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TOPOGRAPHIC-ANATOMIC PECULIARITIES OF THE PHARYNX IN 6-10-MONTH FETUSES OF HUMAN ONTOGENESIS

Abstract. *On the basis of the conducted morphological methods of examination topographic-anatomic peculiarities of the pharynx in human fetuses were studied and successively analyzed. During fetal period the pharyngeal cavity is of a funnel shape, that is, its cranial part is wide, and the caudal one – narrowed. At the end of the seventh month of the intrauterine development small sulci and tubercles in the pharyngeal tonsils located on the surface of the tonsil folds pass to the posterior labia of the pharyngeal openings in the auditory tubes. The number of small sulci and tubercles with pinholes increases considerably. The shape of the openings in the auditory tubes is slit-like in the majority of cases, but sometimes an oval and triangle ones are found. The length of the palatoglossal and palatopharyngeal arches and the distance between them increases considerably. The mucous membrane in the pharyngeal and oral parts of the pharynx is covered with the stratified pavement epithelium.*
Key words*: pharynx, fetuses, man, ontogenesis.*

Introduction. Pathology of the respiratory organs has one of the highest rates in the structure of occurrence of diseases among children and teenagers [1]. Congenital defects of the pharynx constituting only 1% of all the congenital defects are worth of being investigated by neonatologists in details [9].

It should be noted that in the group of children from their birth to the age of 14 the sickness rate of respiratory diseases including pathology of the pharynx and lymphoid tissue associated with the mucous membrane is higher than that of children aged 15-17. A high registration rate of diseases of the respiratory system, cases of chronic pathology require expansion of groups of out-patient observation of children [2, 3].

The pharynx is a unique organ experiencing maximal antigenic load that performs immune-receptor function consisting of acquaintance with the lymphoid tissue antigens associated with the mucous one and invaded by antigen-rewarded lymphocytes of other organs. The lymphoid tissue associated with the mucous membranes of the tubular organs and its reactivity are studied quite comprehensively [4, 5]. The information concerning morphogenesis of the respiratory tract is rather exhaustive. At the same time, the issue concerning the formation of the pharyngeal lymphoid tissue associated with the mucous membrane at the early postnatal period remains insufficiently investigated [6, 7, 8].

Objective: to investigate topographic-anatomic peculiarities of the pharynx in fetuses during 6-10 months of human ontogenesis.

Materials and methods. The study was conducted on 22 specimens of dead human fetuses by means of histological, macro- and microscopic methods, plastic and graphic reconstruction, and morphometric examination.

Results. The age sizes of structures in the sixth-seventh month fetuses (186,0 - 270,0 mm of PCL) are the following: cranial-caudal size is from 8,09 to 8,22 mm, the length of the nasal part of the pharynx – from 1,11 to 1,15 mm, the oral one - from 1,42 to 1,47 mm, the laryngeal one – from 5,74 to 5,82 mm. The transverse size of the pharynx in the cranial portion is 8,91 - 9,06 mm, in the caudal portion – 3,16 - 3,32 mm. The distance between the choanas and the posterior wall of the pharynx is 9,74 - 10,49 mm. Small sulci and tubercles in the pharyngeal tonsils located on the surface of the tonsil folds pass to the posterior labia of the pharyngeal openings in the auditory tubes. Their number increases to 10. The anterior-posterior size of the pharyngeal openings of the auditory tubes increases from 2,93 mm to 3,04 mm. Two rollers pass from the posterior labia to the posterior wall of the nasal pharyngeal part,

depressions or pharyngeal corners are located backward from them. At the end of the seventh month of the intrauterine development the length of the palatoglossal arches is from 5,27 to 5,50 mm, palatopharyngeal ones – from 5,71 to 5,93 mm, the distance between the arches is 3,34 - 3,56 mm.

During the eighth-ninth months of the intrauterine development (fetuses 271,0 - 378,0 mm of PCL) the longitudinal size of the pharynx increases from 11,21 to 11,61 mm. The length of the nasal pharyngeal part is from 2,06 to 2,25 mm, the oral one – from 2,23 to 2,31 mm, pharyngeal – from 7,04 to 7,21 mm. At the end of the fetal period (fetuses 359,0 - 378,0 mm of PCL) the cranial-caudal size of the pharynx is 22,91 - 23,43 mm including the length of the nasal part – from 3,90 to 4,04 mm, oral – from 6,08 to 6,25 mm, laryngeal – from 12,91 to 13,12 mm. The transverse size of the pharynx in the cranial portion is from 10,72 to 10,93 mm, in the caudal portion – from 4,64 to 4,84 mm. In the majority of cases the pharyngeal openings of the auditory tubes are of a slit-like shape with the anterior-posterior size at the end of the tenth month of the intrauterine development from 3,66 to 3,81 mm. The distance from the middle of the pharyngeal openings of the auditory tubes to the surface of the pharyngeal tonsil ranges from 2,43 mm to 2,59 mm, to the posterior wall of the nasal pharyngeal part – from 7,23 to 7,42 mm, the posterior border of the hard palate is at the distance from 4,09 to 4,30 mm, the height between them is from 2,20 to 2,34 mm. The length of the palatoglossal arches is 6,26 - 6,41 mm, palatopharyngeal ones – from 6,73 to 6,94 mm, and the distance between them is 3,53 - 3,75 mm.

The structure and topography of the laryngeal part of the pharynx in fetuses of this age group do not change considerably. Only absolute values increase. The anterior-posterior size of the laryngeal part of the pharynx in the portion of the cranial border is 6,85 - 6,96 mm, on the level of the arytenoid cartilage – from 4,11 to 4,32 mm, and in the point of transition of the pharynx into the esophagus the anterior-posterior size is 1,53 - 1,62 mm.

The caudal border during the whole fetal period is shifted into the cranial-caudal direction.

Discussion. By the results of our studies at the beginning of the fetal period of the human ontogenesis the pharyngeal cavity is of a funnel shape, that is, its cranial part is wide, and the caudal one – narrowed. An intensive growth of the palatine tonsils is marked during the fourth-fifth months of the embryonic development, and it becomes dramatically slower at the sixth-eighth months. And only at the end of the tenth month of prenatal ontogenesis their growth becomes intensive again. According to our data the number of folds of the mucous membrane in the pharyngeal tonsil ranges from 9 to 11. The tonsil size during the period of embryonic development changes irregularly, during the 8-9th months of development their growth becomes slower.

Till the end of the fetal period further development of the examined structures is manifested by a growing increase of their absolute sizes.

Conclusions. During the 21-40th weeks of the intrauterine development of human fetuses the cranial-caudal size of the pharynx increases from 8,22 mm to 23,43 mm, the length of the nasal part of the pharynx – from 1,15 mm to 4,04 mm, oral – from 1,47 mm to 2,mm, laryngeal – from 5,82 mm to 7,21 mm. The anterior-posterior size of the pharyngeal openings of the auditory tubes increases from 3,04 mm to 3,81 mm, and in the majority of cases they are of a slit-like shape. The length of the palatoglossal arches is from 5,50 mm to 6,41 mm, palatopharyngeal ones – from 5,93 to 6,94 mm, and the distance between them is 3,56 - 3,75 mm. The caudal border during the whole fetal period is shifted into the cranial-caudal direction.

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