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Guest Editorial

# Modern Methods of Predicting a Clinically Narrow Pelvis in Full-Term Pregnancy

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## Abstract

Change in the frequency and types of anatomically narrow pelvis, as well as anthropometric indicators of pregnant women and large fetus frequencies remain one of the causes of obstetric complications associated with a clinically narrow pelvis. Therefore, the issues of predicting the clinically narrow pelvis before the implementation of obstetric complications did not lose their significance. The purpose of the study was to clarify the value of some prognostic indices in objective prediction of the clinically narrow pelvis.

Retrospectively, 125 births were examined, 65 of which ended operationally for clinically narrow pelvis and 60 pregnant women are delivered through the natural birth canal. In all women, the Matveyev and Ershova index was retrospectively determined., Ultrasound pelviometry was carried out with the calculation of the pelviocranial index (PKI). As a result of the study, they came to the conclusion. That the most significant risk factors for a clinically narrow pelvis are a large fetus and incorrect insertion of the fetal head, as well as an anatomically narrow pelvis. In the presence of these risk factors, ultrasound determination of the direct dimensions of the small pelvis should be carried out with the calculation of PKI to predict the clinically narrow pelvis. The normative values of prognostic indices have undergone some changes due to the change in anthropometric indicators of modern pregnancy. So, it is most advisable to consider the indicator-300 as the lower limits of the Matveev index norm, and the Ershova index -5.2%.

At If there are risk factors of a clinically narrow pelvis, it is advisable to perform ultrasound pelviometry with the calculation of the pelviocranial index to select the method of delivery.

***Keywords:*** *Prediction; Clinically Narrow Pelvis*

## Introduction

Clinically narrow pelvis (CTT) has a high percentage of maternal complications (ruptures of the soft tissues of the birth canal, postpartum bleeding, infectious-toxic complications of childbirth, vesicovaginal fistulas), so on the fetal side (hypoxia, asphyxia, trauma) [1-5]. In modern obstetrics, there are fewer pelvis with pronounced degrees of constriction, but more large fetuses due to which, the frequency of the clinically narrow pelvis remained almost unchanged [5]. At the same time, the frequency of the structure of the anatomically narrow pelvis changed with the predominance of its transversely narrowed forms [2,5]. The so-called atypical forms of

narrowing of the small pelvis appeared, when the outer dimensions remain normal, and the capacity of the pelvis is reduced by flattening the sacrum [5]. At the same time, prediction of the clinically narrow pelvis is mainly based on magnetic resonance pelvimetry [4], which is only available to large treatment facilities. On the absence of a reliable correlation relationship between the external dimensions of the pelvis and its capacity, and on average the correlation index is 0.58. At the same time, the average anthropometric data of women also underwent significant changes in connection with this, there was an urgent need to revise the standards of prognostic indices based on anthropometric indicators [2], as well as to use methods for predicting CT based on ultrasound pelvimetry and fetal anthropometry available to medical institutions of any level. Analysis of the reasons for criminal liability of obstetricians-gynecologists over the past 5 years, conducted by V.I. Gorbachev., *et al*. (2021) showed a lack of prediction and timely diagnosis of KUT as the leading cause of fetal and neonatal deaths in 10 observations out of 23 criminal cases regarding unqualified health care delivery [6].

## Purpose of the Study

The purpose of the study to determine the feasibility of predicting a clinically narrow pelvis with the clarification of regulatory indicators of some prognostic indices.

## Materials and Methods

A retrospective study of 65 birth histories diagnosed with: Clinically narrow pelvis (CTT)., ending in operative delivery and a second group of women (60 persons) delivered through the natural birth canal and selected by random sampling, which was considered to be a favorable delivery through the natural birth canal.

The inclusion criteria were: full-term pregnancy, absence of increased nutrition, history of infertility, presence of uterine tumors and traumatic injuries to the bone pelvis. The criteria for not including were: the presence of pathology, the absence of which was assumed when determining the inclusion criteria.

All women were calculated prognostic indices using the method of Ershova A.S. (1977) and Matveev Yu.G. (1973).

Ershovoy A.S. = percentage of the estimated weight of the fetus from the mass of the pregnant woman, which should normally not exceed 5.4%.

Matveeva Yu.G. = (growth-Okr.zhivotv) + (growth - VDM) + (Pelvis index - 0.5 0cr. Abdomen) + (Ind. pelvis - HDM), where HDM is the height of the uterine floor, and the pelvic index was equal to the sum of the external pelvic dimensions: distantia spinarum-(D.S), distantia cristarum-(D.C), distantia trochanterica-(D.T) and conjugate externa-(C.Ext). According to the author, there was no discrepancy between the size of the pelvis and the head of the fetus at an index exceeding 305.

