cases, Type 3 in 7 cases and Type 4 in 16 cases. Type 3, 4 was severe except one case. Frequency of subjects with proteinuria in preeclamptics with Type 3, 4 was significantly higher than that in preeclamptics with Type 1, 2 at one month after delivery.

These result suggest that this method has clinical utility.

79. Difference of Renal Tubular Damages in Proteinuria Type and Hypertension Type of Toxemia of Pregnancy: Urinary Trehalase as a Marker

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Trehalase is localized in renal brush borders. By measuring urinary trehalase, we proved renal tubular damages which occurred in toxemia of pregnancy. In this paper, we classified a toxemia of pregnancy to three types: proteinuria type (P, Ph), proteinuria plus hypertension type (PH) and hypertension type (Hp). A complete dialyzed urine was concentrated 10 times to a volume of exactly to 0.5 ml. Trehalase activity was assayed by a method described previously.

Urinary trehalase activity of P, Ph (211.9 ± 37.1 μmol/hr/g. Cr, mean ± S.E) and HP (141.4 ± 22.9) were significantly higher than Hp (13.0 ± 6.2). And urinary NAG and β_2-MG were also observed to be similar results to urinary trehalase.

From these results, it is suggested that severe proteinuria with or without hypertension (P, Ph, HP) shows heavier tubular damages than mild proteinuria type with hypertension (Hp).

Considering this difference of tubular brush borders damages, the mechanism of toxemia of pregnancy would be different between H and P.

80. The Meaning of Atrial Natriuretic Polypeptide in the Pathophysiology of the Pregnancy Induced Hypertension

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In order to investigate the regulation mechanism of hANP secretion in PIH, two loading tests, Angiotensin-II (A-II) loading test by Gant et al. or 5% sodium loading test, were examined to the normal and PIH pregnant women. In normal pregnancy maternal serum hANP level increased as pregnancy course, and in the 3rd trimester it was 136.0 ± 2.5 pg/ml (M ± SD), while in mild PIH it was 156.0 ± 0.7 pg/ml and in severe PIH 162.6 ± 13.9 pg/ml. During A-II loading test the positive correlation ($r=0.68$, $p<0.01$) between the increased ratio of mean arterial blood pressure (ΔMAP) and that of hANP (ΔhANP) was observed in normal pregnancy, and the negative correlation ($r=-0.59$, $p<0.01$) in mild PIH, but no significant relationship was observed in severe PIH. On the other hand after the administration of hypertonic NaCl solution, % increase of plasma hANP in normal pregnancy was 23.7 ± 5.4%, whereas in mild PIH it was 22.3 ± 6.1%. These results suggest that in normal pregnancy hANP is secreted to maintain the blood pressure within normal range playing a vasodilating action and sodium regulating action, and in PIH the secretion of hANP is highly stimulated in situ, but its reserve function is reduced than in normal pregnancy.

81. Physiologic Role of Endogenous Human Atrial Natriuretic Peptide in Preeclamptic Pregnancies

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In order to assess the effect of endogenous human atrial natriuretic peptide on the vascular system in preeclampsia, the circadian variation of plasma human atrial natriuretic peptide, cyclic GMP, cyclic AMP and blood pressure were measured in normal non-pregnant, pregnant and preeclamptic women. Among these three groups, the levels of human atrial natriuretic peptide were 43.7 ± 1.6, 82.7 ± 2.7 and 243.4 ± 9.6 pg/ml (mean ± S.E.), those of cyclic GMP 2.86 ± 0.13, 4.08 ± 0.07 and 14.03 ± 0.37 pmol/ml (mean ± S.E.) and those of cyclic AMP 17.25 ± 0.09, 18.30 ± 0.39 and 19.98 ± 0.78 pmol/ml (mean ± S.E.), respectively. In severe preeclamptic women, the mean 24-hour values of human atrial natriuretic peptide and cyclic GMP rose significantly, compared with those in normal non-pregnant and pregnant women. Also in severe preeclamptic women, cir-

cadian variations of plasma atrial natriuretic peptide, cyclic GMP and blood pressure confirmed the same circadian rhythm with acrophase at mid-night. Plasma cyclic AMP values did not differ significantly among the three groups, and did not confirm a circadian rhythm. These results indicate that plasma human atrial natriuretic peptide scarcely influences blood pressure and plasma cyclic AMP values, though it may induce the relaxation of vascular smooth muscles via the cyclic GMP system in preeclampsia.

