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HISTOTOPOGRAPHIC ARCHITECTONICS OF THE ESOPHAGEAL-GASTRIC TRANSITION IN HUMAN FETUSES

ГІСТОТОПОГРАФІЧНА АРХІТЕКТОНІКА СТРАВХІДНО-ШЛУКОВОГО ПЕРЕХОДУ В ПЛОДІВ ЛЮДИНИ

Резюме: Гістологічним методом досліджено особливості стравохідно-шлункового переходу в плодів людини. Серії гістологічних зрізів виконували трьох проекціях з наступним вивченням під світловим мікроскопом. Інтенсивні процеси судиноутворення в слизовій оболонці впродовж плодового періоду свідчать про формування венозного судинного сплетення. У підслизовій пластинці в ділянці стравохідно-шлункового переходу в плодів періоді спостерігається формування і накопичення кардіальних залоз. Найбільш інтенсивні процеси формування залоз відбуваються з 7-го по 10 тижень внутрішньоутробного розвитку. Потовщення циркулярних м'язових волокон, утворення багатой кровоносними судинами складок слизової оболонки в плодів, свідчить про формування нижнього стравохідного замикача.

Ключові слова: стравохідно-шлунковий перехід, кардіальний замикач, плід, анатомія.

The study of features of the esophageal-gastric transition (EGT) structure is presently a topical question of theoretical and practical gastroenterology. In children the diseases related to disorder of EGT closed function occur rather often. These diseases result in heavy complications which are in continuously relapsing motion and malignant regeneration. Disfunction of the esophageal-gastric sphincter (EGS) in a new-born can provoke esophagitis, stictures, vomit, decreasing of body weight, obstructive to apnoebradycardia, laryngospasms, increasing the risk of a sudden death. The enormous amount of methods of surgical treatment of EGS insufficiency is indicative of the absence of adequate methods of treatment, inadequate understanding of etiopathogenesis, features of its development and becoming the variants of structure in the prenatal period of human ontogenesis. Considering incomplete evidence of EGT anatomic features insufficiency of EGT is found in 31% operated patients [1-3].

Objective: to determine histotopographic features of the esophageal-gastric transition in human fetuses.

Material and methods. The research was conducted on 21 dead human fetuses with 161.0-500.0 mm of parietal-calcaral distance (PCD) by means of histological method of examination. The esophagus was cut out on 0,5 higher the diaphragm

and near to the cardiac part of the stomach. The series of histological cuts were made in sagittal, frontal, horizontal planes. Histological cuts were stained with hematoxylin-eosine and by Van-Hison method with further examination under a light microscope.

Results and discussion. The subdiaphragmal segment of the fetal esophagus at the 4th month of development consists of 3 layers (mucous, muscle, serous), and is characterized by the presence of an oval form of the lumen, without expressed folds and appearances (Fig. 1).

The subdiaphragmal segment of fetal esophagus at the 5th month of development is characterized by forming folders in the mucous layer which to the 10th month acquires a stellate form. The amount of folds in the esophageal lumen was from 4 to 6. The circular muscle layer is thicker than a longitudinal one (Fig. 2).

The mucous layer is represented by compound squamous non-keratinized epithelium which forms 4-6 layers [4, 5].

Numerous mitoses characterize epithelium of the mucous membrane expressing condensations of chromatine in cells. More intensive condensation of chromatine was observed in basal layers of cells, on the epithelial surface there were cells which lost cellular organization and added to their desquamation. Cellular elements of lamina propria of the mucous layer are represented by fibroblasts, that

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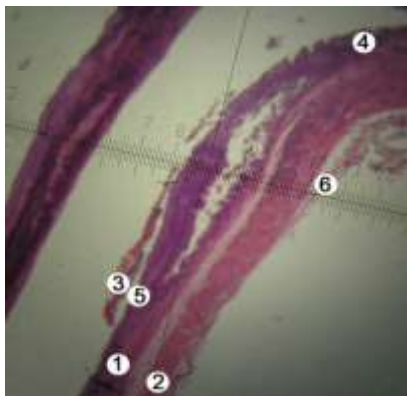


Fig. 1. The horizontal cut of subdiaphragmatic esophageal segment of fetus is 190,0 mm of PCD. Stained with hematoxylin-eosin. Microphoto. Ob. 8. 1. circular muscle fibres; 2. longitudinal muscle fibres; 3. epithelium, that is removed layer by layer; 4. mucous layer; 5. submucosa; 6. serous layer

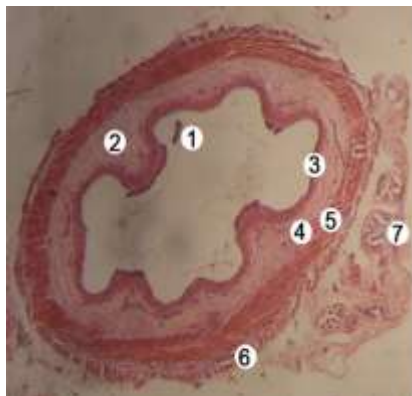


Fig. 2. The horizontal cut of subdiaphragmatic esophageal segment of fetus is 220,0 mm of PCD. Stained with hematoxylin-eosin. Microphoto. Ob. 81. 1. epithelium; 2. submucosa; 3. mucous layer; 4. muscle plate; 5. circular muscle layer; 6. slanting muscle layer; 7. lymph nodes



