The features of fetoplacental angiogenesis in pregnant women with anamnestic embryonic losses

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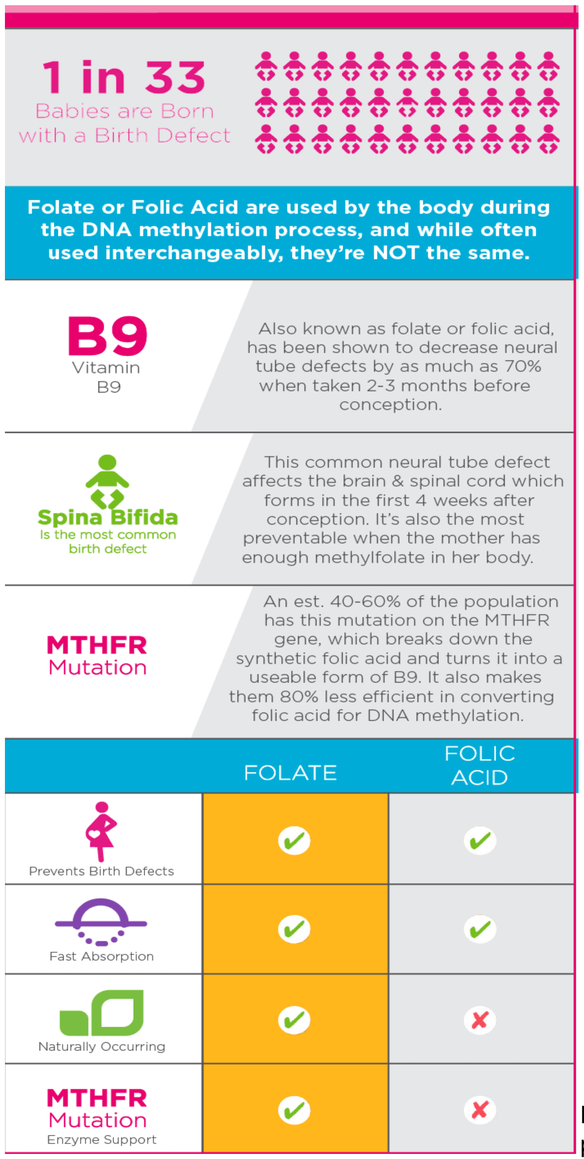
Introduction



Miscarriage occurs frequently among pregnant women but it is often difficult to know the factors responsible. Poor diet, without enough vitamins, has been associated with an increased risk of women losing their baby in early pregnancy. The miscarriage is considered not only as the most important element of original selection, but also as the first manifestation of serious pathological changes, which in 30% of incidents are the cause of subsequent recurrent miscarriage. It is extremely important that 75-80% of losses were occurred within early gestational age (8-10 weeks). One of the important reasons for spontaneous miscarriage is the chorionic-placental factor, which in 40-50% of cases is the strongest predictor of the manifestation of perinatal pathology (placental dysfunction, preeclampsia, preterm birth) if pregnancy will progress.

A few studies have suggested also that being deficient in folic acid is associated with a higher risk of early miscarriage. There's no scientific evidence that MTHFR gene mutations cause recurrent pregnancy loss, but women who've had multiple pregnancy losses often test positive for the MTHFR gene mutation.

Folic acid supplementation for pregnant women and those planning pregnancy: 2015 update. J Clin Pharmacol. 2016 Feb; 56(2): 170–175.

Aim

The goal of our prospective study was to study the factors of fetoplacental angiogenesis in pregnant women who had test positive for the MTHFR gene mutation (C677T) with previous embryonic losses (PEL)

Materials and methods

We were decided to investigate the role of vascular endothelial growth factor (VEGF) and placental growth factor (PlGF) in the development of gestational complications in pregnant women who had test positive for the MTHFR gene mutation (C677T), and previous pregnancy losses in the early gestational age. In accordance with the task of our study, 40 pregnant women were examined, in term of pregnancy 10-12 weeks. The clinical group was represented by 20 pregnant women who had a history of embryonic losses, and test positive for the MTHFR gene mutation (C677T). 20 pregnant women with a physiological pregnancy comprised a control group.

Results

According to the results of our prospective study, the difference in the serum level of VEGF between women with the physiological pregnancy (36.14 ± 3.88 pg/ml) and the clinical group (23.49 ± 2.88 pg/ml) had a statistically significant difference ($p < 0.05$). These results may indicate that placental development in pregnant women with PEL were occurred in conditions of impaired formation of processes angiogenesis and disorders local hemodynamic.

Table. The analysis of VEGF and PlGF indicators in pregnant women who had test positive for the MTHFR gene mutation (C677T), and anamnestic embryonic losses, n = 40, (M ± δ)

№	Clinical group	VEGF, pg/ml	PlGF, pg/ml
1	Pregnant women who had a history of embryonic losses, and test positive for the MTHFR gene mutation (C677T), (n=20)	23,49±2,88*	11,85±2,85*
2	Women with a physiological gestational process (n=20)	36,14±3,88	20,17±2,92

* P value < 0.05 is statistically significant.

An analysis of the serum data of PlGF also revealed a significant decrease ($p < 0.05$) of PlGF to 11.85 ± 2.85 pg/ml (pregnant women with PEL) against 20.17 ± 2.92 pg/ml in women with a physiological process of gestation.

These results may indicate that placenta development with genetic polymorphism according to methylenetetrahydrofolate reductase (C677T) occurs in conditions of impaired formation of its vascular system and a decrease of optimal hemodynamics. In link with the foregoing, it was of interest to study the clinical outcome of pregnancy and to expose the predictive value of reducing VEGF at the end of the first trimester of pregnancy in women who had test positive for the MTHFR gene mutation (C677T) with anamnestic embryonic losses. The results obtained will be able to answer some questions regarding the genesis of perinatal pathology in violation of folate metabolism (MTHFR gene mutation (C677T)) in our prospective study.

A decrease in the concentration of placental growth factor in the serum in women who had test positive for the MTHFR gene mutation (C677T), was associated with a disoders of the processes of placentogenesis, and can be a predictor of the development of preeclampsia, placental dysfunction, and preterm labor.

Conclusion

The result of our study of endothelial angiogenesis factors in women who had test positive for the MTHFR gene mutation (C677T) with PEL may be evidence of impaired optimal blood flow in the uterus-placenta-fetus system and may be an early marker of placenta-dependent pregnancy complications.

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