The pelviocranial index (PKI) was calculated for women diagnosed with a clinically narrow pelvis in the postpartum period according to the method developed by V.A. Kramarsky (1994) to confirm the likelihood of CT. With a CTT of less than 0.82, a high probability of CTT was noted, from 0.82 to 0.83, the probability of CTT was not excluded, and with a CTT of more than 0.83, the probability of CTT was excluded. The PKI was calculated according to the formula BPR: (PRP + PRV/2). Where BPR-biparietal size of the fetal head in mm, determined before delivery. PRP-direct size of small pelvis cavity, PRV-direct size of small pelvis outlets.

### Statistical analysis

All results of the obtained studies were processed using the Microsoft Excel 2013 application package, STATISTICA v.11, Biostat 2009 Professional version 5.8.4. Data from the normal distribution are presented as mean and standard deviation I. Qualitative data are presented as absolute (n) and relative (%) values. Student's t-test was used to assess the differences between the compared groups on quantitative variables with normal distribution. The differences between the compared values were considered statistically significant with the probability of error $p \leq 0.05$, and these statements were regarded as significant.

## Results and Discussion

The average age of women diagnosed with "clinically narrow pelvis" was 24,6 ± 0,78 years. At the same time, there were 24 primary pregnant (36.9%). The first birth was in 47 (72.3%) people. 53 (81.5%) had an aggravated obstetric-gynecological history. Clinical manifestations of functional inferiority of the small pelvis occurred in 56 analyzed cases, which amounted to 86.2%. In the second group of women, the average age was 22,8 ± 0,9 years, the first pregnant was 32 (53.3%) people, the first birth in 54 (90%) people, the aggravated obstetric and gynecological history in 34 (56.7%) people.

Of the risk factors of the clinically narrow pelvis in the first group of women, the most common large fetus occurred in 24 (36.9%) observations. In the second group of women, a large fetus was detected in 12 (20%) women. At the same time, the average fetal weight among women with a clinically narrow pelvis was 3406 ± 86,2 grams, and in the second group of maternity patients 3246 ± 67,5 grams and did not have a significant difference (R ≥ 0,05). The anatomically narrow pelvis was detected in 6 (9.2%) observations in the first group and only in 2 (3.3%) cases from the second group of women. The combination of anatomically narrow pelvis and large fetus was noted in only one observation (1.5%) of the first group of women, and in the second group there was no such combination. In 13 (20%) cases, incorrect insertion of the fetal head into the pelvic cavity was recorded. In the control group, all births proceeded with physiological biomechanism. Birth activity abnormalities were noted in 16 (24.6%) women in the first group and in 8 (13.3%) of the second. Moreover, in the second group of women in all observations, childbirth was effective. In the group of women with a clinically narrow pelvis, weakness of the birth forces was noted in 6 (9.2%) cases, and discoordination of the contractile activity of the uterus of various degrees of severity in 10 (15.4%). In the second group of women, a violation of the contractile activity of the uterus in childbirth was manifested only in the form of weakness of the birth forces. The average duration of childbirth in the first group of women was 8 hours 48 minutes ± 1 hour 24 minutes with fluctuation from 4 hours to 18 hours 20 minutes, and in the second group 7 hours 23 minutes ± 54 minutes with fluctuation from 6 hours 10 minutes to 13 hours ± 40 minutes and had no statistically significant differences (p = 0.243).

The state of functional inferiority of the small pelvis was noted in 34 (52.3%) women in the active phase of childbirth, when the opening of the cervical throat was from 4 to 8 cm, on average 5,8 ± 0,8 cm and in 31 (47.7%) in the phase of slowing down the birth process, when the opening of the cervical throat was almost complete or complete.

None of the observations showed fetal hypoxia intrauterine (according to CTH) in both the main and control groups, and the condition of newborns at birth was satisfactory with an Apgar score of 8 to 9 points, averaging 8,2 ± 0.4 points. In the control group of women, the condition of children at birth ranged from 7 to 9 points on the Apgar scale, averaging 7,6 ± 0,6 points and did not have significant differences with the average Apgar scores in the main group of women.

The average duration of cesarean section surgery was 36,2 ± 0,4 minutes with a range of 25 to 60 minutes. Average blood loss 386,1 ± 48 ml. With a range from 300 to 700 ml. In the control group of women, the mean blood loss during childbirth and postpartum was 235.6 ± 58 ml and was significantly less than in the main group (r ≤ 0,05).

