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ABSTRACT

of the dissertation for the degree of Doctor of Philosophy

**MORPHOMETRIC AND TOPOGRAPHIC FEATURES OF
THE FEMALE LESSER PELVIS AND SOME OF ITS
ORGANS IN DIFFERENT AGE PERIODS**

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GENERAL REVIEW OF THE WORK

Relevance and degree of elaboration of the topic. According to the analysis of scientific literature, it should be noted that nowadays, various aspects of the morphology of the skeleton, including the general anatomy of the structural elements of the female pelvis, have not been studied sufficiently. All information obtained about the structure of the female pelvis and the relationship of its parameters to each other has a great importance in both theoretical and clinical medicine.^{1,2}

Any anatomical defect of the pelvis causes various complications that will affect both the course and the outcome of childbirth. Therefore, the individual and age characteristics of the pelvis are considered prognostic criteria for the selection of clinical tactics in the pre- and antenatal periods in obstetric and gynecological practice. The normal pelvimetric parameters of the pelvis indicate the presence of normal sexual development in teenage and adolescent periods.³

Despite the importance of studying the anatomical and morphological features of the female pelvis, there are practically no research works devoted to this topic in our country. At the same time, complex studies using parametric groups, that is, scientific works characterizing the greater and lesser pelvis as a whole, are not found in the local literature sources.

Currently, one of the main directions of studying the anatomy

¹Гайваронский, И.В. Бессонов, Н.Ю. Ниаури, Д.А. (Gayvaronskiy, I.V. Bessonov, N.Yu. Niauri, D.A.) Оригинальные подходы к изучению морфометрических характеристик плоскости выхода из малого таза у взрослых женщин // – Санкт-Петербург: Журнал акушерства и женских болезней, – 2012. №1, – с. 20-25.

²Şadlinski, V.B., Abdullayev, A.S. Antropologiya morfologiyanın əsasları ilə / V.B.Şadlinski, A.S.Abdullayev. – Bakı: Sahhafçı, – 2019. – 413 s.

³Сырова, О.В. (Syrova, O.V.) Размерные характеристики и формы таза у девушек 17-19 лет // – Саратов: Сборник научных трудов «Аспирантские чтения». – 2008. №2, – с. 81-82.

of the female pelvis is the instrumental method of examination, which provides the basis for studying the configuration of the pelvis, as well as the shape, size and other features of the female genital organs.⁴

Thus, the above unambiguously confirms the relevance of studying the anatomical, morphological and osteometric features of the female pelvis among the population of Azerbaijan. On the other hand, it is equally important to study the variability of various parameters of the uterus and ovaries in the context of interaction with the osteometric features, size and shape of the female pelvis.

Purpose of the study. To identify the diversity of pelvic forms in women of different ages by conducting an osteometric assessment and to study the relationship between the osteometric characteristics of the pelvis and the parameters of the uterus and ovaries.

Objectives of the study:

1. To study the pelvimetric parameters of the female pelvises regardless of their shape.

2. To determine the shape of the studied pelvis based on pelvimetric parameters.

3. To determine the pelvimetric parameters of the pelvis of women aged 16-60 years and the range of their variability.

4. To clarify the age dynamics of morphometric features of different forms of the female pelvis.

5. To determine the dependence of the size of the uterus and ovaries on age and the shape of the pelvis and pelvimetric parameters, as well as their topographical and anatomical features.

Research methods. The pelvimetric, macromicroscopic anatomical dissection and ultrasound examination methods were used in the research. The numerical parameters obtained as a result of the study were calculated by the variational statistical

⁴Труфанов, Г.Е. (Trufanov, G.E.) Диагностика "стертых" форм узкого таза методом магнитно-резонансной пельвиометрии // – Москва: Бюллетень Федерального Центра сердца, крови и эндокринологии им. В. А. Алмазова. – 2012. №1. – с. 74-81.

method using the “MS EXCEL-2016 and SPSS-22” software packages.

The main provisions of the dissertation submitted for defense:

1. The age-related features of the size and the individual-typological variability of the anatomical forms of the pelvis were determined.

2. The range of variability of the main pelvimetric parameters of the pelvis of women in the reproductive period was revealed and their average value was determined.

3. Using the morphometric studies, the age features of the uterus and ovaries of women aged 16-60 years were clarified. It was found that the size of the uterus and ovaries depends on the shape and metric characteristics of the pelvis.

4. Based on the size and anatomical shapes of the pelvis, it is possible to predict the morphometric parameters of the uterus and ovaries.

Scientific novelty of the study. As a result of the study, the limits of age variability of most of its sizes were studied for the first time as a result of the study of pelvic features of women of various shapes, and the relationship between osteometric indicators of the pelvis and the parameters of the uterus and ovaries was studied. An increase in morphometric parameters of the uterus and ovaries was noted. Tendency to increase in the investigated morphometric parameters of uterus and ovaries was observed. This tendency is observed at least in the thickness of the left ovary and the length of the cervix, and most of all in the length of the uterine body and the length of the right ovary. According to USI, for the first time, the minimum and maximum levels of dispersion of the values of the sizes of the right and left ovaries with a narrow and normal configuration of pelvic shapes are indicated.

