

Laser Correction of Disorders of Utero-Placental Circulation In Abortion

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Abstract: Method of vaginal bipolar rheohysterography using sensor own design examined 165 pregnant with threatening abortion when pregnancy 8-21 week and 40 in similar terms physiologically developing pregnancy (a control group). In pregnant women with threatening abortion identified unstable hemodynamics in utero-placental complex - speed reduction quick filling of vessels, the average speed of a slow filling of vessels, obstruction of the outflow of venous blood. Influence of low intensity laser beam on the corporeal biologically active point made correction of hemodynamic in utero-placental complex - blood flow indices recovered to a physiological level. Recommended use a laser reflex-therapy in the complex treatment of threatening abortion, complicated by placental insufficiency.

Key words: Threatening abortion • Placental insufficiency • Utero-placental blood • Vaginal bipolar rheohysterography • Laser reflexotherapy

INTRODUCTION

Placental insufficiency is one of the most difficult problems of obstetrics, the successful solution of which is hampered by a variety of causal factors of this disease. In the structure of causes of placental insufficiency, occupies a leading place infringement of blood circulation in utero-placental link functional utero-feto-placental complex [1, 2].

Medicamental therapy violations placentation folic acid, tocopherol acetate, dydrogesterone, pentoxiphylline and other drugs symptomatic, in the early stages of pregnancy is ineffective; moreover, the appointment of these drugs is associated with a risk embriotoxic or teratogenicity effect. In this connection, the pressing task of obstetricians and researchers is to seek ways without medication correction of hemodynamic disorders in utero-placental system that do not have a damaging effect on the fetus. These methods currently confidently include laser reflexotherapy (LRT). Repeatedly proven the positive effects of low-intensity laser radiation on the metabolic processes in the human body [3, 4], absence of harmful effects on a fetus [5, 6], make laser reflexotherapy priority direction in the development of methods of treatment and prophylaxis MO. In the basis of laser

therapy is the local stimulation of metabolic processes in irradiated tissues and reflex effect through vegetative nervous system of the Central mechanisms of regulation of functional activity of the cardiovascular, endocrine and other systems of the body [7].

It is well known that haemodynamic reactions are regulated by the vegetative nervous system, therefore, the method of laser acupuncture in this case it is logical to assume pathogenetically substantiated method of treatment of disorders of blood circulation in utero-placental complex. All the above stated defined the purpose: to study the efficacy of low-intensity infrared laser radiation in the correction of utero-placental blood flow in pregnant risk group for the development of placental insufficiency.

MATERIALS AND METHODS

For the realization of this goal we examined the dynamics of 165 pregnant with threatening abortion when pregnancy 8-21 week (the main group). The control group consisted of 40 women with physiologically developing pregnancy on terms comparable with pregnancy in women major group. The criteria for inclusion in the study were: - reproductive age of the patient; - the period of pregnancy

from 8 to 21 weeks; - absence of inflammatory and other somatic diseases that affect the studied parameters of homeostasis; - a written consent of the pregnant to participate in the study. Blood flow study carried out by the vaginal bipolar rheohysterography using a two-channel, by automatic data processing, the device «Rheoprocessor» (Moscow) sensor own design. This technique unlike other, allows to register synchronously intensity of circulation in utero-placental complex and on the side intact uterus [6]. Quantifying rheohysterogramm was carried out on the following parameters:

- RI - rheography systolic index;
- AFI - amplitude-frequency indicator;
- V_{max} - maximum speed of filling (vessels), (Ohm/sec.);
- V_{mid} - average speed slow filling (vessels), (Ohm/sec.);
- α - time filling of vessels;
- T - the duration of the cardiac cycle, (sec);
- a/T - ratio of the time anacrotic phase to the duration of wave (%);
- Q- α - time rapid filling (vessels), (sec);
- β - distribution time of diastolic waves (sec)/

Indicators analyzed separately, in comparison, in the left and right of vascular beams of the uterus.

Correction of disorders of blood circulation in the uterus carried out by the method of laser reflexotherapy by exposure to laser ray low-intensity radiation parameters: λ - 0,89 mkm, pulse frequency of 80 Hz, pulse duration – 260 nanosecond; t - 8-10 sec.; course 5-7 days the biologically active point (BAP), located in the area of sacrum (lower corner of a rhombus of Michaelis) with the use of «Pattern - 2K» (Kaluga).

