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FEATURES OF THE DEVELOPMENT OF ENTERAL INSUFFICIENCY SYNDROME IN ACUTE PANCREATITIS

Sayfiddin BAYMAKOV[1,a], Khamidbek RASULOV[2,b], Ramziddin RISBOEV

[1] Doctor of science, Tashkent State Dental Institute
[2] PhD student of Tashkent State Dental Institute
Tashkent, Uzbekistan.
[a]bsayfiddin@yahoo.com , [b]rasham87@mail.ru

ЎТКИР ПАНКРЕАТИТДА ИЧАК ЕТИШМОВЧИЛИГИ СИНДРОМИНИНГ РИВОЖЛАНИШ ХУСУСИЯТЛАРИ.

Сайфиддин БАЙМАКОВ[1,a], Хамидбек РАСУЛОВ [2,b], Рамзиддин РИСБОЕВ

[1] Тиббиёт фанлари доктори, Тошкент давлат стоматология институти
[2] Мустақил изланувчи,Тошкент давлат стоматология институти
Тошкент, Ўзбекистон
[a]bsayfiddin@yahoo.com , [b]rasham87@mail.ru

ОСОБЕННОСТИ РАЗВИТИЯ СИНДРОМА ЭНТЕРАЛЬНОЙ НЕДОСТАТОЧНОСТИ ПРИ ОСТРОМ ПАНКРЕАТИТЕ

Сайфиддин БАЙМАКОВ[1,a], Хамидбек РАСУЛОВ [2,b], Рамзиддин РИСБОЕВ

[1] Доктор медицинских наук, Ташкентского государственного стоматологического института
[2] Свободный соискатель Ташкентского государственного стоматологического института
Ташкент, Узбекистан
[a]bsayfiddin@yahoo.com , [b]rasham87@mail.ru

ABSTRACT

The article deals with identifying enteric insufficiency and its role in the manifestation of the severity of acute pancreatitis since the intestine plays the most critical role in the pathogenesis and progression of this disease, especially in its severe course. Analysis of the literature has shown that enteric insufficiency manifestations play a decisive role in the severity of the course and the danger of a fatal outcome of acute pancreatitis. Its timely detection at an early stage of the disease can serve as a kind of guarantee for predicting the course and success of the treatment. It has been shown that the current lack of clear understanding of many

links in the pathogenesis of enteric insufficiency in acute pancreatitis and clinically reliable methods of its diagnosis makes it difficult to choose the most rational therapeutic tactics.

Keywords: enteric insufficiency, acute pancreatitis, intestine,

АННОТАЦИЯ

В статье рассматриваются вопросы выявления энтеральной недостаточности и ее роли в проявлении тяжести острого панкреатита, поскольку кишечник играет наиболее важную роль в патогенезе и прогрессировании этого заболевания, особенно при его тяжелом течении. Анализ литературы показал, что проявления энтеральной недостаточности играют решающую роль в тяжести течения и опасности фатального исхода острого панкреатита. Его своевременное выявление в ранней стадии заболевания может служить своеобразным залогом прогнозирования течения и успешности проводимого лечения. Показано, что отсутствие в настоящее время четких представлений о многих звеньях патогенеза энтеральной недостаточности при остром панкреатите и надежных в клиническом плане способов ее диагностики затрудняет выбор наиболее рациональной лечебной тактики.

Ключевые слова: острый панкреатит, синдром энтеральной недостаточности, эндотоксемия, динамическая кишечная непроходимость, Обструктивная кишечная непроходимость, кишечная непроходимость, прогноз, диагностика.

АННОТАЦИЯ

Мақолада ичак етишмовчилигини аниқлаш ва унинг ўткир панкреатитнинг оғирлик даражаси намоён бўлишидаги роли муҳокама қилинади, чунки ичак ушбу касалликнинг патогенезида ва ривожланишида, айниқса унинг оғир кечишида энг муҳим рол ўйнайди. Адабиётлар таҳлили шуни кўрсатдики, ичак етишмовчилигининг намоён бўлиши ўткир панкреатитнинг оғирлиги ва ўлим билан якунланиши хавфида ҳал қилувчи рол ўйнайди. Касалликнинг дастлабки босқичида уни ўз вақтида аниқлаш даволаниш жараёни ва муваффақиятини башорат қилишнинг ўзига хос кафолати бўлиб хизмат қилиши мумкин. Ҳозирги вақтда ўткир панкреатитда ичак етишмовчилиги патогенезидаги кўплаб ўзига хосжихатларни ва уни ташхислашнинг клиник жиҳатдан ишончли усулларини аниқ тушунмаслик энг оқилона даволаш тактикасини танлашни мураккаблаштириши кўрсатилган.

Калит сўзлар: ўткир панкреатит, энтерал етишмовчилик сидроми, эндотоксемия, динамик ичак тутлиши, обструктив ичак тутилиши, ичак тутилиши, башоратлаш, диагностика.

SUMMARY

Acute pancreatitis is considered one of the most challenging and urgent problems of emergency abdominal surgery. It is the most common cause of hospitalization for gastrointestinal tract pathologies associated with a high financial burden [35]. Currently, acute pancreatitis ranks second to third among acute surgical diseases of the abdominal cavity and accounts for 10-25% in urgentabdominal pathology structure [52].

The overall mortality rate ranges from 3% to 10%, but with the development of severe local and systemic complications, this figure reaches 36% - 50% [16,29]. Moreover, in the early phase of the disease (in the phase of pancreatogenic toxemia), in 55-69% of cases, the direct cause of the development of fatal outcomes is progressive multiple organ failure [16, 17]. It is reported that manifestations of several organs' failure simultaneously experience from ten to twenty percent of patients with acute pancreatitis, and it is among them that the highest mortality rate is observed [51, 28].

