead to supposition that inner cortex of fetal adrenal and/or the placenta produce the 17-ketosteroids of late pregnancy. Whether this is "compensatory" as result of cessation of maternal 17-ketosteroid production, or whether maternal reduction is secondary to events occurring within the fetal circulation is an interesting, but as yet unanswered question. Renal clearance studies of 17-ketosteroids in normal pregnancy are needed to clarify the relationships among following data: (a) 17-ketosteroids in fetal (cord) plasma at adult levels; (b) lowered 17-ketosteroid levels in maternal plasma; and (c) slight or no increase of urinary 17-ketosteroid excretion during pregnancy.

Summary. 1. Plasma neutral 17-ketosteroid determinations were made on control group of 33 normal men and women, and on experimental group of 30 pregnant women at term. 2. Adult controls showed mean plasma value of 61 μg/100 ml (S.E. = 5). No significant difference was found between values obtained on normal men vs. normal, non-pregnant women ($P > .05$). 3. Pregnant women showed a mean plasma value of 18 μg/100 ml (S.E. = 2). This value is significantly lower than the mean of control adults ($P < .001$). 4. From the results of plasma analyses it is concluded that there is a physiological reduction in *maternal* elaboration of 17-ketosteroids during the last 24 hours of pregnancy. The data of other workers on urinary excretion of 17-ketosteroids in pregnancy(1-4) suggest that this finding may hold for the last third of pregnancy. Renal clearance studies will be necessary before final conclusions can be drawn. 5. It is postulated that the inner cortex of the fetal adrenal and/or the placenta take over production of 17-ketosteroids during the latter part of pregnancy.

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