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Morphology of the Ectopic Pancreatic Tissue in the Major Duodenal Papilla.

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ABSTRACT

The histological examination was performed on the material of 327 papilla of Vater. Ectopic pancreatic tissue was found in 14,7% cases. At the histopathological evaluation, complete, acinar, and ductal anatomical types of the ectopic pancreas were identified. Atrophy and sclerotic changes were obtained in the papilla of Vater and ectopic pancreas in 50% cases. Epithelium was characterized by mucin secretion injury. A number of spindle cells possessing smooth muscle immunophenotype were typical for ectopic pancreas.
Keywords: ectopic pancreas, major duodenal papilla, morphology.

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INTRODUCTION

The major duodenal papilla is the main object of different endoscopic surgical invasions with the lesions of the bile ducts, gallbladder, and pancreas. The overall account of structural features of the major duodenal papilla is one of the ways of preventing postmanipulating complications. The most difficult factor taken into account is ectopic pancreas (aberrant pancreas, heterotopic pancreas, pancreatic heterotopia) in the papilla of Vater [1]. Heterotopic or ectopic pancreatic tissue is a congenital abnormality defined as pancreatic tissue that lacks anatomic and vascular continuity with the main pancreas. Generally this tissue is found accidentally and may be asymptomatic or may present non-specific gastrointestinal symptoms, such as abdominal pain and bleeding [2-5].

During routine autopsy series ectopic pancreas is found from 0,5 to 14%, in accordance with the data of different authors [6]. The most common sites for it are the stomach (27.5%), duodenum (25.5%), colon (15.9%), esophagus, and Meckel`s diverticulum [1, 7-10]. It can also occur in the jejunum, omentum, mesentery, gallbladder, biliary tract, liver, spleen, pelvis, and lungs [6, 11, 12]. Cranial cavity, retroperitoneal space and mediastinum are described as an extremely rare position of heterotopic pancreas and inexplicable phenomenon [13].

Heterotopic pancreatic tissue can produce symptoms associated with acute and chronic cholecystitis, pancreatitis, gastric and duodenal ulceration. It can cause gastrointestinal bleeding, obstructive jaundice, and malignant tumors of gastrointestinal tract [2, 14, 15]. Aberrant pancreas can also lead to gastric outlet obstruction or duodenal stenosis [16].

METHODOLOGY

We experienced 327 autopsies; sex, age, clinical data, pathological and clinical diagnoses taken into consideration. Head of the pancreas with descending duodenum were examined macroscopically. The location and form of the major duodenal papilla were identified. After cutting the ampulla hepatopancreatica we determined the size of mucous membrane folds, the way of fusion of pancreatic duct and common bile duct, the presents of polypoid changes, measured the common canal length, and interductular septum width. Then histological, histochemical and immunohistochemical methods were used.

MAIN PART

The main goal was to provide information about the frequency and morphology of aberrant pancreas in the papilla of Vater.

The average age in the group without ectopy was 60,7±1,3 years in male and 63,8±1,2 in female. The average age in the group with ectopy was 58±3,1 and 63,2±2,7 years in male and female respectively. Ectopic pancreas in the major duodenal papilla and periampullar region was found in 48 cases (14,7%). Macroscopically the pancreatic ectopia was detected in 1 case only (2,1%). It was suspected as a tumour of papilla of Vater. All other 47 cases had no macroscopical changes.

In adulthood heterotopic pancreatic tissue was found in 37,5% in the group with ectopia, and in 28,7% in the group without ectopia. In elderly age it was identified in 45,8% in the group with ectopia, and in 47,3% in the group without ectopia. In general population the frequency of pancreatic heterotopia decreases from the first period of adulthood (18,2%) to the senile age (13,6%). The statistic differences were not found in the age groups in accordance with nonparametric test ($\chi^2 < 3,0$). In accordance with gastrointestinal tract diseases significant differences were found in the two groups ($\chi^2 = 4,0403$; $p < 0.05$ by F-criteria). Primarily it concerned the cholelythiasis.

