

increases, probably reflecting the placental production of this steroid.

In the initial stages of pregnancy, steroid determinations have scarce clinical significance. Their usefulness increases as pregnancy advances and they become determinant when the full foeto-placental interrelations are established.

In cases of suspected molar pregnancy, the determination of the ratio 16 $\alpha$ -hydroxylated oestrogens/16-deoxyoestrogens may be useful as a low production of the first group of compounds is consistent with the absence of the foetus.

Blood levels and urinary excretion of steroids in pregnancies induced with exogenous gonadotrophins may differ considerably from those found in spontaneous pregnancies. These differences, when present, are specially marked in the first few weeks after conception. It is generally agreed that the elevated steroid levels usually found in the gonadotrophins induced pregnancies, are probably due to ovarian hyperstimulation resulting either in multiple corpora lutea or, perhaps, in hyperactivity of one corpus luteum.

The high oestrogen, progesterone and 17 $\alpha$ -hydroxyprogesterone levels found in pharmacologically induced pregnancies associated with hyperstimulation, usually return to the levels normally found in the spontaneous pregnancies of the same age by the 8th-10th week of gestation and they are not correlated with the occurrence of multiple pregnancies.

**42. Significance of HCG, HCS, progesterone, and estriol determinations during the first half of human pregnancy, I. GERHARD and B. RUNNEBAUM, Abteilung für gynäkologische Endokrinologie, Universitäts-Frauenklinik, 69 Heidelberg, West Germany**

This study was undertaken to ascertain if the determination of hormones in maternal blood gives reliable information about the functional state of the endocrine systems during early pregnancy. Using radioimmunoassay techniques, HCG, HCS, progesterone, and estriol were determined in 75 women with normal pregnancy and in 82 women with bleeding during pregnancy weeks 5-23. In women with normal pregnancy the hormones were assayed weekly, and in patients with vaginal bleeding usually 3 determinations per week were performed. Of 32 women with bleeding during week 5-10 of pregnancy, 11 went to term and 21 had an abortion. In the women with abortion, HCG was below the normal range in 8, HCS and progesterone in 10, and estriol in 6 women. Of 30 women with bleeding during week 11-14, 12 went to term and 18 had an abortion. In the women with abortion HCG and HCS were below the normal range in 10, progesterone in 9, and estriol in 12 women. Of 20 women studied during week 15-23, 3 went to term and 17 had an abortion. In the abortion group HCG was below the normal range in 6, HCS in 8, progesterone in 6, and estriol in 8 women. In most women with bleeding and abortion during the first half of pregnancy, the levels of the studied hormones were significantly below the normal range. In general, women with vaginal bleeding during early pregnancy have a good prognosis for normal termination, if repeated determinations of HCG, HCS, progesterone and estriol are within the normal range.

**43. Steroids and protein hormones as indices of placental blood flow, P. G. CROSIGNANI, A. ATTANASIO, G. TURCONI, G. C. LOMBROSO, L. COMO, G. PARDI and E. TONANI, Department of Obstetrics & Gynecology, University of Milan, Italy**

Toxemia and post-term pregnancy are two situations where placental blood flow may be impaired. The severe reduction in placental blood flow in part of toxemic patients is deduced from the fetal outcome (intrauterine death, retarded growth), while the fetal hypoxia occasionally present in post-term pregnancy is inferred from its manifestations in labor (stained liquor, altered patterns of fetal heart rate). Seventeen toxemic patients who delivered either a dead fetus or a small-for-date infant were studied by plasma measurement of free estradiol ( $E_2$ ), free estriol ( $E_3$ ), chorionic gonadotropin (HCG), and placental lactogen (HPL). Plasma estradiol was normal in all 7 patients in whom it was measured. Estriol was abnormally low (below 2 SD) in 2 of 9 patients. Chorionic gonadotropin was abnormally high (above 2 SD) in 7 of 13 patients. Placental lactogen was abnormally low (below 2 SD) in 11 of 17 patients. Five of the 7 women with high HCG showed low HPL as well. Intensive care and early intervention (7 caesarean sections in this series) probably anticipated further pathological changes in these indices and more critical conditions in the fetuses. Thus, in toxemia, placental protein hormones seem more prompt and reliable indices in reflecting impaired placental blood flow, compared with free  $E_2$  and  $E_3$ . Twenty-five post-term patients were similarly studied. Twelve of these showed stained liquor and/or pathological changes in FHR during labor; all of them had normal  $E_3$  and HPL levels, while as a group they had significantly higher HCG plasma concentrations. Thus, even the short lasting reduction in placental blood flow which characterizes a considerable number of post-term pregnancies seems effective in enhancing HCG production before or in the absence of  $E_2$ ,  $E_3$ , and HPL changes.

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**44. Estrogens and progesterone and other biochemical parameters in pathological pregnancies, RICHARD GOEBEL and ERICH KUSS, I. Frauenklinik der Universität München, Germany**

In late pregnancy, serum free estrone, estradiol-17 $\beta$ , estriol as well as total estrogens and progesterone were estimated and compared with urinary total estrogens. About 4000 specimen were analyzed during surveillance of more than 200 high risk pregnancies (114 toxemia, 41 low birth weights without signs of toxemia, 45 diabetes, 14 fetal deaths). The serum constituents were measured by radioimmunoassay, urinary total estrogens by photometry. The between assay precisions were characterized by VK's <8%. Parallel assays of placental lactogen, phosphatase, cystine aminopeptidase and fetoprotein were run.

#### Results:

1. Toxemia
  - (a) Normal weighted newborns were delivered mostly in cases of mild toxemia. The values of urinary estrogens and unconjugated serum estriol were found in the normal range, the other estrogens and progesterone frequently in the lower range.
  - (b) Small-for-date babies were delivered in most cases of severe or superimposed toxemia. In about 75%, the growth retardation was indicated by low urinary total estrógen and by low serum unconjugated estriol. The other parameters were less clear-cut.
2. Intrauterine fetal retardation (without toxemia)
 

In 86% of cases, fetal retardation was indicated by low serum unconjugated estriol and by low urinary total estrogens. The other parameters were again found to be less clear-cut.