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MODERN APPROACHES TO THE DIAGNOSIS OF ACUTE PANCREATITIS

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Abstract.

Acute pancreatitis is an acute inflammatory disease that represents a significant problem for human health. Currently, this condition remains one of the most relevant issues in gastroenterology and surgery due to its high incidence and the risk of severe complications. The aim of this study is to review and analyze contemporary literature on this topic. The article examines the main etiological factors, features of pathogenesis, epidemiology, and modern diagnostic methods, including laboratory and imaging techniques.

Keywords:

Acute pancreatitis, diagnosis, cholelithiasis, alcohol, pancreas, imaging diagnostics, computed tomography, magnetic resonance imaging, ultrasound.

Introduction:

Acute pancreatitis is characterized by inflammation of the pancreas accompanied by a systemic inflammatory response, requiring hospitalization to prevent serious complications. The main causes of this disease include gallstone disease and alcohol abuse; in addition, the consumption of fatty and spicy foods, food and chemical poisoning, as well as gastrointestinal diseases such as gastritis and duodenitis, play a significant role [2]. This disease may also be complicated by systemic inflammation and infections, which act as secondary and aggravating factors [1].

Epidemiology. According to current data, acute pancreatitis ranks third among conditions accompanied by acute abdominal syndrome. According to GBD data cited by the WHO, the global incidence ranges from 200 to 800 cases per million population per year. The disease is more common in men, which is associated with smoking and alcohol consumption. Analysis of the age distribution indicates a rise in incidence among children—up to 3–13 cases per 100,000 children per year. Despite improvements in diagnostic and treatment methods, the overall mortality rate reaches 3–6%, and 20–45% in severe cases [3]. Additionally, regional

variations in the prevalence of the disease can be noted: the highest incidence is observed in Central Asia [4].

Several criteria are considered for the diagnosis of acute pancreatitis:

1. The presence of free fluid in the abdominal and pleural cavities.
2. Signs of edema in the pancreatic tissue and pancreatic stroma.
3. Findings from ultrasound examination.

If two or more of the listed signs are present, a diagnosis of acute pancreatitis is made [5].

There are 4 phases of acute necrotizing pancreatitis:

– Phase I (early, lasting for the first 2 weeks):

• Phase IA (lasts for the first 5 days from the onset of the disease. During this time, pancreatic necrosis of varying extent forms, and endotoxicosis develops. The maximum duration for the formation of necrotic areas in the pancreas is 3 days without subsequent progression).

• Phase IB (usually develops in the second week after the onset of the disease; characterized by the body's reaction to foci of necrosis that have arisen in the pancreas and peripancreatic tissue; during this period, a peripancreatic infiltrate typically forms and a resolution fever is observed);

– Phase II (late phase, characterized by liquefaction and sequestration; begins around the third week of the disease and may last several months. When large areas of pancreatic necrosis become sequestered, the pancreatic ductal system may be damaged, which determines the volume and rate of spread of fluid collections in the retroperitoneal space and the risk of developing other complications) [5,6].

Biochemical diagnostics are of great importance in acute pancreatitis. Based on the literature, alpha-amylase levels are informative indicators, as they increased threefold or more during the disease. Aspartate aminotransferase (AST) and alanine aminotransferase (ALT) levels are also significant, and bilirubin may also increase slightly [5].

Materials and Methods: The author of this review article conducted a literature review of scientific works using the search engines Cyberlenica and Google Scholar.

Imaging diagnostics.

Imaging methods play a significant role in acute pancreatitis and its complications. The most important ones are: ultrasound (US), computed tomography (CT), magnetic resonance imaging (MRI), endoscopic ultrasonography (EUS), magnetic resonance cholangiopancreatography (MRCP), and endoscopic retrograde cholangiopancreatography (ERCP) (5).

There are several indications for the use of these methods:

1) Imaging for diagnosis in cases of unclear clinical presentation.

2) Determination of the primary etiology of acute pancreatitis

3) Assessment of complications and disease severity

4) Planning of surgical intervention

Ultrasound examination.

Ultrasound is a quick and easy imaging modality for confirming the diagnosis of pancreatitis while ruling out other causes of acute abdomen. The most characteristic ultrasound findings of acute pancreatitis include: enlargement of the pancreas; blurred or absent pancreatic margins; decreased (less commonly, increased) echogenicity of the organ. Additionally, the presence of fluid in the omental bursa, abdominal cavity, and retroperitoneal space. The use of color Doppler imaging allows for the visualization of increased blood flow in the organ's tissue [8].

EUS (endoscopic ultrasound) is considered highly informative due to the proximity of the transducer to the pancreas, the absence of significant interference from intestinal gas, and the use of high-frequency ultrasound transducers. This method allows for the detection of small and occult pancreatic neoplasms not identified by CT or MRI, especially in patients with recurrent disease. Additionally, EUS-guided fine-needle aspiration biopsy enables the differentiation of focal pancreatitis from pancreatic tumors. However, ultrasound also has certain limitations, in particular the inability to differentiate between interstitial and necrotizing pancreatitis, which is due to the lack of assessment of parenchymal perfusion [9].

Computed tomography.