Theoretical and practical significance of the study. The theoretical significance of the study is determined by the fact that the results obtained will further clarify and expand the existing data on the pelvimetric characteristics of the female pelvis. Anatomical,

individual-typological, age and metric (dimensional) features of the female pelvis are of great importance in obstetric-gynecological, forensic, surgical and traumatological practice. In addition, the information obtained about the osteometric parameters of the pelvis, anatomical variants of their shape, as well as the morphometric features of the uterus and ovaries can be used in the educational process of the departments of Human Anatomy and Medical Terminology, Obstetrics and Gynecology, Forensic Medicine, Radiology, and Azerbaijan State Academy of Physical Education and Sport.

Approbation of dissertation materials. The main results of the dissertation work were presented at the international scientific conference dedicated to the 85th anniversary of Honored Scientist, Professor R.A. Askerov (Baku, 2018), at the All-Russian Scientific-Practical Conference with international participation on "Problems of modern human morphology" (Moscow, 2018), at a joint meeting of the staff of the Departments of Human Anatomy and Medical Terminology, Cell Biology, Cytology and Embryology of the Azerbaijan Medical University (Baku, 2021), as well as at the scientific seminar of the Dissertation Council FD 2.08 of the Supreme Attestation Commission under the President of the Republic of Azerbaijan operating at the Azerbaijan Medical University (Baku, 2021).

Application of results. The research results were applied in the educational process and relevant lectures at the departments of Human Anatomy and Medical Terminology, Forensic Medicine, as well as Obstetrics and Gynecology of the Azerbaijan Medical University.

Published materials. 22 scientific works on the topic of the dissertation were published. 11 of them are scientific articles, 10 conference materials, and 1 thesis. 3 of the journal articles were published in foreign media («Журнал Анатомии и Гистопатологии» - Voronezh, «Astana medical Journal» - Astana, and «Экспериментальная и клиническая медицина» - Georgia), and 1 in the periodical republic scientific publication included in the

international system of summarization and indexing (Scopus).

Volume and structure of the dissertation. The dissertation is presented on 208 pages (207791 characters) of the computer text. It consists of the following sections: «Introduction» (volume: 8644 characters), «The main content of the dissertation» (volume: 171593 characters), «Conclusion» (volume: 23161 characters), «Results» (volume: 3409 characters), «Practical recommendations» (volume: 984 characters), «List of used literature».

“Main content of the dissertation” is divided into 5 chapters: Chapter I. “Literature review” (volume: 48241 chapter), Chapter II. “Materials and methods” (volume: 9494 characters), Chapter III. “Results of the study of pelvimetric parameters of women without taking into account the shape of the pelvis” (volume: 18776 characters), Chapter IV. “Age features of morphometric features of the female pelvis of different shapes” (volume: 46305 characters), Chapter V. “Morphometric and topographical-anatomical features of the uterus and ovaries, depending on the shape and age of the female pelvis” (volume: 48777 characters).

The bibliography includes 192 sources, of which 3 are in Azerbaijani, 134 in Russian, and 55 in other foreign languages. The text of the dissertation contains 54 tables, 5 diagrams, and 24 photographs.

MATERIALS AND METHODS OF RESEARCH

78 certified female pelvises without injuries and deformations taken from the museum of the Department of Human Anatomy and Medical Terminology of the Azerbaijan Medical University were used as research material.

The studied female pelvic bones cover the period from teenage (16-20 years) to I adolescence (21-35 years) and II adolescence (36-60 years).

Pelvimetric measurements were performed on the pelvis for each age group. Also, 36 female corpses stored in the morgue of the Department of Human Anatomy and Medical Terminology of the

Azerbaijan Medical University were examined, 13 of which belong to the period of teenage, 13 - to the period of the I adolescence and 12 - to the II adolescence age. Morphometric parameters were registered in a special form and included in an electronic database created in the computer program "Excel-2010".

In addition, archival materials of the results of ultrasound examination (USM) performed on 36 patients at MedEra Hospital were analyzed. Ultrasound images were obtained using an ultrasound scanner and a 4D device "Logic 9E".

In the study, the main dimensions of the pelvis were determined by morphometry. Generally accepted pelvic points were used in the measurements.⁵

During the study, we carried out the following measurements (pelvimetric parameters):

1. Anatomical conjugate – the distance between the sacral promontory and the upper border of the pubic symphysis.

2. True or gynecological conjugate – the distance between the sacral promontory and the posterior more convex point of the pubic symphysis facing the pelvic cavity.

3. The diagonal conjugate – the distance between the sacral promontory and inferior border of the pubic symphysis.

4. The rectus diameter of the lesser pelvic outlet (outlet conjugate) – the distance between the convex point of the lower border of the pubic symphysis facing the pelvic cavity and the apex of the coccyx.

5. Transverse diameter – the distance between the most distant points of the arcuate lines of the pelvic bones.

6. Oblique diameter – the distance between the sacroiliac joint on one side and ilio-pubic eminence on opposite sides.

7. Distantia cristarum – the distance between the most distant points of the iliac crests.

8. The transverse size of the lesser pelvic outlet - the maximum distance between the inner surfaces of the sciatic tuberosity.

9. Pelvic height – the distance between the sciatic tuberosity

and the highest point of the iliac crest.

10. *Distantia interspinarum* – the distance between the schiasspine.

11. The rectus diameter of the widest part of the lesser pelvic cavity - the distance between the convex point of the pubic symphysis facing the pelvic cavity and the middle of the junction of the bodies of the II and III sacral vertebrae.

12. The transverse diameter of the widest part of the lesser pelvic cavity – the distance between the farthest points of the right and left acetabular cavities.

13. The rectus diameter of the narrow part of the lesser pelvic cavity – the distance between the lower border of the pubic symphysis and the middle of the sacrococcygeal joint.

