

Biochemical parameters of amniotic fluid following Covid-19 infection

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Objective

To study non-specific biochemical parameters of amniotic fluid in women who have undergone COVID-19.

Methods

Biochemical analysis of specific markers of amniotic fluid was carried out in the Republican Perinatal Center in 2022 in 70 pregnant women who were delivered during this time. All pregnant women are divided into 3 groups. Group I (control) – pregnant women with physiological pregnancy and without obstetric and somatic diseases (n=10), group II - pregnant women who underwent COVID-19 in the second trimester of their gestation (n=30). Group III- pregnant women who underwent COVID-19 in the third trimester (n=30). Amniotic fluid sampling was performed using transabdominal amniocentesis in the period from 22 to 38 weeks of gestation. The amniotic fluid was examined using the RT-1904C biochemical analyzer (Raito, China). Amniotic fluid was pre-centrifuged at 2700 rpm for 5 minutes. Colorimetric and kinetic research methods were used. The following parameters were studied: total protein (TP), glucose (GLU), urea (UREA), creatinine (CRE), alanine aminotransferase (ALT), aspartate aminotransferase (AST), alkaline phosphatase (ALP), alpha-amylase (AMYL), uric acid (UA), cholesterol (CHOL), triglycerides (TG). We used test kits from Cypress Diagnostica, Belgium.

Results

The indicators of total protein and alpha-amylase in the amniotic fluid in pregnant women of group 2 were 26.15 ± 2.18 gr/l and 143.01 ± 14.32 units/l, while in group 3 of pregnant women this indicator was 17.44 ± 0.83 gr/l and 121.14 ± 9.21 units/l, respectively. These indicators were clearly lower than in the control group, amounting to 35.08 ± 1.93 g/l and 197.3 ± 11.37 units/l. A similar indicator was found for cholesterol in the amniotic fluid. In the group of pregnant women who underwent COVID-19 in the second trimester, cholesterol was 0.89 ± 0.7 mmol/l and in the group of pregnant women who underwent COVID-19 in the third trimester, it was 0.54 ± 0.105 mmol/l. This indicator was clearly lower than in the control group, amounting to 1.7 ± 0.21 mmol/l. In the studied groups of pregnant women, there is a significant increase in alkaline phosphatase from 21.28 ± 3.002 unit/l in the control group to 49.57 ± 13.57 and 139.21 ± 37.86 unit/l in the main two groups.

Conclusion

In contrast to the control group patients, pregnant women who have undergone COVID-19 have low levels of total protein that performs a construction, energy and transport function. There is an increase in the activity of alkaline phosphatase, revealing damage to liver cells with possible damage to the placenta. A lower concentration of alpha-amylase, which is involved in the carbohydrate metabolism of the fetus, was revealed.

Biochemical parameters of amniotic fluid in pregnant women who underwent COVID-19 in the II and III trimesters of gestation.

Indicators	Control group	II-trimester	III-trimester
TP, g/l	35,08±1,93	26,15±2,18	17,44±0,83*
GLU, Mmol/l	2,31±0,32	3,22±0,44	6,89±1,29
UREA, Mmol/l	8,83±1,24	6,67±1,64	5,20±1,38
CRE, micromol/l	383,21±54,09	247,52±42,96	228,22±60,53
ALT, Unit/l	94,5±13,33	136,50±19,77	145,83±9,74
AST, Unit/l	30,63±4,321	29,225±4,06	59,91±23,81
ALP, Unit/l	21,28±3,002	49,57±13,57	139,21±37,86*
Hemoglobin	107,0±15,08	81,08±5,17	80,53±4,48
AMYL, Unit/l	197,3±11,37	143,01±14,32	121,14±9,21*
CHOL, micromol/l	1,7±0,21	0,89±0,7	0,54±0,105*
TG, Mmol/l	0,27±0,03	0,3±0,48	0,6±0,44
LDL, Mmol/l	0,03±0,002	0,04±0,01	0,05±0,01
HDL, Mmol/l	0,02±0,003	0,02±0,002	0,08±0,001

Note: * - the reliability of differences with the control group, ^ - between the studied groups (p <0.05).