PECULIARITIES OF THE SUBHYOID TRIANGLE IN HUMAN PREFETUSES

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Abstract

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Background: Finding out the features of morphogenesis and topographic changes of suprahyoid region (SHR) of the neck and its structures in the dynamics of human intrauterine development (IUD) remains a relevant area of morphological research.

Material and methods: Thirty preparations of human prefetuses of 14.0-80.0 mm parietococcygeal length (PCL) (7-12 weeks of IUD) were studied using a complex of modern methods of morphological research.

Results: On the basis of obtained digital indicators of the main morphometric parameters of human SHR in the dynamics of the prenatal period of IUD the critical periods of development of the region were clarified and mathematical functions that describe the normal course of organogenesis of SHR were created, which can be useful for creating diagnostic algorithms for the norm when carrying out prenatal diagnostics and monitoring the state of the fetus. It has been established that the 9-10th week of IUD is a critical period in the development of SHR, since during this time, intensive growth processes occur, which are manifested by a sharp change in the size of the organ, and this can lead to the appearance of variants of the structure and possible congenital defects of the SHR and the dental-maxillary apparatus in general.

Conclusions: 1. At the 10th week of the prefetal period of IUD, there is an accelerated increase in the anteroposterior size of the LAP (y = -6.3851 + 1.041 * x; r = 0.9374; p = 0.00001). 2. At the 11th week of the prefetal period of IUD, there is an accelerated increase in the lateral length of the SHR (y = -6.1289 + 1.1277 * x; r = 0.8891; p = 0.00001). 3. During the clarification of the regularities of the dynamics of changes in the width of the SHR, it was found that at the beginning of the prefetal period of the IUD, the growth rates of the indicator are slow, but from the 9th week of IUD, its accelerated growth is observed (y = -4.5904 + 1.1074 * x; r = 0.8662; p = 0.00001). 4. Features of the change in the value of the anterior angle of SHR in the prefetal period of human ontogenesis demonstrate a general tendency towards its decrease during this period of development – from 90.18±0.55° (7th week) to 82.12±1.17 ° (12th week), but after a sharp decrease in this angle until the end of the 8th week of development (79.32±1.03°), its intensive growth begins during the 9th week and until the end of the prefetal period (y = 93, 8224 – 0.9577 * x; r = -0.4140; p = 0.0229).

Key words: anterior cervical region, suprahyoid triangle of the neck, prefetus, prenatal ontogenesis, human.

Actuality

Finding out the features of morphogenesis and topographic changes of suprahyoid region (SHR) of the neck and its structures in the dynamics of human intrauterine development (IUD) remains a relevant area of morphological research [1-5].

Refined, comprehensive data on gender, age and constitutional features of the structure and topography of organs and structures of the SHR of the neck during the prenatal period of human ontogenesis will make it possible to develop new criteria for the interpretation of medical diagnostic imaging data, the degree of fetal viability, improve existing and develop new methods of surgical correction of congenital neck defects [6-9].

Materials and methods

Thirty preparations of human prefetuses of 14.0-80.0 mm parietococcygeal length (PCL) (7-12 weeks of IUD) were studied using a complex of modern methods of morphological research: anthropometry, morphometry, three-dimensional reconstruction and statistical analysis. The morphometric parameters of SHR were determined: width (distance between the inner surfaces of the condylar processes of the mandible), anteroposterior length (distance from the anterior surface of the hyoid

bone to the lower edge of the mental symphysis), lateral length (length of the lateral border of the SHR – distance from the inner surface of the angle of mandible to the lower edge of the mental symphysis), the anterior angle of the SHR (the angle between the lateral borders of the SHR).

Results and discussion

On the basis of obtained digital indicators of the main morphometric parameters of human SHR in the dynamics of the prenatal period of IUD the critical periods of development of the region were clarified and mathematical functions that describe the normal course of organogenesis of SHR were created (Fig.), which can be useful for creating diagnostic algorithms for the norm when carrying out prenatal diagnostics and monitoring the state of the fetus. It has been established that the 9-10th week of IUD is a critical period in the development of SHR, since during this time, intensive growth processes occur, which are manifested by a sharp change in the size of the organ, and this can lead to the appearance of variants of the structure and possible congenital defects of the SHR and the dental-maxillary apparatus in general.