14. The transverse diameter of the narrow part of the lesser pelvic cavity – the closest distance between the inner surfaces of the sciatic bones.

To achieve the purpose of the study, we have selected three main indexes: the pelvic ring index (PRI), the pelvic height-width index (PHWI), and the transverse-longitudinal lesser pelvic index (TLSPI) (table).

In our opinion, these indexes can provide detailed information about the shape of the entrance to the lesser pelvis, its height, as well as the general shape of the greater pelvis.

In addition to osteometry, the macromicroscopic dissection method developed by Vorobev V.P (1958) was used in the study. According to this method, longitudinal incisions were made along the white line of the abdomen (from the navel to the end of the groin) on the corpses studied.

Then the woman's lesser pelvic organs were examined and their exact location was clarified. As a result of the examination, the uterus, fallopian tubes, and ovaries were removed from the lesser pelvic cavity in the form of an organ complex.

After cleaning the surrounding soft tissues and vascular fragments, images of the organs were taken. At the next stage,

the parameters of the uterus (length, width, wall thickness) and the ovary (width, length, thickness) were determined.

In the analysis of archival materials of the USI results, the generally accepted principles of anthropometry were used.⁶

Table
General characteristics of pelvimetric indexes

№	Pelvimetric indexes and their description
1.	Pelvic ring index (PRI) - the percentage ratio of the rectus diameter of the lesser pelvic inlet to the transverse one
2.	Pelvic height-width index (PHWI) – the percentage rate of height and interspinous distance of the pelvis
3.	The longitudinal-transverse pelvic index (LTPI) – the percentage rate of the longitudinal size of the lesser pelvic outlet to the transverse one.

Morphometric parameters of the uterus (body and neck) and both ovaries were recorded in the USI protocols. For the body of the uterus, its longitudinal and transverse dimensions were taken as a basis.

As a longitudinal dimension, the distance from the farthest point of the uterine cervix-uterine body to the inner orifice of the cervix is taken; as a transverse dimension, the distance between the farthest points of the anterior and posterior walls of the uterus, perpendicular to the length is taken. The thickness of the body of the uterus is the largest transverse dimension along the entire perimeter of its wall.

To determine the length of the uterine cervix, the maximum

⁶Автандилов, Г. Г. Медицинская морфометрия / Г.Г. Автандилов. Москва: Медицина, – 1990. – 382 с

distance between the external and internal orifices of the cervical canal was chosen. The width of the uterine cervix is the distance between the farthest points of its lateral borders, perpendicular to the length. The size of the ovaries is calculated more simply. Thus, the maximum length, width and thickness (antero-posterior measurement) of the body are determined in three planes perpendicular to each other.

The indicators obtained in the course of the study were statistically analyzed taking into account modern recommendations. The statistical analysis was carried out using the methods of variational and variance analysis.⁷

The signs presented in the groups are arranged in a variational order and the average mathematical indicator (M) and its the average quadratic tendency for each series of variations (σ), standard error (m), minimum (min), maximum (max), as well as the 95% accuracy interval (95% DI) of the variation, were calculated. At the initial stage of statistical analysis, parametric methods were used. Subsequently, it was investigated whether the distribution of series in the group belongs to the family of normal distributions, and it was found that the asymmetry and kurtosis of the series are significantly lower than their representativeness coefficients. Taking this circumstance into account, we consider it expedient to apply parametric methods to compare the assumptions that the obtained series obey the law of normal distribution, and to compare the obtained series.

In cases where the number of compared groups exceeds 2, an analysis of variance (ANOVA test) was performed to compare the numerical indicators. The analysis of variance is based on the division of the total variance into intra-group and inter-group.

$$D=D_x+D_e$$

⁷Петри, А., Наглядная статистика в медицине. Перевод с английского языка / А.Петри, К.Сэбин – Москва: ГЭОТАР-МЕД., –2009. – 168с.

D – total variance

De – intra-group variance (deviation).

Dx – inter-group variance (factorial)

The ratio of inter-group variance to intra-group variance allows us to assess the influence of controlled factors on the final result. The statistical accuracy of the difference was assessed by Fisher's criterion.

RESEARCH RESULTS AND THEIR DISCUSSION

According to the results of a study of preparations covering the period of adolescence, the greatest deviations are observed in the parameters of pelvic height, true conjugate, and oblique diameter. The least variable is the transverse diameter of the entrance to the lesser pelvis, the rectus diameter of the narrow part of the lesser pelvic cavity and the transverse diameter of this part. Of the other parameters of the pelvis, anatomical conjugate, pubic-sacral distance, interspinous distance are more variable than other parameters.

There is a certain correspondence between the proofs we have obtained and the results of O.V. Sirova (2008).³

According to the results of osteometry, the height and transverse parameters of the pelvis predominate in the first mature group. As in adolescence, the maximum distance value at this age was determined on the background of increasing variability ($29.0 > X > 21.8$; $S = 1.87$) and at the same time, due to an increase in pelvic height ($X_{og} = 20, 90$ cm) an increased variance was observed ($S = 1.93$). On the other hand, it should be noted that in this age group, the average size of the diagonal conjugate of the lesser pelvic entrance is greater than the transverse diameter of the entrance ($X_{og} = 11.68$ cm). During the I adolescence period, the greatest increase is in the rectus diameter of the lesser pelvic cavity ($X_{og} = 10.40$ cm).

The most variability in the II adolescence age category is observed in the parameters of the pelvic height, comb distance and

diagonal conjugate. At the same time, the intensity of the variability in the transverse diameter of the true conjugate and lesser pelvis is increased. This increase is not observed in previous age groups.