Statistical analysis was performed on a personal computer IBM PC/ Pentium using the MEDSTAT programme (B. L. Akimov). Calculated arithmetic mean (M) and standard error of the average arithmetic mean (m). For the evaluation of critical reliability of differences compared averages used Student's criterion. The differences are recognized statistically significant at the level of no more than $P < 0.05$.

RESULTS AND DISCUSSION

According to the poll surveyed pregnant established that in the main group aged 17-19 years were 24 people (14.5 %), control - 3 (7,5 %), aged 20-24, respectively, 48 (29,0 %) and 15 (37,5 %), aged 25-29 years - 51 (30.9 %)

and 11 (27,5 %), aged 30-34 - 24 (14.5 %) and 12 (30.0 %) and aged 35-39 years in the main group were 18 (10,9 %) and in control - 1 (2,5 %), i.e. by the age factor surveyed groups of women were relatively comparable. In the control group in terms of pregnancy up to 12 weeks were examined 20 (50 %) were women and during gestation 13-21 week - 20 (50 %). Threatening abortion in women of the main group 106 (64,2 %) occurred in the first trimester of pregnancy and 59 - (35,8 %) - in terms of pregnancy 13-21 week. Analysis of obstetric-gynecological history has shown that she is pregnant core group formation menstrual function in 15-16 years occurred in 30 (28.6 %), (control 3; (7,5 %), in 17 years and older - 20 (19,0 %), (in the control group, 2; 5,0 %). The 27 pregnant with threatening abortion (25,7 %) menstrual cycle was irregular (in control group - in 7; 17.5 %) and 11 (6.7 %) took place polimenoreya (in control group - 0). When studying the reproductive function is established that in the control group, more than half (52.5 per cent) of women were first pregnant. The average number of births in this group is for every woman was 0.25, medical abortion - 0.12, a miscarriage of 0.1. In the main group first pregnant were 40 (24,2 %) of patients, but from 65 re pregnant childbirth in history had only 33 (50,7 %). The average number of abortions per woman in this group amounted to 0.46 and spontaneous - 0,22 that is in 2 times more frequently than in the comparison group. From gynecological diseases brought the attention of the increased frequency of inflammatory diseases of the uterus and adnexa in the main group of women - 55 (33,3 %) compared with pregnant control group - 3 (7,5 %). Among somatic diseases in pregnant women, threatening abortion relatively more likely to have 11 (6,7 %) pointed to the pathology of the gastrointestinal tract (chronic gastritis, peptic ulcer 12 duodenal ulcers), diseases of the thyroid gland (thyrotoxicosis) - 5 (3,0 %). Thus, the results of clinical analyses show that pregnant women with threatening abortion burdened and obstetric-gynecological and somatic history. Reography hemodynamics studies in the womb of the pregnant women of the control group showed that in the first trimester there is a significant intensification of blood flow on the side of implantation (determined by ultrasound), was expressed in increase of AFI 15.9 %, V_{max} - by 20.4 % and V_{mid} - by 52.0 % ($P < 0.05$), i.e. actually 1.5 times compared with the flow of blood through the intact party (IP) of the uterus (Table 1). At that, judging by the index of the D/A, they part of implantation (PI) almost 2-fold increased speed of the outflow of venous blood ($P < 0.05$).

Table 1: Rheography indicators of blood flow in the uterus in physiological pregnancy (M±m)