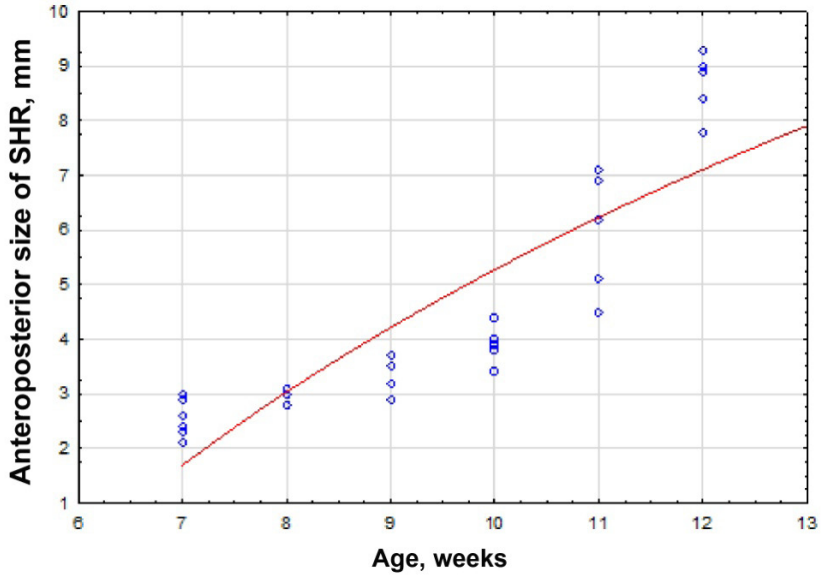

Fig. 1. The dynamics of changes in the anterior-posterior size of the suprahyoid region in the prenatal period of human ontogenesis. Logarithmic dependence on age.

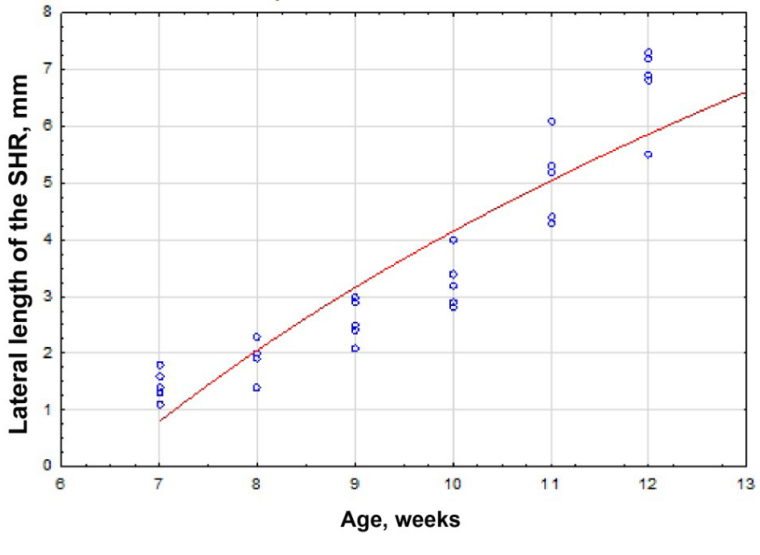

Fig. 2. Dynamics of changes in the lateral length of the suprahyoid region in the prenatal period of human ontogenesis. Logarithmic dependence on age.