On the other hand, it should be noted that in this age group, the average size of the diagonal conjugate of the lesser pelvic entrance is greater than the transverse diameter of the entrance ($X_{og} = 11.68$ cm). During the I adolescence period, the greatest increase is in the rectus diameter of the lesser pelvic cavity ($X_{og} = 10.40$ cm).

The most variability in the II adolescence age category is observed in the parameters of the pelvic height, intercristarum distance and diagonal conjugate. At the same time, the intensity of the variability in the transverse diameter of the true conjugate and lesser pelvis is increased. This increase is not observed in previous age groups.

The noted results are consistent with the results of other researchers.^{8,9}

In the II adolescence age category, the most frequent variability is observed in the parameters of the pelvic height, intercristarum distance and diagonal conjugate. At the same time, the intensity of the variability in the transverse diameter of the true conjugate and lesser pelvis is increased. This increase is not observed in previous age groups. The results mentioned corresponding to the results of other. Studies have shown that the oblique diameter of the entrance and the rectus diameter of the narrow part of the lesser pelvic cavity are also subject to age-related changes.

In general, there is an increase in variance for most pelvimetric signs in this age group.

⁸Виноградов, С.В. (Vinogradov, S.V.) Комплексная морфометрическая характеристика таза взрослого человека с учетом пола и формы телосложения // Материалы научной конференции ученых-морфологов «Современные проблемы морфологии», – Санкт-Петербурга. – 2006, – с. 5-9.

⁹Стрелкович, Н.Н. Медведева, Н.Н., Котиков, А.Р. (Strelkovich, N.N. Medvedeva, N.N., Kotikov, A.R.) Конституциональные особенности формы таза женщин города Красноярска с учетом вектора времени // – Красноярск: Сибирское медицинское обозрение, – 2015. №1, – с. 51-54.

Transversely narrowed pelvic forms are characterized by a high degree of the tendency of metric parameters to variations. Anatomical and true conjugates, rectus and transverse diameters of the wide part of the pelvis, as well as oblique diameter, the transverse diameter of the narrow part of the pelvis, intercrislarum distance and pelvic height, are parameters that are subject to the strongest fluctuations.¹⁰

In all three age categories, the greatest interval variability is observed in the parameters of the recuts diameter of the narrow part of the pelvis, the symphysosacral distance, the true conjugate, the longitudinal size of the pelvic cavity, and the parameters of the intercrislarum distance.

The maximum difference between the studied parameters is associated with the intercrislarum distance (by age groups: $27.3 > X > 22.9$; $28.5 > X > 21.9$ and $30.0 > X > 23.3$).

Thus, there are no significant differences between the same pelvimetric features in different age groups in transversely narrowed pelvic forms. It should be noted that pelvimetric signs of a generally equal narrowed pelvic shape are characterized by a certain variability.

The average size of more than half of the features (anatomical and diagonal conjugate, transverse and oblique diameters, rectus and transverse diameters of the wide part of the lesser pelvis, symphysosacral distance) vary greatly in different age groups.

Two more signs – the height of the pelvis and the interspinous distance reliable differ and do not reach 1 cm (the difference between the average values is 0.98 cm and 0.99 cm, respectively).

The least variable with age is the transverse diameter of the pelvic cavity and intercrislarum distance. The obtained parameters

¹⁰Шмедьк, Н.Ю. Труфанов, Г.Е. Вихтинская, И.А. (Shmedyk, N.Yu. Trufanov, G.E. Vikhtinskaya, I.A.) Магнитно-резонансная нельвиметрия: диагностика риска клинически узкого таза и дистосии плечиков в конце третьего триместра беременности // – Москва: Проблемы женского здоровья, – 2014. №1, – с. 44-51.

show some differences from the results of other researchers.^{11,12}

Average values of pelvimetric features in narrowed pelvic forms, results of comparison of the same indicators in narrow and normal groups of the pelvis, differences in pelvic measurements at different ages were compared with relevant data from other researchers.

Some of the results show quantitative differences. For example, the percentage distribution of narrow and normal pelvic shapes in the studied collection differs from the results of some authors. According to some recent researchers, such as Kurbatova AV et al. (2010)¹³, the transverse narrowing form of the anatomically narrow pelvis is more common in modern women (45.2%).

In our study, both transversely narrowed and generally equally narrowed forms of the pelvis account for 25%. According to the evidence obtained by Sirova OV (2008)³, the narrow shape of the pelvis was relatively rare in our study (55.6% vs. 46%). It should be noted that the results obtained by the author in the study of pelvimetric parameters were obtained only as a result of a study of the pelvis of adolescent girls (from 17 to 19 years), and this circumstance is reflected in the comparative analysis. However, a similar picture emerges when we compare the results of a gynecological examination of girls aged 16-20 years with our data.

Probably, "changes in the structure of the anatomical narrow

¹¹Гайворонский, И.В. Ниаури, Д.В. Бессонов, Н.Р. (Gayvoronskiy, I.V. Niauri, D.V. Bessonov, N.R.) Морфологические особенности строения малого таза как предпосылки к развитию пролапса гениталий // – Курск: Курский науч.-практический вестник «Человек и его здоровье», – 2018. №2, – с. 86-94.

¹²Блощинская, И.А. (Bloshchinskaya, I.A.) Современные аспекты технологии в родов узком таза / И.А.Блощинская, В.А.Борисенко, Т.М.Черненко [и др.] // Новые технологии в акушерстве и гинекологии. – Москва: – 2013. №2, – с.52-55.

