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Review Article

Low Value of Apnea-test on Fetal Survival in Intrauterine Hypoxia is Universal Indicator for Planned Caesarean Section

NA Urakova[1] and AL Urakov[2,3]*

[1]Department of Obstetrics and Gynecology, Izhevsk State Medical Academy of the Ministry of Health Russian Federation, Izhevsk, Russia

[2]Department of General and Clinical Pharmacology, Izhevsk State Medical Academy of the Ministry of Health Russian Federation, Izhevsk, Russia

[3]Department of Modeling and Synthesis of Technological Structures, Udmurt Federal Research Center of the Ural branch Russian Academy of Sciences, Izhevsk, Russia

***Corresponding Author:** AL Urakov, Department of General and Clinical Pharmacology, Izhevsk State Medical Academy of the Ministry of Health Russian Federation, Izhevsk, Russia.

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Abstract

The review is devoted to the justification of apnea-test on fetal survival for hypoxia in a pregnant woman as a criterion for choosing the type of planned delivery through the natural birth canal or by Cesarean section. It is shown that during physiological childbirth in women, the uterus repeatedly worsens the blood supply to the placenta, which causes intrauterine hypoxia of the fetus at each contraction. This is because during contractions, the uterus squeezes not only the fetal bladder with amniotic fluid and the fetus, but also the placenta, as well as blood vessels that are located inside the uterine wall and through which arterial blood flows to the placenta. Therefore, when giving birth through the natural birth canal, the fetus is forced to repeatedly experience periods of hypoxia. However, the ability of fetuses to survive periods of intrauterine hypoxia in future births today is not taken into account when choosing the type of delivery. It has been shown that apnea-test on fetal survival at hypoxia can increase the accuracy of choosing the planned type of birth resolution. It has been established that if the period of immobility of the fetus during respiratory retention by its mother is less than 10 seconds, then childbirth through the natural birth canal is contraindicated, since this can cause drowning of the fetus in amniotic fluid, asphyxia, encephalopathy and pneumonia of the newborn. Planned Caesarean section can improve the prognosis of childbirth.

Keywords: Pregnancy; Delivery; Caesarean Section; Apnea-test; Intrauterine Hypoxia; Diagnostics; Indications

Introduction

The World Health Organization recommends that Caesarean section (C-sections) be performed only when medically necessary [1]. It is generally believed that a planned C-section should be performed for the following indications: obstructed labor, twin pregnancy, high blood pressure in the mother, breech birth, or problems with the placenta or umbilical cord and some others [2]. However, sometimes a C-section can be performed without these indications, and at the request of the mother [2,3]. This means that pregnant women can and should take part in choosing the type of delivery. It is also clear that women's reasonable participation in this process is only possible if they have a certain com-

petence [4,5]. At the same time, there is no alternative to the fact that for women, the first place should be the desire to give birth to a live and healthy newborn, who would have been born pink, screamed immediately after birth and maintained a high potential of their mental abilities [6].

At the same time, women are afraid to give birth to a child not only with down's disease or with cerebral palsy, but also with low mental abilities, as for example, as a result of the birth of a fetus with an umbilical cord entwined through the natural birth canal. Many women know that a physiological birth with an umbilical cord entwining causes hypoxic damage to the cortical cells of their child's brain. And every obstetrician is waiting to be called to court on the application of a mother who accuses him of guilt for an improperly performed birth, as a result of which her child's mental abilities have decreased. And sometimes it is very difficult to find the true reason why a particular child does not have high achievements in school [7,8].

Therefore, to improve the quality of delivery and to protect obstetricians, an apnea-test for fetal survival in hypoxia was proposed [9]. This functional apnea-test for fetal survival in acute hypoxia allows both the obstetrician and the pregnant woman to get objective information about the degree of readiness of the fetus to survive hypoxia in the upcoming physiological birth [10]. Many years ago, it was shown that the results of such a functional test allow you to choose the type of delivery in a timely manner in order to avoid asphyxia of the newborn, to increase the probability of having a healthy child with high Apgar scores, with preserved cortical cells and without symptoms of postpartum encephalopathy in the future.

