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Prolonged epidural analgesia by EPH-Gestosis-affected pregnant females.

### Introduction

Conducting the labor with EPH-Gestosis affected parturient must include a constant monitor control of the state of parturient, especially her hemodynamics, state of fetus according to the data of external and internal cardiotocography, conducting intensive therapy and selection of the rational method of anesthetization. In the obstetrical division of the institute of obstetrics and gynecology named after D.O. Ott the method of prolonged epidural analgesia is used more than 30 years. The restrained, and sometimes negative attitude of some obstetricians toward this form of anesthetization, in our opinion, can be explained by the absence of unity of opinion about the influence of this method on the state of fetus, the contracting activity of uterus and the methods of conducting the labor under the conditions of epidural analgesia [ 1, 2, 5 ]. Immense value under the conditions of contemporary perinatal obstetrics acquires importance of epidural analgesia for the perinatal outcomes [10 ]. Beginning from 1973 prolonged epidural analgesia (PEA) is successfully used by EPH-Gestosis affected parturients. since the basic goal of conducting the analgesia benefit in parturients with EPH-Gestosis is not only the reaching of valuable analgesia, but also the normalization of the disrupted functions of organism (hypertension, a change in the functional state CNS, the disturbances of the functions of the liver, kidneys and of otherAs shows a study of a number of the authors [ 4 ], PEA possesses varied action favorably affecting the function of systems and organs. Among these actions moderate arterial hypotension occupies important place, thanks to which epidural and spinal analgesia finds use in parturients with EPH-Gestosis [ 4,5,6 ].

Podtetenev A.D. and Bratchikova T.V. (2004) [ 4 ] consider that PEA with EPH-Gestosis of average gravity is the optimum, pathogenetically substantiated method of analgesia. Analgesic, hypotensive and spasmolytic effects of PEA, in the opinion of the authors, are combined with the absence of negative influence on the function of cardiovascular system, respiratory organs, the function of the liver and kidneys, which with heavy EPH-Gestosis acquires special importance. With premature termination of pregnancy because of EPH-Gestosis PEA also has an effect / shortening first period of the labor due to shortening the active phase and relaxing the perineal muscles in the second period as it leads to

the decrease of pressure on the head of the fetus. With the growth of gravity of EPH-Gestosis while the labor process, worsening in the state of fetus and the need of the urgent measures such as caesarian section, or the imposition of obstetrical tongs, inspection of the walls of the cavity of uterus, suturing the injuries of perineum, etc. [ 4 ].

In relation to perinatal outcomes, some foreign authors consider PEA as the outstanding method of analgesia during vaginal parturition without the negative influence on the state of the fetus and newly born child [ 10 ].

#### The purpose of a study.

Development of the method of prolonged epidural analgesia with the hypertensive forms of EPH-Gestosis, and also the study of the special features of conducting the labour under the PEA by the EPH-Gestosis-affected parturients, and also changes in the nature of the contracting activity of uterus, the state of the fetus and newly born child.

#### Material and the methods of study.

Development of PEA procedure in parturients with EPH-Gestosis, the study of the state of fetus was carried out by the cardiotocography method before and under conditions of the PEA. The contracting activity of uterus was studied by external cardiotocography. Central and peripheral hemodynamics was studied. In our study was used the EPH-Gestosis classification which was developed in our institute [2].

<b>Marks</b>	<b>E-Gestosis</b>	<b>Proteine in the urine</b>	<b>Sys NIBP</b>	<b>Dia NIBP</b>	<b>Degree of EPH-Gestosis gravity</b>
<b>0</b>	Absent	Abs	< 120	< 80	Optimal blood pressure
<b>1</b>	Pathological increase of weight	Trace of proteine in multiple probes	130	85	Normal BP
<b>2</b>	External. Not significant	< 1	130-139	85-95	Normal or increased BP
<b>3</b>	External, significant	>= 1	140-159	90-99	Mild hypertension EPH-Gestosis 1 <sup>st</sup> degree
<b>4</b>	Systemic	>=2 – 3	160-179	100-109	Moderate hypertension, EPH-Gestosis of 2 <sup>nd</sup> deg
<b>5</b>	Systemic	> 3	>=180	>=110	Severe hypertension, 3 <sup>rd</sup> degree EPH-Gestosis
<b>6</b>	Systemic	> 3	>= 180	>= 110	Severe hypertension