¹³Курбатова, А.В., Егорова, А.Т., Синдеева, Л.В. (Kurbatova, A.V., Egorova, A.T., Sindeeva, L.V.) Показатели антропометрического обследования девочек-подростков и девушек таймыра // Красноярск: Сибирское медицинское обозрение, – 2010. №6, – с. 43-49.

pelvis" play a role here, as noted in the work of Schmedik N.Y. et al. (2014).¹⁰ They authors believe that the lack of a clear boundary between the narrow and normal forms of the pelvis can be explained by the "intermediate" form of the pelvis. In the studies of these researchers, the "intermediate" form is 69%, the anatomically narrow form is 18%, the normal form is 13%.

This situation may explain to some extent some of the observed inconsistencies. In general, based on the results of the study of our osteological collection, a narrow pelvis is relatively rare. The fact that differences do exist, in fact, in the works of the last two authors suggests the spread of common narrowed and transversely narrowed forms of the pelvis, which are sharply asymmetric (narrowing more than 53%). In our study, common narrowed and transversely narrowed forms of the pelvis are equally common.

The fact that transversely narrowed forms predominate among narrow pelvises is also noted by other researchers.¹⁴

At the same time, the noted data of researchers on the percentage of the narrow pelvis as a whole do not coincide with the presented data. The determination of the number of individual narrow forms in the population does not have objective criteria, so it is very difficult to talk about any ratio of this configuration.

In our opinion, the reasons for the development of pelvic anomalies may be different. It is known that the deficiency of vitamins, microelements, and minerals, unsatisfactory living conditions, infectious diseases, rachitis, etc. play a role in the development of such anomalies. Also, changes in the structure of the pelvis during puberty can be explained by strong emotional stress, physical exertion, and intense sports activity.

The study of age-related dynamics, taking into account the pelvimetric characteristics of the features of the configuration of the

¹⁴Васильева, Э.Н. (Vasil'eva, E.N.) Прогнозирование и программирование родовой деятельности у женщин с индивидуальными особенностями строения костного таза: / диссертация .кандидата медицинских наук / – Казань, 2009. – 127 с.

pelvis, shows that the shape of the pelvis to a certain extent affects the change in its dimensional variability.

Analysis of the osteometric parameters of the pelvis in all three categories (16-20, 21-35, and 36-60 years) shows that there is a certain age-related variability in the size of the osteometric parameters of the pelvis in its normal, generally narrowed and transversely narrowed forms. However, both narrow pelvic shapes are osteometrically more stable with age than the normal configuration.

Variability of many features of the pelvis of normal structure is observed. Especially in this group, the differences are more noticeable in sagittal parameters.

At the same time, the variability of pelvic signs in normal pelvises increases sharply during the II adolescence period. These data correspond to some extent to the data obtained by S.V.Vinogradov (2006)⁸ and T.N.Strelkovich et al. (2012)¹⁵. According to their results, morphometric differences in the structure of the pelvis are revealed, taking into account the shape of the human body (the shape of the pelvis changes according to the shape of the body).

On the other hand, according to T.V. Kuznetsova (2011)¹⁶, the linear dimensions of the pelvis do not depend on the shape of the body and have individual structural features. As for the age-related variability of pelvimetric characteristics for a specific configuration of the pelvis, not all of our results coincide with the arguments of other authors. Thus, according to O.V.Syrova (2008)³, a wide range of size variations is observed among girls aged 17-20 years. As in our study, the author observed a large change not only in

¹⁵Стрелкович, Т.Н., Медведева, Н.И., Хапилина, Е.А. (Strelkovich, T.N., Medvedeva, N.I., Khapilina, E.A.) Антропометрическая характеристика таза женщин в зависимости от соматотипа // – Красноярск: В мире научных открытий. –2012. №2, – с. 60

¹⁶Кузнецова, Т.В. (Kuznetsova, T.V.) Медико-социальные факторы, определяющие репродуктивное поведение женщин в современных условиях: / автореферат диссертации кандидата медицинских наук. – Москва, 2011. – 26с.

the pelvimetric characteristics of various narrow pelvic shapes but also in the category of the normal pelvis. For some pelvimetric characteristics, the coefficient of variation of the studied material (obtained in a normal-sized pelvis) ranged from 0.8% to 10.6%. He also noted that most pelvic sizes in girls after adolescence period show little change. As we mentioned above, there are differences for the 36-60 age group. But it should be noted that O.V. Syrova (2008)³ did not study the pelvis in the adolescence period, and the results were obtained only based on comparison with data from different authors.

Thus, based on comparing the results of studying the age-related morphodynamics of various forms of the female pelvis with the corresponding results of some authors in this direction, several conclusions can be drawn. According to the average values of the most metric features of the pelvis, the samples studied by us have no distinctive features that distinguish them from similar collections studied by other authors. In our materials, the ratio of narrow and normal pelvic shapes is slightly different (normal size -54%, general narrowed shapes-23%, narrowed shapes-23%). There are statistically significant differences between the parametric characteristics of objects associated with different pelvic shapes in all age periods. However, the differences are expressed unevenly across the age range. The values of the average parameters of objects assigned to different forms during the first I adolescence period, which is the most homogeneous group, differ little (although these differences are statistically significant). The differences in most pelvimetric features among all types of the pelvis are most noticeable in the 16-20 age group. However, from this point of view, the II period of adolescence does not occupy an intermediate position. In this age group, there are noticeable statistical differences between different pelvic configurations. At the same time, in this group, the average parameters of most of the features (both in normal and narrow forms) for the sample are maximum compared to relatively young age periods. It should be noted that, in general, the non-homogeneous

configuration indifference of signs in all age categories does not exceed 5-6.