According to the 2020 clinical guidelines for the management of acute pancreatitis, performing a CT or MRI of the abdominal organs early on (72–96 hours from the onset of the disease) is recommended when the diagnosis is unclear and for differential diagnosis with other diseases. According to foreign authors, the main indications for initial CT in acute pancreatitis are: diagnostic uncertainty, the need to confirm disease severity based on clinical findings, the absence of clinical improvement after conservative treatment, or a worsening of the patient's clinical condition.

Contrast-enhanced CT is the gold standard in patients with OP and is considered the most informative in emergency settings. Contrast-enhanced CT (using an iodinated contrast agent administered intravenously at a rate of 3–5 mL/s) is recommended when it is necessary to confirm the diagnosis, identify (if possible)

causes and complications, rule out alternative causes of abdominal pain, assess the severity of acute pancreatitis, and for preoperative planning. While CT is considered the "gold standard" for assessing the condition of the pancreatic parenchyma, standard MSCT allows for the detection of parenchymal necrosis with high sensitivity. Interstitial edematous pancreatitis is more common and does not involve necrotizing inflammation of the pancreatic parenchyma. On contrast-enhanced CT, relatively homogeneous enhancement is observed in the pancreatic parenchyma, but there are no non-enhancing (necrotic) areas.

Magnetic Resonance Imaging (MRI).

MRI is also the primary imaging modality for evaluating the disease itself and its complications. The advantages of MRI are: 1) radiation-free imaging; 2) fewer contraindications than CT, and it is a reliable method for staging the severity of pancreatic cancer, which has prognostic significance for the disease's prognosis; 3) MRCPI can provide non-invasive imaging of the pancreatic ducts and may demonstrate a possible communication between pancreatic pseudocysts and the pancreatic ducts; 4) for detecting local hemorrhage or pseudoaneurysms, which can aid in surgical planning [10]. It should also be noted that MRI is no less effective than CT in determining the presence and extent of pancreatic necrosis and in identifying the presence, location, and extent of fluid collections. However, in emergency settings, CT and ultrasound are the most appropriate imaging methods due to their availability, speed, and low cost.

When surgery is indicated, it is important to visualize the site of pancreatic duct rupture and the extent of the rupture; for this reason, T2-weighted imaging (T2-WI), as well as MRCP and multi-planar reconstruction, are typically performed.

MR perfusion can reflect early changes in pancreatic blood flow, allowing for the diagnosis of pancreatic necrosis at an early stage of the disease through quantitative analysis of pancreatic blood perfusion.

Acute pancreatitis demonstrates restricted diffusion and can be differentiated from normal pancreatic tissue based on diffusion-weighted imaging (DWI) results due to increased signal intensity on DWI and reduced measured diffusion coefficients. DWI can be used as a non-invasive method to detect infection in fluid collections associated with acute pancreatitis [11].

Conclusion:

The present analysis confirms that acute pancreatitis is a common disease regardless of age, characterized by a rapid course and the presence of severe complications that often lead to fatal outcomes. Therefore, early diagnosis of acute

pancreatitis and determination of its severity are crucial for selecting the appropriate treatment strategy. This review examined and evaluated various imaging modalities that help diagnose AP with high accuracy and in a timely manner: CT, MRI, MRCP, and ultrasound.

References:

1. Yamshchikov O. N. et al. Acute Pancreatitis: Current Perspectives. A Literature Review //HEALTH CARE. – 2025. – p. 57.
2. Artyomova, O. O. Acute Pancreatitis. – 2024.
3. https://link.springer.com/article/10.1186/s12889-024-20796-z
4. https://www.pharmaco-vigilance.eu/content/children-drugs-and-pancreatitis
5. Artyomova, O. O. Acute Pancreatitis. – 2024.
6. National Legal Internet Portal of the Republic of Belarus [Electronic resource]. https://minzdrav.gov.by/upload/dadvfiles/CProtokol/КП_Диагностика_лечение_пациентов_взр_нас_с_острым_панкреатитом_в_стац_условиях_пост_МЗ_2023_182.pdf. – Date of access: 03/06/2024
7. Lukashev A. D. et al. ACUTE PANCREATITIS AND MODERN DIAGNOSTIC METHODS //Bulletin of the Smolensk State Medical Academy. – 2024. – Vol. 23. – No. 4. – Pp. 159–166.
8. Glushkov N.I. et al. Modern Methods of Ultrasound Diagnosis of Acute Pancreatitis in Elderly and Senile Patients // Kuban Scientific Medical Bulletin. – 2007. – No. 4–5. – pp. 59–63. [Glushkov N.I. et al. Kubanskij nauchnyj medicinskij vestnik. Kuban Scientific Medical Bulletin. – 2007. – No. 4–5. – pp. 59–63.
9. Türkvatan A., Erden A., Türkoğlu M., Seçil M., Yener Ö. Imaging of acute pancreatitis and its complications. Part 1: acute pancreatitis // Diagnostic and Interventional Imaging. –2015. – Vol. 96(2). – P. 151–160.
10. Grassedonio E., Toia P., La Grutta L. et al. Role of computed tomography and magnetic resonance imaging in local complications of acute pancreatitis // Gland Surg. – 2019. – No. 8(2). – P. 123–132.
11. Abuzeid H., Ahmed A., Kamel O., Sabry K. Role of diffusion-weighted MR imaging in the diagnosis of acute pancreatitis // Egyptian Journal of Radiology and Nuclear Medicine. – 2020. – No. 51(1)