Eclampsia  
Imminent  
(EI)  
+ subjective  
signs

*Subjective signs: insignificant headache, angiopathy of the retina of the first degree (1 mark); significant headache, angiopathy of the retina of the second degree (2 marks); sharp headache, the disturbance of sight in the correlation with angiopathy of retina 3<sup>rd</sup> degree, pain in the epigastric region, nausea, vomiting (3 marks).  
By the sum of marks understanding: mild EPH-Gestosis (0-12), moderate (13-16), Severe (heavy) EPH-Gestosis (over 17)*

It is important to emphasize position of F. Arias (1989) [ 3 ], who indicates that with conducting labors by females with arterial hypertension its important to focus attention on the questions, connected with the poor transference of blood loss or regional anesthesia. In the opinion of the author, an insufficient increase of the intravascular liquid volume by pregnant females with arterial hypertension is the reason for the poor transference of blood loss and regional anesthesia. Thus, in patients with the Eclampsia Imminent (EI) or eclampsia can develop deep shock after cesarean section, in spite of the moderate or even small blood loss during the operation. This occurs in connection with the fact that the average loss of the blood with the cesarean section, equal to 1000 ml, it corresponds approximately to 35-40% of blood of pregnant female with the Eclampsia Imminent (EI). Deep shock by pregnant females with hypertension can be not only the consequence of blood loss, but also the result of regional anesthesia. The mechanisms of the development of shock in both cases are similar: blood loss while the labor corresponds to removal of blood from the organism due to bleeding, with the regional blockade the blood departs to the reservoirs of the vessels of lower extremities as a result of the blockade of sympathetic and parasympathetic nervous ends. The unfavorable influence of regional blockade on the hemodynamics can be prevented. For this it is necessary to raise the lower extremities of pregnant female, to exclude obstacle to the return of the blood by the pregnant uterus and to fill intravascular volume with liquid and electrolytes. However, it is better to try not to allow the appearance of such complications in labile women. In the opinion of F. Arias [ 3 ] regional blockade (spinal and epidural anesthesia) by patient with the heavy forms of hypertension of that developing during the pregnancy, is contradicted.

#### Results and their consideration.

We have studied the 487 cases of the labors and outcomes by EPH-Gestosis affected pregnant females, which were separated into groups under classification of the Ott Institute (table 2).

EPH-Gestosis forms:

form	quantity	percent
E-Gestosis of pregnant	140	28.7
Arterial hypertension	91	18.7
EPH-Gestosis of 1 <sup>st</sup> degree	135	27.7
EPH-Gestosis of 2 <sup>nd</sup> degree	90	18.5
EPH-Gestosis of 3 <sup>rd</sup> degree	31	6.4

Basic indications to the PEA were unhealthy/painful struggles. Depending on gravity of EPH-Gestosis the PEA was performed within different periods. Thus, for instance if with E-Gestosis of pregnant females, EPH-Gestosis of the 2nd degree the puncture and catheterization of epidural space was performed during regular labor and deployment of uterine opening on 4-6 cm, then

with the heavier forms of EPH-Gestosis (EPH-Gestosis 2-3, Eclampsia Imminent (EI)) the epidural blockade was performed at the very beginning of labor. In contrast to the group of comparison the puncture and the catheterization of epidural space in parturients with EPH-Gestosis was performed at the higher level (T11-12; L1-2) with the subsequent introduction of catheter in the cranial direction for the purpose of the blockade of the ganglia of boundary sympathetic stem and achievement of hypotensive effect. In parturients with the heaviest forms of EPH-Gestosis

(EPH-Gestosis of the 2nd degree, Eclampsia Imminent (EI)) the puncture and the catheterization of epidural space was performed under conditions of the anticonvulsive therapy (diazepam, magnesia sulfate) or under general anesthesia (inhalation anesthetics and other.). Before the PEA 70 (14.5%) of women for the purpose of the treatment of EPH-Gestosis was obtained sulfate magnesia, in 223 (54.8%) hypotensive drugs have been used (dibazol, papaverine, pentamine and other.) Before production of the PEA 123 (26.3%) of parturients obtained different analgesics - phentanyl, promedol

(trimiperidin), neuroleptics - droperidol, diazepam or inhalation anesthetics (nitrous oxide, etc.) Complete (outstanding effect) anesthetization it is noted in 453 (91.7%) parturients, good - in 21 (4.3%), satisfactory - in 13 (2.7%) and in 6 (1.3%) parturients analgesia after production PEA did not developed in.