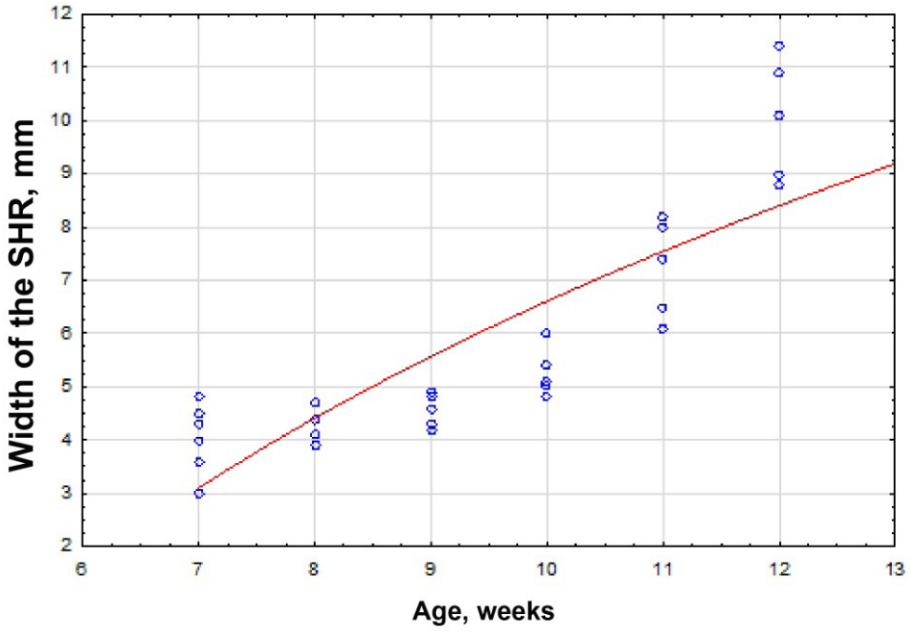

Fig. 3. Dynamics of changes in the width of the suprahyoid region in the prenatal period of human ontogenesis. Logarithmic dependence on age.

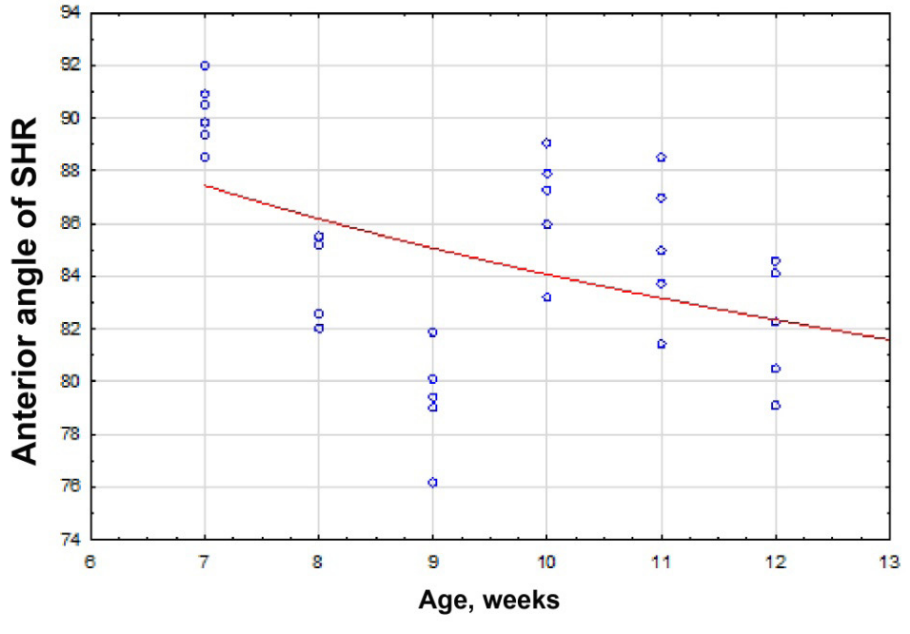

Fig. 4. Dynamics of changes in the anterior angle of the suprahyoid region in the prenatal period of human ontogenesis. Logarithmic dependence on age.

Conclusions

1. At the 10th week of the prefetal period of IUD, there is an accelerated increase in the antero-posterior size of the LAP (y = -6.3851 + 1.041 * x; r = 0.9374; p = 0.00001).

2. At the 11th week of the prefetal period of IUD, there is an accelerated increase in the lateral length of the SHR (y = -6.1289 + 1.1277 * x; r = 0.8891; p = 0.00001).

3. During the clarification of the regularities of the dynamics of changes in the width of the SHR, it was found that at the beginning of the prefetal period of the IUD, the growth rates of the indicator are slow, but from the 9th week of IUD, its accelerated growth is observed (y = -4.5904 + 1.1074 * x; r = 0.8662; p = 0.00001).

4. Features of the change in the value of the anterior angle of SHR in the prefetal period of human ontogenesis demonstrate a general tendency towards its decrease during this period of development – from 90.18±0.55° (7th week) to 82.12±1.17° (12th week), but after a sharp decrease in this angle until the end of the 8th week of development (79.32±1.03°), its intensive growth begins during the 9th week and until the end of the prefetal period (y = 93, 8224 – 0.9577 * x; r = -0.4140; p = 0.0229).

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