When analyzing the presented material, the satisfactory condition of newborns is noteworthy, verification of the diagnosis in almost half of the studied women occurred with almost complete opening of the cervical throat, only 37% of newborns had large foetal sizes, and an anatomically narrow pelvis was noted only in 9% of observations. At the same time, the combination of a large fetus and an anatomically narrow pelvis, as high-risk factors, took place in only one observation (1.5%). One possible manifest of pelvic functional inferiority may be improper insertion of the fetal head, which occurred in only 20% of observations. And the combination of incorrect insertion and a large fetus took place in only one observation (1.5%). Impaired contractile activity of the uterus as a possible manifestation of a clinically narrow pelvis was noted in every fourth woman (24.6%). At the same time, early repetitive activity against the background of incomplete

opening of the cervical throat with proper insertion of the fetal head, its relatively small size and the absence of anatomical narrowing of the pelvis in the active phase of childbirth could be regarded as discoordination of the birth forces, and not the manifestation of a clinically narrow pelvis.

To support this assumption, prognostic indicators of functional inferiority of the small pelvis were analyzed. Thus, the average Matveev index was equal to 295 ± 1,2 with a fluctuation of 262 to 343 in the first group of women and 315,8 ± 1,6 in the second with a fluctuation of 289 to 347 and statistically had significant differences. (P = 0.0135). At the same time, the Matveev index with an indicator of less than 300 in the main group took place in 30 observations, amounting to 46.2%, in the control only in 11 cases, amounting to 18.3%.

The Ershova index in the first group of women was on average 5,4 ± 0,8%, which exceeded the indicators indicating the possibility of a favorable course of childbirth. At the same time, the index ranged from 3.96 to 6.2% and in 30 (46.2%) cases exceeded the permissible standards. In the second group of women, the average Ershova index was 4,9 ± 0,9 with a fluctuation of 4.0 to 5.5%. An unfavorable combination of the prognostic indices of Matveyev and Ershova was noted only in 24 observations, which was 36.9%, and in the control group only in 6 (10%) cases. During the control pelviometry and the determination of the PKI, its unfavorable indicators were noted only in 20 (30.75%) observations. In 16 (24.6%) cases, PKI indicated the likelihood of a CT that had to be diagnosed early in childbirth. And in almost 44.65% of cases, the index indicator was favorable.

Thus, in almost half of the cases, there was an evidence-based version of the functional inferiority of the small pelvis, which was confirmed by prognostic indices and the prognostic value of the PKI. The objectivity of the assumption is also indicated by factors such as the satisfactory condition of children at birth, the absence of traumatic damage to the mother and fetus and a low percentage of the combination of adverse risk factors of the clinically narrow pelvis. Operative births, in none of the observations, were complicated by pathological blood loss, or toxic and infectious complications.

Noteworthy are the absence of clinical manifestations of functional inferiority of the pelvis in 9 (13.8%) women out of 65, the presence of a large fetus in 24 (36.9%) pregnant women, anatomically narrow pelvis in 6 (9.2%) cases, atypical insertion of the fetal head in 13 (20%) women. And the combination of risk factors, such as a large fetus and an anatomically narrow pelvis took place only in 1 (1.5%) observation, as well as the presence of a large fetus and incorrect insertion of the head of the fetus into the small pelvis also in one case (1.5%).

Of the risk factors, the largest fetus turned out to be the most significant, the frequency of which did not exceed even 40%. Atypical insertion of the fetal head was in second place, the frequency of which was 20% and only in third place the anatomically narrow pelvis (9.2%).

## Conclusion

When analyzing the indicators of prognostic indices, the significance of each of them turned out to be equivalent if we take the Matveev index not exceeding 300 as the norm, and Ershova more than 5.2%, then in 46.2%, the indicators of these indices turned out to be unfavorable for delivery through the natural birth canal. Thus, based on the data obtained, the following conclusions can be drawn:

1. The risk factors of the clinically narrow pelvis include: a large fetus, atypical, not corresponding to the anatomical shape of the pelvis, insertion of the head of the fetus into the cavity of the small pelvis and anatomical forms of the narrowed pelvis.
2. Taking into account the change in the height and weight indicators of modern women and the frequency of anatomical forms of the narrowed pelvis, Matveev's index less than 300 and Ershova's index more than 5.2% are considered risk factors.
3. In the presence of a large fetus, an anatomical form of pelvic narrowing, it is advisable to calculate the Matveyev and Ershova indices and, if their unfavorable indicators are determined in the delivery tactics, or in terms of childbirth, indicating the presence of risk factors requiring a timely and targeted assessment of the course of childbirth.

4. In the presence of risk factors for CT (narrow pelvis, large fetus), ultrasound pelviometry should be carried out with the determination of PKI to select the optimal method of delivery.

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