During the investigation the cone-shape, cylindrical and flat forms of the major duodenal papilla were distinguished. The significant differences were not present in both groups with different forms of the papilla of Vater.

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The histological examination revealed the presence of pancreatic heterotopia position in the medial wall of the major duodenal papilla in 37,5% cases, in the interductular septum – in 37,5%, in the lateral wall – in 16,7%, and in the parapapillary area of duodenum – in 8,3% (fig. 1).

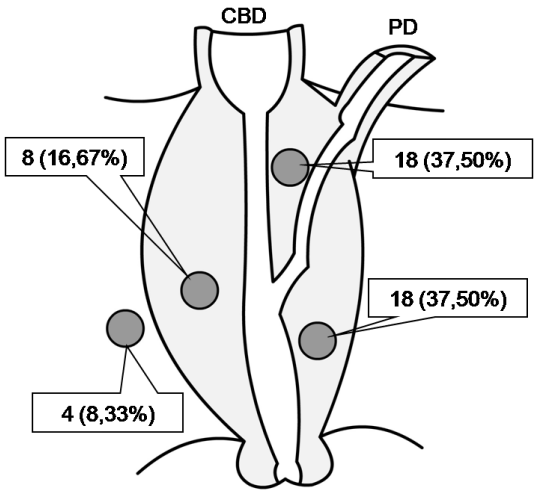

Figure 1: Distribution of the ectopic pancreas in the walls of the major duodenal papilla (CBD – common bile duct, PD – pancreatic duct).

The histotopographical examination revealed the presence of heterotopic pancreatic tissue in duodenal submucosa (2 cases, 4,2%), in the inner circular layer of muscularis externa (4 cases, 8,4%), in the free edge of interductular septum (10 cases, 20,8%), in the mucosa and muscular-glandular layer of papilla of Vater (13 cases, 27,1%), in the walls of papilla of Vater and base of interductular septum (19 cases, 39,6%).

At the histopathological evaluation, the Heinrich classification system was used to classify heterotopic pancreas which consists of three anatomical variations: Type 1 (Containing acini, islets and ducts), Type 2 (Acini and ducts, no islets), Type 3 (Ducts alone) [1, 2].

Multiple and vast areas of heterotopic pancreatic tissue in view of lower magnificent microscope were detected in 7 (14,6%) cases. The study of heterotopic pancreas microstructure in the papilla of Vater, histochemical and immunohistochemical features of the components, some of morphometrical measures made it possible to identify the main histological variants of pancreatic heterotopia. It is advisable to distinguish the following histological variants: exocrine, complete, and ductal.

The exocrine variant is characterized by the presence of pancreatic acini and ducts (fig. 2). Their number can be varied.

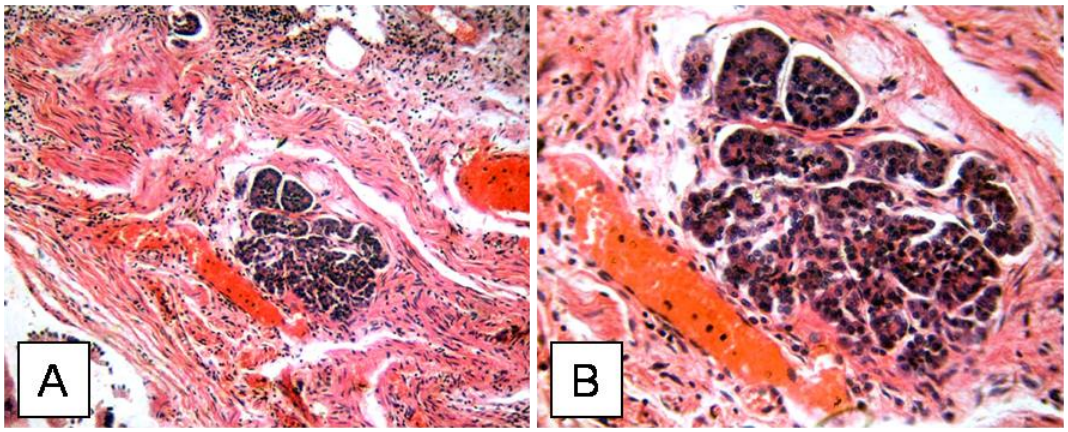

Figure 2: Exocrine variant of heterotopic pancreas in the major duodenal papilla. Hematoxylin & eosin. A×100, B×200.