The indicator	I trimester			Pregnancy 13-21 week				
	PI ₁	IP ₁	PI/IP x 100 (%)	PI ₂	IP ₂	PI/IP x 100 (%)	PI ₂ /PI ₁ x 100 (%)	IP ₂ /IP ₁ x 100 (%)
RI	0,293±0,029	0,252±0,018	116,2	0,366±0,013	0,197±0,019	185,8**	124,9*	78,2*
AFI	0,414±0,028	0,357±0,014	115,9*	0,505±0,012	0,275±0,014	183,6**	121,9*	73,3*
V _{max}	0,656±0,019	0,545±0,031	120,4*	1,301±0,045	0,585±0,012	222,4**	198,3**	107,3
V _{mid.}	0,152±0,023	0,100±0,026	152,0*	0,180±0,026	0,124±0,006	173,1**	118,4	124,0
D/A	0,329±0,035	0,605±0,030	54,3*	0,359±0,012	0,561±0,017	64,0**	109,1	92,7
α/T	17,621±1,788	16,527±1,577	106,6	13,716±1,089	18,920±0,607	72,5*	77,8*	114,5*
Q-a	0,166±0,014	0,155±0,011	107,1	0,178±0,014	0,181±0,006	98,3	107,2	116,7*
B	0,462±0,015	0,493±0,017	93,7	0,479±0,017	0,496±0,003	96,6	103,7	100,6

* - statistically significant difference indicators (P<0,01)

** - statistically significant difference indicators (P<0,001)

In the second trimester pregnant women of the control group continued unidirectional circulation changes in the uterus: V_{max} - PI increased by 222,4 % (P<0.001), V_{mid.} - on 173,1 % (P<0.001), the synchronous speed of the outflow of venous blood on this side was also higher speed IP average 64,0 % (P<0.001). A more detailed analysis of the data allowed to reveal the peculiarities of perestroika blood circulation in the uterus in the dynamics of physiological pregnancy. They were intensification of blood flow to the PI second trimester, based on the figures RI - 124,9 %, AFI - on 121,9 %, V_{max} - the 198,3 %, V_{mid.} - 118,4 % (P<0.001). The IP has been reversed trend: RI decreased to 78.2 % (P<0.01), AFI - to 73.3 % (P<0.01), V_{max} increased only 107.3 % and V_{mid.} on 124,0 % (P<0.05), i.e. a sharp increase in blood supply to the uterus PI happened «at the expense» of its IP, which we believe should be considered as an adaptation hemodynamic reaction of the organism mother, aimed at improvement of tissues trophism in utero the developing fetus. In contrast to pregnant women with threatening abortion and emerging placental insufficiency in the late first and early second trimester have expressed human blood circulation in the uterus: a decrease in the inflow of arterial blood to the PI, manifested decrease in RI by 45.4 % (P<0.01), AFI - by 54.3 % (P<0.01), V_{max} - 47.7 % (P<0.01) and obstruction in the outflow of venous blood on the side of the localization of the placenta: in the calculation of the D/A - 114,0 % (P<0.05) and the coefficient α/T - 134,9 % (P<0.05). At the end of the first half of pregnancy on a background described pathological hemodynamic shifts in pregnant main group appeared the phenomenon of «reversion» blood flow: V_{max} IP uterus was 1,923±0,040 Ohm/s, which exceeded the same indicator of PI in the average 183,8 % (P<0.001).

The V_{mid} on IP increased to 0,211±0,015 Ohm/C, which exceeded V_{mid} PI more than in 3 times (on 319,6 %;

P<0.001). The presented data suggest that one of the major pathogenetic biomechanism threatening abortion in the first and second trimesters of pregnancy may serve unstable hemodynamics in the womb of vegetative character. A convincing argument in favour of our assumptions were the results of laser reflexotherapy, as described above. Under the influence of low-intensity laser radiation in pregnant main group increased to the physiological level of adaptive reactions of hemodynamics for adequate blood circulation of a fetus: increase V_{mid.} PI on average by 28.4 % (P<0.05) with a simultaneous increase of 11.9 % (P<0.01) time outflow of venous blood, which contributes to a plethora in the field of placental site and improve the utero-placental perfusion. Thus, the results of our research and data of other authors [7] indicate that the positive effect of laser acupuncture can be explained by nonspecific adaptive reaction of the organism on its influence, the manifestation of which is the stimulation of the functional activity of capillaries due to dilatation and disclosure of reserve. According to the above mentioned author in repeated sessions of laser therapy is an observed increase in capillary network, the increased speed of regeneration of microvessels in 2 times [8-10].

These data allow us to recommend laser reflexotherapy in complex therapy of threatening abortion, the eradication of hemodynamic disorders in the uterus and prevention of placental insufficiency.

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