Significant percentage of failures we are explaining by several reasons. First, by parturients with expressed E-Gestosis identification of epidural space is difficult. Second, with the heavy forms of EPH-Gestosis puncture and the catheterization of epidural space it is necessary to carry out under the conditions of anesthesia, which also hampers the identification of epidural space. A decrease in arterial pressure was noted simultaneously with the development of analgesia in the majority of parturients. So with use of trimecaine at the dose 1.5-2.0 mg/kg of the mass of body systolic pressure was reduced on 10-15 mm Hg, but diastolic substantially did not change. With an increase in the dose of Trimecaine to 3.0 mg/kg - systolic AD was lowered on 30-40 mm Hg, and diastolic by 10-15 mm Hg. Hypotensive effect PEA depended not only on dose, but also on the degree of gravity of EPH-Gestosis. So for example with the identical dose of the introduced solution of trimecaine the greatest decrease both in systolic (to 33.7%) and diastolic (to 28.7%) arterial pressure was observed with EPH-Gestosis 3rd degree. The same dose of trimecaine (3 mg/kg) in parturients with EPH-Gestosis of the 2nd degree decreased on the average - the systolic pressure on 23%, diastolic by 24.7%, and with EPH-Gestosis of the 1st degree respectively by 18.5% and 17.4%. In this case it is necessary to note that for achievement of hypotensive effect with EPH-Gestosis of the 1st degree was required the higher doses of anesthetic (3.8 mg/kg/hour), than with EPH-Gestosis of the 3rd degree - 3.5 mg/kg/hour). One should assume that the decrease of the necessary dose of anesthetic in parturients with the heavy forms of EPH-Gestosis is explained by reduction in the detoxification function of the liver, which participates in the biotransformation of local anesthetics (P. Lund, 1975) [ 1 ].

According to the data of Shaurin` A.V. (1976) [ 5 ] the use of trimecaine in the average dose 3.8 mg/kg/hour as the anesthetic for the epidural analgesia in parturients with the hypertensive form of EPH-Gestosis causes valuable analgesia, statistically significant decrease in arterial pressure and central venous pressure, what in this category of patients is therapeutic effect, since it frees from the need of applying other hypotensive means. According to the data of the author, during the study of hemodynamic indices were obtained the following indices. Assuming in each group the initial arterial pressure for 100%, we're observed that after PEA the most significant percentage of a decrease in arterial pressure happened by parturients with 3rd degree of EPH-Gestosis gravity, when arterial pressure was considerably increased. In this group systolic arterial pressure was reduced on the average to 33.68%, and diastolic on the average by 28%. With the 2nd degree of EPH-Gestosis gravity arterial pressure

respectively was reduced on the average to 22.82% and 24.69%, while with 1st degree - 20.3% and 19.6%. [ 5 ].

According to our data short-term or insufficient hypotensive effect was noted in 106 (21.7%) parturients, although the degree of the analgesic effect was sufficient. Hypotensive effect was absent with the low L2-3, L3-4 the puncture of epidural space and with the introduction of catheter in the caudal direction. In the number of parturients hypotensive effect decreased after 4-5 introductions of anesthetic, which in our opinion was caused by to trimecaine/lidocaine tachyphilaxy. Insufficient hypotensive effect required the order of the hypotensive drugs by 41 (8.4%) parturients.

In parallel to a decrease of arterial pressure with the PEA a decrease in central venous pressure was observed. As is known, increase of central venous pressure is one of the early and indicative signs of the EPH-Gestosis. Central venous pressure in EPH-Gestosis affected parturients in the spaces between the struggles before performing PEA depended on gravity of EPH-Gestosis.

With EPH-Gestosis of 1st degree it was equal to 82.5+- 4.5 mm water col., with EPH-Gestosis of the 2nd degree - 144,4 + - 6.5 mm, with EPH-Gestosis of the 3rd degree - 137.3+-11.3 mm after conducting PEA and development of the expressed analgesia simultaneously with a decrease in arterial pressure was

observed a decrease in central venous pressure: with EPH-Gestosis of the 1st degree to 64.4 + - 3.5 mm (to 21.9%), with EPH-Gestosis of the 2nd degree to 80.9 +- 9.3 mm (to 43.8%), with EPH-Gestosis of the 3rd degree to 96.7 +- 6.06 (to 29.8%) mm.