However, this suggestion was not noticed by women or obstetricians and gynecologists. At the same time, no other similar functional test that provides an assessment of fetal survival in acute hypoxia has been proposed. However, we believe that this test is aimed at preserving women's health, on the one hand, and at reducing perinatal pathology, on the other hand. This is what motivates us to return to apnea-test again.

Results

The apnea-test was invented in 2011 in Russia. The essence of the apnea test for pregnant women and their fetuses is that when a pregnant woman goes to the doctor at the end of pregnancy, the doctor conducts sonographic registration of fetal motor activity during voluntary apnea, which is similar to the Stange test. In this case, the doctor registers the time of the beginning of apnea and of the moment of the appearance of respiratory movements in the chest of the fetus and the extension of his arms. The doctor then determines the duration of the fetal immobility period during apnea in seconds. The duration of fetal immobility in the womb during apnea is then used as the value of the apnea-test [9,10].

In Russia, clinical studies have been conducted on the role of this apnea-test. The results showed that it has a very high predictive value [11].

In particular, it was found that normally the immobile state of the fetus during its mother's apnea persists for more than 25 seconds. In this case, the fetus has a high readiness for physiological delivery, since it is able to survive without brain damage in intrauterine hypoxia that occurs during physiological delivery.

On the other hand, it has been shown that in fetoplacental insufficiency, the immobile state of the fetus during maternal apnea persists for less than 10 seconds. In this case, the fetus is not ready for physiological delivery, since it is not able to survive without harm to its health with intrauterine hypoxia that occurs during physiologically childbirth. It was found that in this case, physiological childbirth is most likely complicated by drowning of the fetus in amniotic fluid, blockage of its Airways with feces, asphyxia of the newborn, postpartum pneumonia and encephalopathy. As a rule, newborns have low Apgar scores. But replacing a physiological delivery with a planned Caesarean section prevents these complications.

At the same time, it was shown that planned Cesarean section, intended for the prevention of hypoxic damage to the cortex cells in the fetus with a low survival rate for apnea, most effectively performs a protective role if it is performed at the time of day when the pregnant woman has the lowest body temperature [12].

In other words, the results showed that there is no alternative to using the previously proposed apnea-test for fetal survival in hypoxia in every pregnant woman, since this allows timely selection of the type of delivery for the actual exclusion of asphyxia of the newborn, postpartum pneumonia and encephalopathy that occur due to the use of delivery through the natural birth canal.

It should be recognized that about 10 years have passed since the publication of these facts, but neither women nor obstetricians

and gynecologists have adopted this apnea-test. In all likelihood, there is no available explanation of what the retention of breath by a pregnant woman has to do with physiological childbirth. In this regard, we present information that has been received by specialists in recent years and which allows us to take a new look at the apnea-test in pregnant women.

It turned out that in obstetrics, there is a gap in understanding how the uterus during childbirth worsens the blood supply to the placenta and causes natural intrauterine hypoxia of the fetus [13]. That is why women do not know the truth that their uterus during contractions compresses the blood vessels inside itself, that this inevitably causes transient ischemia of both the uterus and placenta, and also causes fetal hypoxia [14,15].

Moreover, these consequences of contractions are most significant for the fetus in the final period of physiological labor, when the uterus contracts for a period of 60-90 seconds [16,17]. So it turns out that in the final stage of physiological childbirth, the uterus during contractions causes the longest periods of intrauterine hypoxia of the fetus [18,19].

But the human fetus is normally absolutely ready to stay alive with such repeated periods of hypoxia that the uterus creates during physiological childbirth. It is established that as soon as acute intrauterine hypoxia occurs, the fetus immediately begins to save the use of oxygen. Several mechanisms of such adaptation of the fetus to acute hypoxia are described [20,21]. Among them, an important place is occupied by urgent immobility of the fetus. It was found that as soon as a pregnant woman holds her breath, her fetus immediately stops motor activity [9,10,22].

It was found that the survival of fetal brain cells in intrauterine hypoxia, as well as the subsequent development of postpartum encephalopathy depends on many factors [18,23]. However, currently in obstetrics, there is no recognition of what factor plays the main destructive role for the fetus in the body of pregnant women during physiological childbirth.

Under these conditions, we take responsibility and state that such a major disastrous factor is the discrepancy between the delivery of oxygen to the fetal brain cortex and the demand of fetal brain cortical cells for oxygen.