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Depending on the combination of acini and ducts, the division of exocrine variant into predominantly acinar, acinar-ductal, and predominantly ductal is considered to be the most correct, in our opinion. If we see small or bad visible ducts and a lot of acini it is predominantly acinar variant of heterotopic pancreas. When the quantity of acini is almost equal to ducts it is acinar-ductal variant of heterotopic pancreas. If a lot of ducts and small quantity of pancreatic acini are seen it is predominantly ductal variant of heterotopic pancreas. The ductal variant can be an independent variant or a stage of heterotopic pancreatic tissue transformation as a result of sclerotic and atrophic changes (fig. 3).

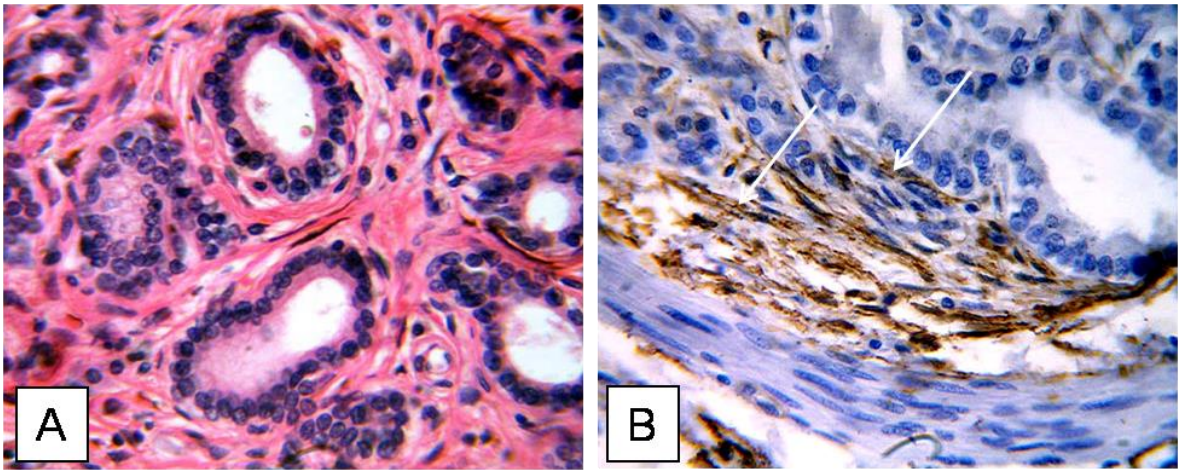

Figure 3: A. Ductal variant of heterotopic pancreas in the major duodenal papilla which looks like adenomyoma. Hematoxylin & eosin. ×400. B. Cells with smooth muscle immunophenotype (arrows) (Mouse Anti-Human Alpha Smooth Muscle Actin, Clone 1A4 "Dako Cytomation", LSAB kit, DAB was used as chromogen) ×400.

The immunohistochemical staining revealed the cells with positive smooth muscle reaction, but hematoxylin and eosin staining showed these elements like a fibroblasts. The spindle-shaped and concentrically oriented cells were present on routine specimens. One part of them looked like fibroblasts, the over one – like myoepithelial cells. The immunohistochemical staining with smooth muscle actine was positive in cytoplasm of these cells.