In the opinion of Shaurin` A.V. [ 5 ] CVP has high diagnostic and forecasting importance. PEA at the average dose 3.8 mg/kg/hour of trimecaine lead in a significant CVP decrease with the 1st EPH-Gestosis gravity degree the percentage of a decrease was 21.93%; with 2nd degree - 43.79%; with 3rd degree - 29.8%, i.e., the most significant decrease of CVP was achieved with 2nd and 3rd EPH-Gestosis gravity degrees. In this case the moment of a CVP decrease coincides with a decrease in arterial pressure, i.e., a maximum decrease is achieved after 15-20 minutes, which composes 15-27% of entire time of the presence of parturient under PEA. Thus, the author achieved significant decrease in arterial pressure and CVP. which was therapeutic effect and freed from the need of applying other hypotensive means. In the opinion of the author, the degree of a arterial pressure and CVP decrease it is easy to regulate by a level of the puncture of epidural space and by a quantity of introduced anesthetic. According to our data, 442 (90.8%) labors were made without special obstetrican measures taken, output obstetrical tongs were used in 3 (0.6%), 42 of 487 cases (8.62%) - were finished by the operation of cesarean section because of different indications (clinical nonconformity of the dimensions of the basin of mother and head of fetus, the absence of struggle induction effect, weakness of labor in combination with hypoxia of fetus etc.). In the control group cesarean section was produced in 30% of cases, obstetrical tongs into 7 (0.8%) the cases, perineotomy in 333 (36.9%) parturients. Of 36 cases of the heavy EPH-Gestosis (EPH-Gestosis of 3rd degree or Eclampsia Imminent (EI)) the operation of cesarean section was done in 26 cases (72.2%) in 2003, in 2002 - 62.5%, in 9 (25%) cases was performed pharmacological induction of the labor, while 3 (8.3%) - finished by the imposition of obstetrical tongs.

Perinatal mortality in the group of EPH-Gestosis affected females been 1.07 on 1000 in 2003 (in 2002. - 3.2). Blood loss up to 400 ml occurred in 446 (91.6%)

women, up to 1000 ml (including the operations of cesarean section) - in 36 (7.4%) , more than 1000 ml in 0.4% of women. An increase of the pathologic blood losses in the group of parturients with EPH-Gestosis, obviously, one should explain by gravity of EPH-Gestosis. As is known, the increased blood loss is one of the most frequent complications of EPH-Gestosis [ 1 ]. According to our data, among the parturients with the mild cases of EPH-Gestosis (E-Gestosis, EPH-Gestosis of the 1st degree) pathologic blood loss occurred in 24 (6.5%) parturients, and with the heavy forms (EPH-Gestosis of the 2nd-3rd degree) it was observed 1.5 times more frequently (9.9%). All operations (operation of the

imposition of obstetrical tongs, cesarean section, intrauterine manipulations, the restoration of the integrity of perineum) were performed after delivery into the epidural space 20-25 ml 2% solution of trimecaine. In contrast to the healthy parturients, PEA was combined with the delivery of neuroleptic drugs (droperidol, seduxen, intravenous narcotics) or inhalation anesthetics.

The overwhelming majority of children was borne with the estimation according to the Apgar scale of 8-9 marks. In asphyxia (the 1-4 of mark) it was borne 1.5% of children. During the study of uterine activity it was revealed no deviations in labor. The lengthening of the labor also was not noted, and there is no increase in the frequency of use of uterotropic drugs, which will agree with literature data and its possible to explain by influence of PEA on the catecholamines blood level. According to the data of the foreign authors oxytocin is used with PEA in 47% (373 parturients) against 25% (339 parturients) in the control ) ( $p < 0.01$ ) [7, 8, 9, 10, 11]. Decrease of the blood pH of the newborn also was not noted, [10, 14, 15] and therefore PEA does not affect the newborn state [16, 17, 18, 19]. The exclusion is noticeable in case of the fetopapental insufficiency is developed hypotension in mother under the effect of PEA. It is important to remember that 30 minutes after PEA a change to cardiotocogram can take place in the form of dip I, dip II and variable decelerations, in 11 % this is most frequently connected with the episodes of hypotension in mother, for which it is necessary to administer liquid from the calculation of 25 ml/kg body weight, since hypotension, hypo-perfusion of intrapapillar placental space, decrease of maternal- fetal exchange, fetal homeostasis are manifested in the form of hemodynamic answer, that at least partially it is possible to avoid by the administering of the physiological solution in the dose of 25 ml/kg . It is necessary to avoid the infusion of glucose, because it can lead to fetal hyperglycemia, hyperinsulinemia, increase in the lactate and decrease pH [ 15 ]; therefore commonly is used Ringer lactate, since it correlates neonatal lactat acidosis [ 14 ]. Therefore is recommended the infusion of solutions with the simultaneous delivery of the lower doses of anesthetic with a constant infusion [ 15 ].

### Conclusion.

Thus, labors with PEA by parturients with EPH-Gestosis are characterized by the decrease of blood loss, and also by the absence of negative influence on the state of newborn. The expressed analgesic effect of PEA, its normalizing influence on the arterial and central venous pressure, and also the absence of unfavorable influence on the labor process, the decrease of the frequency of cesarean section - make it possible to consider expedient the use of PEA by parturients with various forms of EPH-Gestosis.

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