That is why the readiness of the fetus to successfully overcome the difficulties that the process of physiological childbirth prepares for it is determined, in our opinion, by the readiness of the fetus to survive the acute period of intrauterine hypoxia. This readiness of the fetus can be found out by the dynamics of its motor activity during artificial intrauterine hypoxia, which can easily be created by every pregnant woman by analogy with the Stange test by holding their breath.

In our opinion, apnea-test for fetal survival in intrauterine hypoxia is a universal indicator of fetal survival in the course of future physiological childbirth due to the following circumstances. The fact is that this test allows you to determine the duration of safe survival of the fetus in intrauterine hypoxia in real time. This, in turn, allows you to compare this duration with the duration of contractions (periods of uterine contraction) during childbirth and on this basis issue a conclusion about the degree of safety of the type of delivery through the natural birth canal. At the same time, the duration of the adaptive period of fetal survival during maternal apnea is an integral indicator of all factors that affect the blood supply, gas exchange, metabolism and survival of the fetal brain inside the uterus of each woman in each period of time.

This is why this functional test can improve the accuracy of predicting the outcome of delivery through the natural birth canal, and can also serve as a basis for recommending a Caesarean section [11,22].

In all likelihood, human evolution has limited the duration of uterine contractions during childbirth to the maximum period of hypoxia that a fetus can survive inside the womb. This is why periods of intrauterine hypoxia that occur during normal physiological delivery are safe for the fetus. But sometimes with an explicit or implicit pathology of pregnancy, the safety of physiological delivery for the fetus may decrease. How to find out about this in time and how to replace these very dangerous deliveries via the natural birth canal with a Caesarean section in a timely manner? The arguments and facts presented in the article convince us that today the use of apnea-test for fetal survival in intrauterine hypoxia can clarify the answer to these questions.

Discussion and Conclusion

In recent years, Cesarean section has become more and more often a substitute for a physiological birth than previously [24,25]. However, there are no clear indications for choosing a planned Caesarean section and choosing the time of day for this surgical operation when low fetal survival in intrauterine hypoxia is suspected

[26]. Moreover, today the generally accepted standard for providing obstetric care does not contain apnea-test on fetal survival in intrauterine hypoxia [27-29].

At the same time, in Russia in 2011, a method was invented to assess the resistance of the fetus to intrauterine hypoxia [9-11]. This method is an upgrade of Stange-test and can be called apnea-test on fetal survival in intrauterine hypoxia. It was found that normally in the final stage of physiological labor, the uterus during contractions causes periodic and reversible placental ischemia and intrauterine fetal hypoxia lasting up to 90 seconds. Despite this, the fetus normally remains viable and is born alive and healthy, since it is naturally endowed with the necessary reserves of adaptation to hypoxia.

But sometimes in some pregnant women and fetuses, the correspondence between the delivery of oxygen to the fetal brain and its oxygen demand worsens. In this situation, physiological childbirth begins to pose a threat to the fetal brain, and therefore during natural childbirth, the newborn may develop asphyxia, and then postpartum encephalopathy. However, in such a situation, the newborn may appear healthy if the natural birth is replaced by a Caesarean section in time.

For a long time, women around the world and official medicine did not have a universal functional test for choosing the type of delivery, aiming to give birth to a healthy child with preserved mental abilities. It becomes obvious that today the only candidate for this role is apnea-test on fetal survival in intrauterine hypoxia.

It was found that normally in the second half and at the end of pregnancy, the fetus remains motionless for more than 25 seconds during the period when its mother holds her breath. It is shown that in this case, the newborn has a lot of chances that it will be born alive and healthy both during physiological childbirth and by Cesarean section.

On the other hand, with fetoplacental insufficiency and other pathology of the mother and her fetus, sometimes in some pregnant women, the fetus is in a stationary state during apnea for less than 10 seconds. It has been shown that in such cases, physiological delivery increases the risk of neonatal asphyxia and postpartum encephalopathy, while Cesarean section reduces the risk of these perinatal complications, especially when this surgical procedure is performed in a timely manner. It is proved that it is safest to perform a planned Caesarean section in the part of the day when the woman's body temperature is the lowest.

Conflict of Interest

None.

Source of Support

Nil.

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