

CLINICAL AND MORPHOLOGICAL ASPECTS OF THE TOPOGRAPHIC ANATOMY OF THE PARATHYROID GLANDS

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Resume. The age-related features of the topographic anatomy of the parathyroid glands have been studied. The upper limits of the normal size of the parathyroid glands have been established. An increase in any of these parameters above the specified values is an indirect sign of pathology of the parathyroid glands. The dynamics of the integral indices of the parathyroid glands, reflecting the mutual change in the size of the glands, is determined. The patterns of changes in the volume of the parathyroid glands in different age periods have been revealed. The new data obtained on the variant anatomy of the parathyroid glands makes it possible to optimize the performance of surgical interventions in endocrine surgery and significantly reduce the number of surgical complications, which will significantly improve the quality of life of patients in the postoperative period.

Keywords: Parathyroid glands, variant anatomy, linear parameters, age periodization, sexual and age-related features.

According to current data, the incidence of primary hyperparathyroidism is 1-2 cases per 1000 population [4,6,8,11,15,16,18,19]. To date, there is no single and universal way in world medicine to visualize the parathyroid glands and differentiate them with additional lobules of the thyroid gland, lymph nodes of the anterior neck region, lumps of adipose tissue [12,17,19,20]. Domestic and foreign scientists have repeatedly emphasized the relevance and need for an endocrine surgeon to have a good knowledge of the variant anatomy of the OSH, despite this, the issue of the dependence of the topography of the OSH on the constitutional characteristics of the patient (gender, age) has not yet been resolved [3,5,7,9,21]. Meanwhile, the availability of such data could significantly facilitate the performance of surgical interventions on the thyroid gland and OSH and would allow optimizing surgical technique due to preoperative determination of OSH localization, and, consequently, facilitate the course of the postoperative period [1,7,13,14]. The aim of the study was to study the age-related dynamics of the normal size of the OSH in persons of different sexes using morphological techniques.

Materials and methods of research. The study was performed on 217 neck organ complexes obtained from the corpses of persons who died suddenly from diseases

unrelated to the pathology of the neck organs. Among them there were 152 corpses of men aged 17 to 82 years (47.0 ± 1.02 years) and 65 corpses of women aged 15 to 82 years (50.8 ± 1.93 years). In order to differentiate the thyroid gland from the additional lobules of the thyroid gland and lumps of adipose tissue, cannulation of the upper and lower lobes and the introduction of a 1% aqueous solution of Evans's blue into them was performed. Next, the organocomplex was fixed in a 10% formalin solution. At the same time, the thyroid gland turned pale bluish-green, the lymph nodes turned dark blue, and the thyroid tissue turned bright blue [7.10]. The tissue specificity of unchanged CSF was confirmed histologically (staining with hematoxylin and eosin).

The results and their discussion. In the study of 217 organ complexes of the neck, a total of 1,021 CSF were found. In most of the examined neck organ complexes, 5 or 4 CSF were detected, which is 24.0% and 20.0% of the total number of observations, respectively. Gender differences in the frequency of distribution of the total number of FGM were revealed. In men, 5 and 4 glands are most often found (23 and 22%, respectively), and in women, 5 and 3 glands are most often found (26 and 20%). 4 LVH in women was detected much less frequently (in only 15% of cases) (Fig. 1 a, b). According to modern concepts existing in endocrine gland surgery, an increase in any of the sizes of the LV above 1.0 cm is an indirect sign of its pathology [13,14]. In our research, this statement turned out to be true for width and thickness indicators. The length of the LVL in 10.5% of the observations (107 cases) turned out to be more than 1.0. The upper limit of the length norm, in our opinion, should be considered 1.4 cm, since all glands with a length greater than indicated had signs of pathological changes during histological examination. It was revealed that the size of the glands in women is significantly larger than in men.