Fig. 3. The horizontal cut of subdiaphragmatic esophageal segment of fetus is 300,0 mm of PCD. Stained with hematoxylin-eosin. Microphoto. Ob. 81. 1. epithelium; 2. submucosa; 3. mucous layer; 4. muscle plate; 5. circular muscle layer; 6. slanting muscle layer; 7. lymph nodes

content a developed network of endoplasmic reticulum. Intercellular spaces are filled with the fibers of procollagen and collagen. Under the epithelium there was the expressed basal lamina, outside from which-lamina propria. [6, 7] In the serous layer from the 4th month the lymph nodes are distinguished (Fig. 3).

In direction of the stomach cardiac part the longitudinal layer of muscle fibers is multiplied unevenly. Every muscle layer is tunicated by thick connective tissue layer, from which blood vessels enter the layer of muscles. From outside to the muscle layer the layer of adventitial cells adjoins the expressed blood vessels. Esophageal lumen gradually narrows closer to the stomach due to the thickening of all its wall layers. The single areas of compound squamous epithelium of the esophageal mucous layer are alternated with the simple prismatic epithelium of stomach mucous layer on the site of transition of the esophagus to the stomach. The lamina propria was represented by the loose connective tissue. The muscle plate of mucous layer was represented by an irregular thin layer of smooth longitudinal muscle fibers.

The esophageal submucosa is represented by the loose connective tissue. Blood vessels of different caliber, nervous plexuses and glands are found in it. In the esophageal submucosa on the site of transition to the stomach cardiac glands are present. Their ducts are covered by prismatic cells and opened on the

surface of compound squamous non-keratinized epithelium [8, 9].

Next to these glands in the lamina propria of the mucous layer of the stomach on site of transition of the esophagus to the stomach similar cardiac glands (simple tubular glands) are found together with the single alveolar-tubular mucous of esophagus. The muscle layer of the esophagus gradually passes to the muscle layer of the stomach [10].

In the area of cardiac undercuts and on the stomach small curvature the muscle layer is represented by two layers of smooth myocytes. And the internal circular layer is thickened, consists of continuous bunches of smooth myocytes which have mainly a slanting direction. An external layer is irregular, the longitudinal bunches of smooth myocytes have different directions.

Conclusion. Intensive processes of vascular development in the mucous layer during the fetal period are indicative of the formation of the venous vascular plexus. In the submucosa in the area of the esophageal-gastric transition the formation and accumulation of cardiac glands are found during the fetal period. The process of gland formation is the most active intensive from the 7th to the 10th month of intrauterine development. Thickening of circular muscle fibers, formation of rich blood supply in the mucous layer of fetuses are indicative of the formation of the lower esophageal sphincter.

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Abstract. By means of histological method the features of the esophageal-gastric transition in the human fetuses have been examined. The series of histological cuts were made in sagittal, frontal, horizontal planes with further examination under a light microscope. Intensive processes of vascular development in the mucous layer during the fetal period are indicative of the formation of the venous vascular plexus. In the submucosa in the area of the esophageal-gastric transition the formation and accumulation of cardiac glands are found during the fetal period. The process of gland formation is the most active intensive from the 7th to the 10th month of intrauterine development. Thickening of circular muscle fibers, formation of rich blood supply in the mucous layer of fetuses are indicative of the formation of the lower esophageal sphincter.

Key words: esophageal-gastric transition, cardiac sphincter, fetus, anatomy.

ГИСТОТОПОГРАФИЧЕСКАЯ АРХИТЕКТОНИКА ПИЩЕВОДНО-ЖЕЛУДОЧНОГО ПЕРЕХОДА У ПЛОДОВ ЧЕЛОВЕКА

Резюме: Гистологическим методом исследовано особенности пищевода-желудочного перехода у плодов человека. Серии гистологических срезов делали в трех проекциях (сагитальной, фронтальной, горизонтальной) с последующим изучением под световым микроскопом. Интенсивные процессы сосудобразования в слизистой оболочке на протяжении плодового периода свидетельствуют о формировании венозного сосудистого сплетения. В подслизистой пластинке в участке пищевода-желудочного перехода в плодном периоде наблюдается формирование и накопление кардиальных желез. Наиболее интенсивно процесс формирования желез происходит с 7-го по 10-й месяц внутриутробного развития. Утолщение циркулярных мышечных волокон, образование богатой кровеносными сосудами складок слизистой оболочки у плодов свидетельствует о формировании нижнего пищевода сфинктера. **Ключевые слова:** пищевода-желудочный переход, кардиальный сфинктер, плод, анатомия.

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