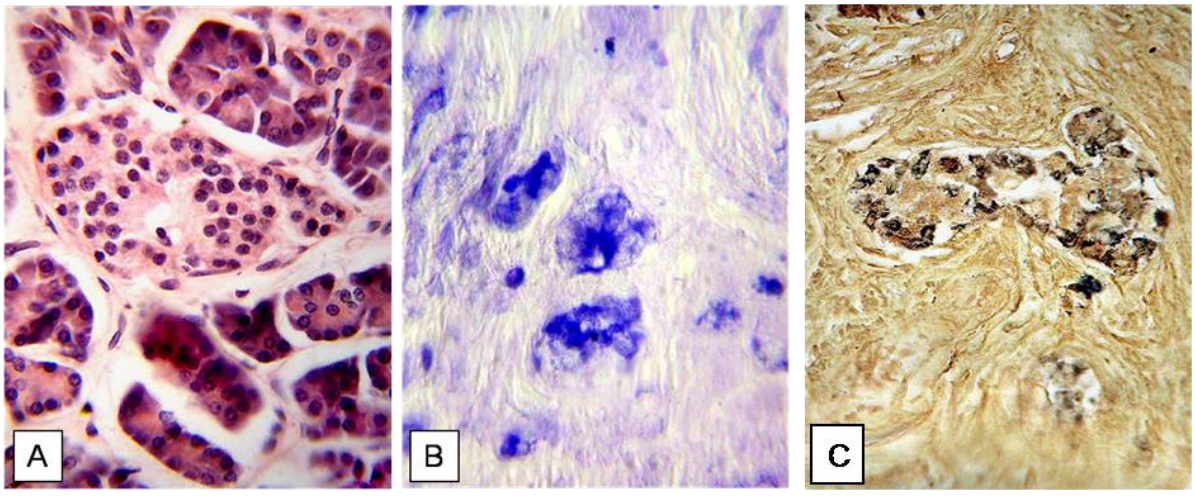

Figure 4: omplete variant of heterotopic pancreas in the major duodenal papilla. A – Islet of Langerhans, Hematoxylin & eosin, ×200: B – B-cells, "Fenaf" technique, ×400: C – A-cells, $AgNO_3$ impregnation, ×400.

The presence of all structural components of the pancreas, i.e. acini, ducts, islets of Langerhans or isolated endocrine cells, is typical for the complete variant. It depends on the stage of involutional and pathological acini atrophy. The complete variant is not obvious because it is not in all cases that the typical islets of Langerhans are distinguished. More often the groups of A- or B-cells are visible after histochemical staining. The complete variant was found in 5 cases (10,4%) but only in one case the islet of Langerhans was

seen on hematoxylin and eosin stained specimen. In other cases the A-cells and B-cells of were stained by impregnation $AgNO_3$ and «Fenaf» technique respectively. In the case with the complete variant of heterotopic pancreas its histological structure almost entirely corresponded to the structure of the pancreas (fig. 4).

The ductal variant is characterized by the presence of small intercalated and interlobular ducts which form the lobule. The ductular structures were from 12 to 40 μm in diameter. Simple columnar or cuboidal epithelium with alcian blue and PAS positive secretory products formed and lined these ducts. This variant of pancreatic heterotopia was found in 8 cases (16,7%). The immunohistochemical staining with smooth muscle actine revealed the positive reaction in spindle-shaped cells inside and particularly around the ductular structures heterotopic pancreas.

Thus, the heterotopic pancreatic tissue is not rare congenital lesion of the major duodenal papilla and is often diagnosed on its serial histological sections. The correlation between HP and cholelythiasis was determined. Most common histotopographical location of HP was the interductular septum or medial wall of the major duodenal papilla near the pancreatic duct. It is advisable to distinguish the exocrine variant with different ratio of acini and ducts, complete variant with all components typical for pancreas, and the ductal histological variant as a self-dependent subtype and a sequent of acinar structures atrophy.

CONCLUSION

- Ectopic pancreatic tissue in the papilla of Vater is defined as not rare abnormaly. It was found in
- 14,7% of routine autopsies.
- Ectopic pancreas more often occurs in the interductular septum or medial wall of the papilla of Vater.
- The exocrine type of ectopic pancreas was the prevalent variant and found in 72,9% cases.
- The spindle-shaped cells inside and particularly around the pancreatic ectopia were revealed by immunohistochemical staining with smooth muscle actin.

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