Monitoring the age-related dynamics of pelvimetric characteristics shows that there is a certain relationship between the shape and size of the pelvis, taking into account the peculiarities of the structure of the female pelvis. Most of the parameters of the pelvis are subject to age-related changes in normal forms, and this is more common in longitudinal measurements. According to our data, the lateral dimensions of the narrow and normal pelvis do not coincide with the views of some authors¹⁷ and are relatively stable with age. When considering the age-related dynamics of pelvimetric signs in various forms of the female pelvis, the description of the indicators is more interesting. The parameters we studied for all three forms of the pelvis did not show statistically significant changes with age. In this regard (age-related changes in osteometric features in different forms of the pelvis), the parameters are not very reliable for the diagnosis of anatomical and topographic changes in the female pelvis. On the other hand, it was confirmed that the pelvimetric parameters in all three pelvic forms are relatively variable in 36-60 years.

The results of our work on pelvic morphometry are to a certain extent consistent with the results of research in this area in recent years. N.Y. Schmedik et al. (2014)¹⁰, having analyzed numerous works of his predecessors on pelvimetry since 1965, concluded that in recent decades there have been significant changes in the frequency of occurrence of the forms of a narrow pelvis.

In his opinion, there is an absolute progressive increase in the frequency of occurrence of narrow, as well as "diffuse" (difficult classified) narrowed forms of the pelvis. Taking into account this information, it becomes clear the ratio of normal and narrow forms of the pelvis obtained in the osteological collection.

¹⁷Аристова, И.С. Николенко, В.Н. Антропометрическая характеристика девушек - студенток саратовского региона // Сборник научных трудов «Актуальные проблемы морфологии», – Красноярск, – 2005, – с. 170-171.

At the same time, comparing our data with data from different authors leads to a very important conclusion. As you can see, the narrow shape of the pelvis is due to uncertain factors that prevent the growth of transverse parameters. However, despite the suppression of the increase in transverse dimensions during morphodynamics, the longitudinal parameters do not decrease, but even slightly increase. If it is believed that an increase in the sagittal direction leads to an increase in the parameters of the pelvis in this direction, this may explain the existence of a narrow "diffuse" shape of the pelvis in modern women. Thus, limiting transverse growth can lead to an increase not only in the length of the pelvis but also in the transverse oblique parameters. On the background of this phenomenon, the reason for the suppression of the transverse dimension of the pelvis in modern women is still not clear. The analysis of the above-mentioned research works shows that the morphometric features of the pelvis have not been fully studied and there is no systematic approach to it. In this situation, morphologists have long studied the possibility of objectifying the classification of the shape and size of the pelvis using various parameters.¹⁸

The indicators allow us to get an idea of the general configuration of the pelvis and its contours. Many indices were used to describe the shape of the pelvis.⁸

Some of the most commonly used indices are: PWI (pelvic width index) – is equal to the percentage of intercristarum distance to the body length; RWIP (relative width index of the pelvis) - is the percentage of the width of the pelvis to the length of the lower limb; PRI (pelvic ring index) - is the percentage of the anatomical conjugate to the transverse dimension of the lesser pelvic entrance; RI (ring index) is the percentage of the true conjugate to the transverse dimension of the lesser pelvic entrance; PH-WI (pelvic height-width index) – is equal to the percentage of the height of the pelvis to the intercristarum distance.

¹⁸Чернуха, Е.А.Анатомически и клинически узкий таз / Е.А.Чернуха, А.И.Волобуев, Т.К. Пучко. – Москва: Триада-Х, – 2005. – 256 с.

S.V. Vinogradov (2006)⁸ studied such indicators in his research and concluded that the use of individual indicators is not enough to obtain the necessary effects for a complete characterization of the shape of the pelvis. According to the author, the complex application of several indicators is important.

In her research, T.V. Kuznetsova (2011)¹⁶ found a weak correlation between the pelvic indices and anthropometric parameters. According to the author, the shape of the pelvis, determined by such indexes as PH-WI and PHI, does not depend on the constitutional type of woman.

The analysis of the obtained osteometric results shows that no unexpected trends between the size of the pelvis and its shape were found. Pelvimetric signs are low for narrow forms of the pelvis and high for its normal size. Thus, in the pelvis belonging to the normal group, PHWI (pelvic height-width index) and TLILP (transverse-longitudinal index of the lesser pelvis) are in the minimum range (respectively: $H_{og} = 78.8$ mm and $H_{og} = 99.1$ mm); however, these indicators were maximum in the group as a whole, equally narrowed pelvic forms - $H_{og} = 87.0$ mm and $H_{og} = 114.4$ mm.

At this time, the highest values of the PRI (pelvic ring index) belong to the group of transversely narrowed pelvic shape ($H_{og} = 109.8$ mm; $H_{og} = 128.4$ mm), with other forms of PRI they practically overlap ($H_{og} = 83,6$ mm for normal sizes and $H_{og} = 83.2$ mm in total equally narrowed forms). In other words, based on the analysis of indicators, signs are already being identified that indicate the ability to distinguish between different configurations of the female pelvis.