Similar patterns are typical for women, however, their length increases much more rapidly, outstripping the indicators of men by one age period, that is, on average, by ten years. So, at the age of 15-25 years, the length of the LVL in women is minimal and equal to 0.58 ± 0.06 cm, at 26-35 years it increases to 0.69 ± 0.06 (which is similar to the indicator for men in the age group 36-45 years), at 36-45 years, the length of the LVL in women is already 0.71 ± 0.03 cm (similar to the indicator for men aged 26-35 years old). Further, the increase in the length of the glandular gland in women temporarily stops and in the age group of 46-55 years, the length of the glands remains the same 0.71 ± 0.03 cm. By 56-65 years, the glandular glands in women reach a maximum length of 0.78 ± 0.04 cm, after which they undergo rapid involution. At the age of 66-75 years, the length of the spine is 0.67 ± 0.03 cm, slightly decreasing in the older age group >75 years to 0.66 ± 0.04 cm.

Thus, it should be noted that with the general direction of development of the glandular gland, in women, the rate of increase in the length of the glands during the period of glandular growth is on average 10 years ahead of the same indicator in men,

in addition, the maximum length of the glandular gland, which is characteristic for both sexes at the age of 56-65 years, in women is significantly greater than in men. The minimum width of 0.39 ± 0.02 cm in men is at the age of 15-25 years. Until the age of 26, the width of the glands increases, amounting to 0.43 ± 0.01 cm, and then until the age of 55 it does not change, and then decreases. So, at the age of 56-65 years, it is equal to 0.44 ± 0.01 cm, and at 66-75 years it is already 0.39 ± 0.02 cm. In women, the minimum width of the glandular gland at the age of 15-25 years is 0.37 ± 0.03 cm. By the age of 26-35, the width of the glands is 0.41 ± 0.02 cm, at 36-45 years - 0.42 ± 0.01 cm. At 46-55 years, the width of the glandular gland in women is maximum and equal to 0.46 ± 0.02 cm. Further, the width gradually decreases: at the age of 56-65 years – 0.42 ± 0.02 , at 66-75 years – 0.44 ± 0.02 cm, over 75 years – 0.42 ± 0.03 cm. Consequently, in contrast to the length, the width of the LVL increases less intensively in women during the growth period than in men, in turn, in men from 26 to 55 years of age, the LVL has a consistently high width, increasing to its maximum only by the period of 56-65 years. The thickness of the OSH was the most constant indicator, so in men aged 15-25 years it was equal to 0.28 ± 0.01 cm. Up to the age of 26, it increased, amounting to 0.30 ± 0.02 cm and was constant until the age of 66, when, obeying the general process of gland involution, it decreased to 0.27 ± 0.02 cm. In women, from 15 to 45 years of age, the thickness of the gland is constant and equal to 0.29 ± 0.02 cm. By the age of 46-55, it reaches a maximum of 0.33 ± 0.02 cm, and then also decreases to 0.25 ± 0.02 cm in the group over 75 years old. Thus, men do not have an age period in which the maximum thickness of the OSH would be pronounced – this parameter retains a high value from 25 to 65 years, and in women, despite the large constancy of the parameter, it is still possible to distinguish a narrow age period from 46 to 55 years, in which the thickness of the OSH is maximum. For a clear understanding of the mutual age dynamics of the studied sizes of the OSH, at the next stage, integral indices were introduced into the work: the "length-latitude index" and the "width-thickness index". The length-latitude index refers to the ratio of the length of the length to its width. The width-thickness index is the ratio of the width of the gland to its thickness. The absence of linear growth of the latitudinal and latitudinal-thickness indices in men and women indicates an uneven change in the size of the OSH with age. Two maxima of the latitudinal and latitudinal-thickness indices were revealed in men - at the ages of 36-45 and 56-65 years. Consequently, in these periods, the length of the LCS prevails as much as possible over their width. This indicates that at the age of 36-45 years and 56-65 years, there is a growth of the pancreas mainly "in length", and at the age of 46-55 years, the width of the glands mainly increases. After 65 years, the latitudinal index is stable, while the latitudinal index decreases. Consequently, during the period of involution, the length and width of the glands in men decrease evenly and much more slowly than the thickness.

