17th World Congress in Fetal Medicine

Evaluation of second trimester amniotic fluid ADAMTS-4, ADAMTS-5, IL-6 and TNF-α levels in pregnant complicated with gestational diabetes mellitus

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Objective

To test the hypothesis of altered A Disintegrin and Metalloprotease Domains with Thrombospondins motifs (ADAMTS) levels suggested in the aetiopathogenesis of gestational diabetes mellitus (GDM) by measuring and comparing ADAMTS-4, ADAMTS-5, IL-6, and TNF-α levels in the second trimester amniotic fluid of pregnant women complicated with GDM and normal controls.

Methods

All pregnant women who underwent elective amniocentesis for karyotype analysis between 01. 04. 2014 - 01. 01. 2018 were enrolled in this study. Twenty patients diagnosed with GDM constituted the study group while an equal number of age and body mass index-matched patients without GDM formed the control group. The statistical software package IBM SPSS 22. 0 (SPSS Inc., Chicago, IL, USA) was used for all data analyses. Differences were considered significant when p values were <0. 05.

Results

During the study period, 576 amniocenteses were performed in Inonu University School of Medicine Department of Obstetrics and Gynecology. The demographic characteristics of the study population are summarized in Table 1. There were no significant differences between the age, body mass index, and gestational age at amniocentesis. The mean amniotic fluid ADAMTS-4 and ADAMTS-5 levels were significantly increased in the GDM group compared with the control group (253. 5±18. 7 and 188. 5±21. 3, p<0. 001; 192. 9±16. 4 and 154, 8±19. 9, p=0. 021 respectively). Also, a significant increase was detected in amniotic fluid IL-6 and TNF-α levels in the GDM group compared with the control group (136. 2±17. 3 and 98. 3±11. 5, p<0. 001; 154. 2±12. 5 and 86. 2±10. 8, p<0. 001 respectively).

Conclusion

This study is the first report that demonstrates significantly increased amniotic fluid ADAMTS-4 and ADAMTS-5 levels in patients complicated with GDM. The results of this study suggested that ADAMTS-4 and ADAMTS-5 may have an important role in the progression of GDM in pregnant by leading an increase in amniotic fluid IL-6 and TNF-α levels.

Table 1. Maternal characteristics and birth outcomes of the study and control group.

	Gestational DM (n=20)	**Control group (n=20)**	**p**
Age (years)*	33.05±3.36	31.10±3.71	0.595
BMI (kg/m^2)*	24.73±5.21	22.90±2.26	0.493
Gravidity**	4 (2-11)	3 (1-7)	0.024
Parity**	2 (1-9)	1 (0-5)	0.527
Having GDM in obstetric history***	13 (65)	0 (0)	<0.001
Gestational age at amniocentesis (week)**	19.5 (16-22)	19 (16-21)	0.752
Gestational age at birth (week)*	38.90±1.86	39.20±1.10	0.152
Mode of delivery***			0.493
Vaginal delivery	5 (25)	6 (30)	
Cesarean section	15 (75)	14 (70)	
Birthweight (gr)*	3396.00±590.90	3249.00±269.12	0.128
Gender***			0.210
Male	8 (40)	11 (55)	
Female	12 (60)	9 (45)	

*mean ± standard deviation; ** median (minimum-maximum), *** n (%)

Table 2. ADAMTS and ctytokine levels of study and control group.

	Gestational DM (n=20)	**Control group (n=20)**	**p**
ADAMTS-4 (pg/ml)*	253.5±18.7	188.5±21.3	<0.001
ADAMTS-5 (pg/ml)*	192.9±16.4	154.8±19.9	0.021
IL-6 (pg/ml)*	136.2±17.3	98.3±11.5	<0.001
TNF-alfa (pg/ml)*	154.2±12.5	86.2±10.8	<0.001

* mean ± standard deviation; ** ADAMTS: A Disintegrin and Metalloprotease Domains with Thrombospondins motifs, IL: Interleukin, TNF: Tumor necrosis factor, DM: Diabetes mellitus.