It should be noted that the tendency to increase the size of the uterus and ovaries with age is also observed in the examined groups. The results of the examinations show that the indicators of narrow pelvic forms of women in the I and II adolescence categories are close to each other. In this case, the average values of the parameters included in both age categories differ significantly compared to the period of adolescence.

The thickness and width of the uterus and ovaries were the least dependent on the age and shape of the pelvis. The greatest variability of morphometric parameters of the uterus and ovaries by age was found in the pelvis of normal configuration (in comparison with other forms). The sizes of the uterus and ovaries in a narrow pelvis are not so diverse. However, both in the narrow pelvis and in the pelvis of normal form, there is a strong variability in the numerous metric signs used in the II adolescence period.

First of all, it should be noted that, as in comparing the results of pelvimetry, this comparative analysis does not reveal differences between the data. The total ovarian size in adults (4 uterine sizes, 3 ovarian sizes) was close to similar measurements noted by many authors.¹⁹

According to our data, the greatest indicator of the uterus is its length. This indicator is greater than the indicators of the width of the uterus and uterine cervix. According to many authors, the period of compliance of the indicated morphometric characteristics with the normative indicators of an adult woman falls on 18 years.^{3,20} Given this information, it can be argued that small differences between our data and the data of some authors may be the result of a wider age range of the studied samples. Comparing the size of the uterus in youth girls and women of I adolescence period, these authors observed a clear increase in age-related indicators. It should be noted that the morphometric features of the uterus and ovaries in the age categories studied by us revealed an age-related growth trend. At the same time, the greatest difference between the period of youth and the period of adolescence I is observed in the parameters of the

¹⁹Савельева, Г.М. Новые технологии в перинатальной медицине / Г.М.Савельева, М.А.Курцер, О.Б.Панина[и др.] // Современные медицинские технологии, – Москва: –2009, №2, – с. 88-91.

²⁰Каракозова, Е.А. Санькова, И.В. Овсенко, Т.Е. Возрастные и конституциональные особенности анатомии матки девушек 17-24 лет по данным УЗИ // Москва: Современные проблемы науки и образования, – 2014. №6, – с. 22-26.

length and width of the uterus. Most of the differences in the above-mentioned morphometric characteristics of the ovaries were also found when comparing the I and II adolescence period.

It should be noted that the comparative description of the measurement characteristics of the ovaries differs little from the results of comparing data on uterus's indicators. The results of the ultrasound examinations of the uterus and ovaries studied by us are consistent with the data obtained by such scientists as V.F. Kokolina et al. (2003)²¹, T.A. Litvinova et al. (2014).²²

The data obtained from the results of ultrasound examination of the ovaries and uterus can be compared with the indications of O.V. Sirova (2008)³. It should be noted that the expected differences should be greater in ultrasound data than in other comparisons. In addition to discrepancies attributed to an individual, social and other known reasons, there may be differences due to unknown reasons related to the technical characteristics of ultrasound devices. On the other hand, no significant differences were observed in this situation.

Summarize the results of the study, it should be noted that the results obtained confirm the existing statistical differences in the parameters of the uterus and ovaries in narrow and normal forms of the pelvis. At the same time, the length parameters of these organs differed most between the parameters of the uterus and ovaries, depending on the shape of the female pelvis.

The parameters of measuring the size of the uterus in normal and narrow pelvises related to the adolescent period were determined. So, in the pelvises of normal size according to the

²¹Кокolina, В.Ф., Мамиев, О.Б., Синчихин, С.П. Беременность и роды у несовершеннолетних в некрупной городской популяции Нижнего Поволжья // – Москва: Российский вестник акушерства и гинекологии. – 2003. № 4, – с. 35-39.

²²Литвинова Т.А. Заловина С.В. Мошак А.Н. Анатомно-антропологические типов женщин // Новосибирск: JournalofSiberianMedicalSciences. – 2014. №4, – с. 24-30.

parameter of the width of the uterus: medium width - 50%, narrow-30% and wide-20%; according to the parameters of the length: medium length-50%, long-30% and short-20%; according to thickness parameters: medium thickness - 50%, thick-30% and thin-20%.

According to the transverse dimension of the uterus in the form of a transversely narrowed pelvis: 80% - narrow, 20% - medium-wide; according to length: 50% - medium length, 30% - long, 20% - short; according to the width in the form of a common equally narrowed pelvis: 70% - medium width, 30% - narrow; according to length: 50% - medium length, 25% - short, 25% - long; according to thickness: 50% medium thickness, 30% thick, 20% thin. No significant changes were found in the percentages we obtained compared to the indicators of other authors.^{23,24}

As for the size of the ovaries, the following results were obtained. There was a bilateral diversity of the sizes of the right and left ovaries. In normal-sized pelvises, short ovaries make up 60% on the right, 40% on the left; long ovaries-60% on the right, 40% on the left; wide ovaries-40% on the right, 60% on the left; thick ovaries-60% on the right, 40% on the left. In the pelvises with a transversely narrowed shape, the short ovaries on the right are 70%; the left ovaries are 30%; the long ovaries on the right are 40%, the left ovaries are 60%; the wide ovaries on the right are 40%, the left ovaries are 60%; while the thick ovaries on the right are 60%, the left ovaries are 40%.; in equally narrowed pelvic forms: short ovary on the right-60%, left-40%; long ovaries on the right-70%, left-30%; wide ovaries on the right-60%, left-40%; thick ovaries on the right -

²³Белов Е.В.Алгоритмизация и прогнозирование течение беременности и сходов родов при наличии поперечносуженного таза юных первородящих: / фвтореферат диссертации кандидата медицинских наук. – Воронеж, 2009. – 23 с.