To analyze the rate of change in the volume of glands with age, the percentage of the average volume of glands in neighboring age groups was calculated. It is necessary to note the high intensity of gland growth at the age of 15 to 35 years, when its volume increases by 32%. Further, the volume increases much more slowly. The rapid rates of gland involution are noteworthy. Over the period from 56 to 75 years, the volume of the gland decreases by 15%, and over the period from 66 to 80 years – by 23%.

In both men and women, the dynamics of LV volume is similar to the changes described for both sexes. It should be noted that in men, the volume of glands increases more smoothly, reaching a maximum value of 0.06 cm³ at the age of 46-55 years, and then also gradually decreases. In women, the increase in LV volume occurs non-linearly - periods of smooth volume change alternate with periods of rapid dynamics. The maximum volume of LVH in women also reaches at the age of 46-55 years. However, the maximum volume index in women is significantly higher than in men and amounted to 0.064 cm³.

Conclusions:

1. In the total sample, 5 or 4 LFS were detected in most observations, which is 24.0 and 20.0% of the total number of observations, respectively. In males, 5 and 4 glands are most often found (23 and 22%, respectively), while in women, 5 and 3 glands are most often detected (26 and 20%, respectively).

2. The size of the glands varied within the following limits: length – 0.70 ± 0.008 cm, width – 0.42 ± 0.004 cm and thickness – 0.30 ± 0.004 cm. In women, the linear dimensions of the body are larger than in men.

3. In women, the rate of increase in the length of the LVL during the period of gland growth is on average 10 years ahead of the same indicator in men, while the maximum length of the LVL in women is significantly longer than in men. The width of the LV in women increases less intensively during the growth period than in men. In turn, in men from 26 to 55 years of age, the LFS have a consistently high width, reaching a maximum only by the period of 56-65 years. In men, there was no pronounced maximum thickness of the LVL, and in women (despite the great constancy of this parameter), the age period from 46 to 55 years should be distinguished, when the thickness of the LVL is maximum.

4. The upper limits of the dimensions of the unchanged plates are determined: length – 1.4 cm, width – 1.0 cm, thickness – 1.0 cm. An increase in any of these parameters above the specified values should be considered an indirect sign of LV pathology.

5. The analysis of integral indicators of the size of the OSH indicates the uneven change in the size of the OSH with age. At the age of 56-65 years, the growth of the pancreas occurs mainly "in length", and at the age of 46-55 years, the width of the

glands mainly increases. In the period of involution after 55 years, the length and width of the glands in men decrease evenly and much more slowly than the thickness.

6. Women are characterized by the dynamics of integral indices similar to the changes found in men, however, with a wide range of absolute index values and a more intensive rate of change. Thus, the latitudinal and latitudinal-thickness indices have three maxima: two in the period of gland growth – 36-45 and 56-65 years old and one in the period of their involution (over 75 years old).

7. The volume of the glands reaches a maximum ($0.056 \pm 0.0033 \text{ cm}^3$) by the age of 50, and then the gland undergoes intensive involution. In both men and women, the dynamics of LV volume is similar to the changes described for both sexes. In men, the volume of the glands changes smoothly, reaching a maximum value of 0.056 cm^3 at the age of 46-55 years. For women, the nonlinear dynamics of the volume of the breast is characteristic – periods of smooth and rapid changes in the volume of the breast alternate. The maximum volume of LV in women, which they also reach at the age of 46-55 years, is significantly higher than in men and is 0.064 cm^3 .

8. The obtained data on the variant anatomy of the thyroid gland are the theoretical basis of thyroid surgery, allowing to significantly optimize the performance of surgical interventions on the thyroid gland and the thyroid gland, and, consequently, to facilitate the course of the postoperative period and improve the quality of life of patients.

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