Early diagnosis of trophoblast produced capillary hypertension (pregnancy-induced hypertension)

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Summary

A clinical study was initiated to demonstrate that blood pressure in the capillaries increases long before there is a rise in arterial blood pressure. Thus the diagnosis of capillary hypertension can be made much earlier, even before gross tissue edema is observed.

Bearing in mind the pathogenetic mechanism of the development of pregnancy-induced hypertension (PIH) complicating the clinical picture, analyzed hematocrit had great statistical significance. Also, by following the diagnostic sequence, after hematocrit, Acidum uricum shows pathologic and protein loss values.

Clinical application of this study would be in timely albumin administration and fast oncotic pressure regulation in order to avoid hypertension complications.

Key words: Hematocrit; Preeclampsia; Predicting.

Introduction

We started a clinical study to demonstrate that blood pressure in the capillaries rises long before there is a rise in arterial blood pressure. As is known, many influential clinicians consider arterial hypertension as a prerequisite for the diagnosis of preeclampsia. As a result, by the time the diagnosis is made, the patient has already experienced several disturbances including hypovolemia, edema, oliguria, high blood viscosity (due to high RBC concentration), visual disturbances and headache (due to filtration of plasma water through the walls of the capillaries of the CNS), and decreased perfusion of all non-essential vascular beds (uterus, liver, GI. tract, etc.).

The most obvious disturbances are generalized edema (often called "non-dependent edema"), hypovolemia, hypoalbuminemia, reduced perfusion of virtually all "nonessential" vascular beds, e.g. the liver, uterus, kidney and hemoconcentrations causing hyperviscosity of the blood, and thus reduced perfusion of the intervillous blood flow.

The diagnosis of capillary hypertension can be made much earlier, even before gross tissue edema is observed.

Material and Method

Easy diagnosis, which may precede rise in arterial BP by several weeks, would be based on rising RBC concentrations in the blood, indicating without question that the hydrostatic pressure in the capillaries has risen above the oncotic pressure of the plasma. Hct values should be obtained once a week starting the 24th week of gestation. When two hct determinations (one week apart) show an increase, the plasma albumin concentration should also be obtained (which at that time still might be in the normal range).

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Laboratory analyses were conducted in two groups of patients and compared in relation to development of the clinical picture. Hematocrit has a priority in diagnostics, then Acidum uricum, proteinuria and large coagulation factors.

Laboratory data were followed and compared with the patientsí clinical picture. Time of delivery development was also observed.

Objective of the study

Patient's arterial BP and HCT are put on a graph sheet for ease of evaluating observations. The hypothesis to be tested is that BP in the capillaries increases before there is a rise in arterial BP.

By understanding the pathogenetic mechanism of hypertension development, we wanted to analyze the possibility of following hematocrit as a parameter and indicator of possible hypertension aggravation during pregnancy.

If data obtained, therapeutic possibilities and albumin administration would be justified in all conditions where such pregnancy-induced hypertension (PIH) were discovered by timely hct analysis and later proteinuria. Thus with the application of albumin preeclampsia could be prevented.

Results and discussion

Sixty patients with pregnancy-induced hypertension were analyzed and results were compared with normal pregnancies. For more adequate processing, 60 normal pregnancies were randomly selected by accidental sampling.

Patients with hypertension in pregnancy were followed by laboratory tests and clinical profiling for a two-week period from the 24th to 38th week of gestation.

Complete laboratory screening included hematogram, erythrocytes, leukocytes, thrombocytes, hematocrit, MCV, mean corpuscular hgb concentration (MCHC), expanded biochemistry with urea and creatinine clearance, uric acid (Acidum uricum), transaminases, LDH,

Table 1. — *Hematocrit delay through weeks of gestation.*

No. of weeks of gestation	10	20	30	40	50	60
28						
30	38%					
32		42%	48%			
34				47%		
36						
38						
40						

Value of Hct.

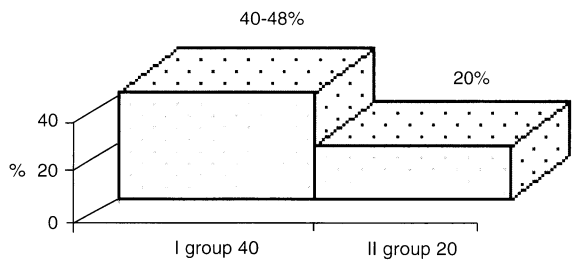

Figure 1. — The show increasing the value of hematocrit in the examining group.

triglycerides, cholesterol, lectorlites, big coagulation factors, fibrinogen, prothrombin (PT), timed PT and PT/INR.

In the group of patients with pregnancy-induced hypertension a 40% rise in hematocrit values was found and an Acidum uricum rise of 20-25% in a 10 to 14 day-interval together with increased proteinuria.

Out of 60 patients, 70% of the hematocrit rise was found from the 30th to 36th week of gestation. In 30% of patients, there was a rise in hematocrit values but a maximum of 20%. From the clinical profile and laboratory analysis, there were no sings of aggravation of the clinical picture.

In 70% of patients with a statistically significant rise in hematocrit values (from 28 to 48), there was also a rise in Acidum uricum from 150 micro mol/l to 600 micro mol/l. It should be noted that along with a rapid increase of values, the clinical picture of hypertension also progresses. All patients with a secondary hematocrit rise within two weeks from the first hematocrit rise showed increased Acidum uricum. An identical scale exists in the incidence of proteinuria. In relation to increased Acidum uricum, proteinuria increased within four to seven days from 0.6 g/l to as high as 4.3 g/l in a 24-hour urine sample.

Each analyzed laboratory parameter showed great statistical significance ($p < 0.01$) when compared to physiologic pregnancy values. By analysis within groups, following hematocrit values in cases of mild forms of hypertension or in cases with a tendency to hypertension progression and preeclampsia, hematocrit values can be considered as a very specific parameter. The fact that 70% of patients had a clinically more serious picture of preeclampsia with greatly increased hematocrit levels was statistically significant.

Based on hematocrit and proteinuria increases pregnancy was terminated.

For 70% of patients with the basic problem of aggravation of symptoms and preeclampsia onset, time of delivery planning was carefully observed.

Out of the 70% of patients (42 patients) a great hematocrit rise of 44% was seen in 24 cases between the 32nd and 34th week of gestation. Considering worsening of the general condition, patients were delivered by cesarean section immediately after the clinical picture revealed development of preeclampsia. Acidum uricum and proteinuria analyses showed the same tendencies but with seven days to two weeks delay.

In conditions where the hematocrit increased later, between the 34th and 36th week of gestation, the difference in rise was from 32% to 40% and it was followed by a mild clinical picture of preeclampsia. Patients were delivered between the 36th and 37th week of gestation.

Conclusion

Bearing in mind the pathogenetic mechanism of the development of PIH complicating the clinical picture, analyzed hematocrit values had great statistical significance. Also, by following the diagnostic sequence, after hematocrit, Acidum uricum shows pathologic and protein loss values.

Clinical application of this study would be in timely albumin administration and fast oncotic pressure regulation to prevent pregnancy-induced hypertension.

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