82. Urine Urokinase/Creatinine, α_2-plasma Inhibitor/Creatinine, α_2-plasmin Inhibitor Plasmin-complex/Creatinine Index and D-dimer during Normal Pregnancy, Trans-vaginal Delivery and Puerperium, and in Cases of Preeclampsia

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Introduction: In a previous study, we reported that the changes of blood coagulation-fiblinolysis and kallikrein-kinin systems in cases of preeclampsia indicated the presence of a chronic DIC with hyperactivity of plasmin and hyperproduction of kinin [Mutoh S. et al: Prenatal care and gestosis: 381~384, Edited by Suzuki M. (1985, Elsevier science Publisher B.V. (Biomedical Division)]. In this study, we tried to obtein systemic information of urine coagulation-fibrinolysis in 151 cases of normal gravidas from early stages to term of pregnancy involving with 17 cases of trans-vaginal delivery and 61 cases of preeclampsia (moderate [G.I. 4~6], n=36, severe [G.I. 6<], n=26, renal type [u-protein 300 mg/dl ≦] n=22). As a control group, 23 cases of none-pregnant women were selected.

Methods for measurement: Specific assays were performed for u-UK/CRE (mean ± SE ng/mg) by RIA (secondary antibody separation), u-α_2PI/CRE (ng/mg) by TD-80, u-α_2PI-Pm-C/CRE index (ng/mg) by TD-80C and u-D-dimer (ng/ml) by ELISA assay.

Results and Discussion: (1) In non-pregnant women (control), during pregnancy, in labor and in puerperium; The levels in a control group, u-UK/CRE was 5.9 ± 0.7 ng/mg, u-α_2 PI/CRE 4.4 ± 0.5, u-α_2PI-Pm-C/CRE 0.8 ± 0.3 and u-D-dimer 30>. U-UK/CRE was slightly increased from the early stages of pregnancy (6.7 ± 0.7) to fullterm (7.2 ± 1.0), and significantly increased from onset of labor to puerperium (2nd stage of labor 10.2 ± 0.6 ng/mg. $p<0.001$). U-α_2PI/CRE and u-D-dimer were unchanged during pregnancy, but u-α_2PI-Pm-C/CRE was significantly increased from the early stage 2.7 ± 0.7 to fullterm pregnancy 6.6 ± 1.2 ng/mg. In the comparison between fullterm pregnancy and onset of labor, u-α_2PI/CRE and u-α_2PI-Pm-C/CRE were significantly increased at the onset of labor [u-α_2PI/CRE was 9.6 ± 1.2 ng/mg ($p<0.02$) and u-α_2PI-Pm-C/CRE was 40.9 ± 18.5 ng/ml ($p<0.02$)]. These patterns were suggested that a slight tendency of hyper-fibrinolytic state was appeared during pregnancy, and significantly appeared after the onset of labor, and the high levels of u-α_2PI-Pm-C/CRE was rapidly cleared from blood circulation caused by the effect of glomerular selective over-filtration. (2) Comparison of the cases of preeclampsia with normal control values of urine coagulation-fibrinolysis system in third trimester of gestation: From the changes of these factors in cases of preeclampsia, we found out that u-α_2PI/CRE and u-α_2PI-Pm-C/CRE in cases of preeclampsia were significantly increased, and u-UK/CRE index was moderately increased and u-D-dimer was significantly increased in severe cases and renal type (u-UK/CRE: 49.9 ± 38.6 ng/mg $p<0.05$, u-D-dimer: 60.4 ± 13.0 ng/ml $p<0.01$). These findings suggested that in moderate cases of preeclampsia, the changes of endotheiral cells are started to occur from the early stages of pregnancy and following the gastational weeks and when it changed to severe cases or renal type, through the damage of the endotherial cells these changes are resulted in hyperfibrinolytic state and finally fall into the intrarenal vascular coagulstion.

83. Biochemical Properties of Urinary Thrombomodulin during Pregnancy and its Pathophysiological Role in Toxemia of Pregnancy

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It is known that thrombomodulin (TM) exists in the glomerulus and is excreted in urine. To elucidate the pathophysiological role of TM in urine in both normal pregnancy and toxemia of pregnancy, the levels of immunoreactive TM (TM antigen) were