²⁴Герасимова, Л.Ч. Клинические опыт программирования родов у женщин с индивидуальными особенности строения костного таза / Э.Н.Васильева, Т.Г. Денисова [и др.] // Практическая медицина, – Казань: – 2010. №2, – с. 82-85.

70%, left -30%.

From an anatomical and topographical point of view, the results of ovarian morphometry show that there is a bilateral asymmetry in their general parameters. The width, length and thickness of the ovaries on the right are expressed in larger numbers than on the left. These morphometric features change asymmetrically with age (the thickness of the left ovary is the least variable).

These results completely or to some extent coincide with the results of V.F. Kokolina et al. (2003)²¹, O.V. Sirova (2008)³. For an appropriate comparative analysis, we did not find studies on the difference in the size characteristics of the ovaries in different pelvic shapes, taking into account age dynamics. However, it should be noted that with narrow forms of the pelvis, there is a wide conservatism of morphometric and anatomical and topographic parameters of the ovaries.

However, there is a tendency to an increase in length compared to the transverse dimensions²³, as well as changes in the morphometric characteristics of the female pelvis, which are characterized by a decrease in transverse dimensions.¹⁵

RESULTS

1. Regardless of its shape, the most frequent deviations in the indicators of the height of the pelvis, true conjugate and oblique diameter of the pelvis in 16-20 years old women, the least deviations in the transverse diameter of the lesser pelvis, the rectus and transverse diameters of the narrow part of the lesser pelvis were determined. In women 21-35 years old, the greatest deviations were found in the pelvic height, intercristarum distance, the rectus diameter of the wide part of the lesser pelvis and in the parameters of the diagonal conjugate, and the smallest deviations were found in the transverse and rectus diameter of the wide part of the lesser pelvis, as well as in the parameters of the true conjugate. Most of these signs in women aged 36 to 60 years showed the highest

average compared to other age groups [2,4,8,18,21].

2. Based on the pelvic ring index, pelvic height-width and transverse-longitudinal indices of the lesser pelvis, the studied female pelvises are divided into three groups: 1. Normal configuration (pelvic height-width index- $H_{og} = 78.8$ mm; transverse-longitudinal index of the lesser pelvis- $H_{og} = 99.1$ mm); 2. General equally narrowed shape (height-width index of the pelvis- $H_{og} = 87.0$ mm; transverse-longitudinal index of the lesser pelvis- $X_{og} = 114.4$ mm); 3. Transversely narrowed shape (height-width index of the pelvis- $H_{og} = 109.8$ mm; transverse-longitudinal index of the lesser pelvis- $H_{og} = 128.4$ mm) [13,16,19].

3. Of the 78 pelvises examined, 42 were normal and 36 were narrowed. The identified forms of the pelvis were observed at all studied ages. The maximum values of pelvimetric signs of women aged 16-20 years were determined for the pelvis of normal sizes, and the minimum values - for the generally equally narrowed pelvis. In this age group, the parameters of the transversely narrowed pelvis are intermediate. In the 21-35 age group, the maximum and minimum values of pelvimetric features of the pelvis of different shapes are similar to the period of adolescence. In the normal and narrow forms of the pelvis of women aged 36-60 years, significant differences were found between the minimum and maximum values of most pelvimetric signs. At this age, almost all pelvimetric signs of the normal pelvis were maximal [4,6,7,10].

4. High variability of pelvimetric measurements is typical for pelvises of the age-related normal configuration. This is more pronounced in the sagittal size of the pelvis of women aged 36-60 years. The pelvimetric values of both transverse and generally equally narrowed pelvis by age groups are not so variable. The narrow pelvis of women aged 21-35 years is characterized by maximum values for most pelvimetric signs [1,3,5,8,11,12].

5. The study of the age characteristics of the uterus and ovaries based on morphometric and ultrasound studies shows that with age there is an increase in the size of the uterus and ovaries, and

the size of the uterus is more variable than the parameters of the ovaries. Higher variability of morphometric features of the uterus and ovaries with age is observed in the pelvis of normal size. In the narrow forms of the pelvis, the size of the uterus and ovaries does not change much [9,14,15,117].

6. The results of the study of the topographical and anatomical features of the uterus and ovaries in different forms of the pelvis show that the uterus in the lesser pelvic cavity is mostly (80%) flexed and incline forward, and in other cases (20%) is flexed and incline backward. Dolichoovarial ovaries are most common on the right in narrow pelvic forms and on the left in the normal-sized pelvis. Although brachioovarial ovaries are found on the right and left sides of the normal-sized pelvis, they are more common on the right side in narrow pelvic forms. Leptovarial and paxioovarial ovaries predominate in normal-sized pelvis compared to narrow pelvic forms [20,22].

PRACTICAL RECOMMENDATIONS

1. The obtained data on individual typological, age characteristics and pelvic measurements can be used by obstetricians and gynecologists, forensic doctors, surgeons and traumatologists as normative indicators.

2. The information obtained can be used in the educational process, i.e. in the practical classes on human anatomy, obstetrics and gynecology, forensic medicine, radiology, in the training process of residents.

3. The information obtained on the topographical and anatomical features of the uterus and ovaries in different forms of the pelvis can be reflected in monographs and information on diseases of the female genital organs, as well as issues related to anthropology. The effectiveness of methods of radiation diagnostics can be assessed on the basis of pelvimetric, uterine and ovarian measurements of the female pelvis of different shapes at different ages,

topographic and anatomical features of these organs.

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