Materials and methods

Acute pancreatitis is defined as a clinical disorder characterized by a sudden onset and severe abdominal pain localized to the epigastric region with or without extension to the back, along with elevated serum amylase and lipase levels (more than three times normal) and resolving with a mild disease without surgery [43]. However, the severity of the disease and the danger of a severe outcome determine precisely organ and systemic complications [7].

According to the 2012 revised Atlanta classification, acute pancreatitis develops in two stages (phase) and has been defined in three degrees of severity: mild, moderately severe, and severe, of which the severe form represents persistent organ failure for more than 48 hours, despite the presence or no local complications [6].

In the early stage, which usually ends by the end of the first week, systemic disturbances are secondary to the pancreas' local inflammation. Upon the disease's progress, generalized inflammation develops, defined as a systemic inflammatory response syndrome [44]. And if it is persistent, there is a risk of an increased risk of organ failure and local complications.

Acute pancreatitis has a mild course in most patients. Still, in 20–30% of cases, dysfunctions of one or more organs develop due to pancreatic necrosis with

potentially infected clusters in the peripancreatic region [34]. Single or multiple organ failure with or without concomitant necrosis, infection, and possibly death can cause a systemic inflammatory response syndrome, initiated by the release of inflammatory mediators from the first week of acute pancreatitis [5]. This response may be similar or even identical to the clinical response resulting from infection and was first described as an inflammatory process, regardless of its cause [34].

Among the internal organs, the intestine performs the main functions of absorption, digestion, absorption, anabolism, and excretion of food. It also plays a vital role in immunology, forming an effective barrier to suppress the absorption of harmful substances such as bacteria, toxins, antigens, and cytokines associated with inflammation [41,54]. Therefore, it is not surprising that the intestine plays the most critical role in the pathogenesis and progression of acute pancreatitis, especially in its severe course, and is considered the "engine" of the systemic inflammatory response and multiple organ failure [18].

In this case, the syndrome of enteric insufficiency, expressed in circulatory hypoxia of the intestinal wall, dysbacteriosis, a significant violation of local immunity, and the mucous membrane's barrier function, the translocation of toxins, and microorganisms themselves into the bloodstream and the lumen of the abdominal cavity. The development of critical violations of the water-electrolyte balance often occurs in critically ill patients. and is usually associated with poor outcomes [23]. Despite this, there was no consensus on a more accurate assessment of gastrointestinal function in acute pancreatitis, so it was not included in the 2012 Atlanta classification, which is widely used to assess the severity of acute pancreatitis. However, it should be emphasized that the importance of gastrointestinal dysfunction in patients with acute pancreatitis can be underestimated, which is obviously due to the lack of precise definition, complexity, diversity, and interconnectedness of the ongoing pathological processes.

The gastrointestinal complications of acute pancreatitis can be broadly divided into those caused by the action of pancreatic enzymes and those caused by the formation of a pseudocyst. Some bowel complications in acute pancreatitis, such asischemic necrosis, perforation, and mechanical obstruction, are relatively rare [48],but this cannot be said for paralytic (dynamic) intestinal obstruction.

Any part of the gastrointestinal tract may be blocked by a large pseudocyst with symptoms depending on its size and location [20]. At the same time, intestinal complications in acute pancreatitis are mainly associated with pancreatic enzymes secreted in the mesentery and passing along different paths, affecting specific intestine segments, with the transverse colon and splenic flexure of the colon being the most common lesions.

The duodenum is the most common site for obstruction due to direct contact of the second and third parts of the duodenum with the pancreas' head. Ectopic pancreatic contact with the stomach's antrum can also increase and disrupt the lumen, resulting in obstruction of the gastric outlet [46].

Obstructive obstruction of the large intestine, which develops as a result of acute pancreatitis, is often localized at the spleen and transverse colon bends. According to a number of authors [37,53], this is due to:

1) external compression of the intestinal walls by the increased size of the body and tail of the pancreas due to severe inflammation;

2) pericolitis or pericolic fibrosis as a result of retroperitoneal action, released from the blood vessels, pancreatic enzymes;

3) thrombosis of the mesenteric arteries (often associated with hypercoagulability in severe inflammatory conditions) or

4) Infarction / ischemic necrosis of the catchment areas secondary to systemic hypotension.

The latter is due to the fact that the flexure of the spleen is a border, often supplied by a poorly developed marginal artery, which makes this area more vulnerable to ischemic stroke [40].

Inflammation of the retroperitoneal space can lead to the involvement of other intestine segments, for example, the small intestine, in the obstructive process. Its obstruction due to compression is less common but most likely involves similar pathogenic mechanisms [47].

According to some authors [11,12], the small intestine is involved in the pathological process only in severe acute pancreatitis due to microcirculation disorders and hypovolemia, fluid movement into the "third space," celiac vessels narrowing, and the development of ischemia-reperfusion phenomena. In this case, the intestine turns into a trigger mechanism for severe systemic complications triggered by a violation of the intestinal barrier, leading to the translocation of bacteria, inflammatory mediators, and toxic products from the intestinal lumen. The foregoing then leads to infection of the tissues of the pancreas, a systemic inflammatory response, and, finally, to sepsis [39].

Another obstructive manifestation of acute pancreatitis includes stenosis of the colon, which can present as a "pseudocarcinoma" with a classic apple corewhen imaged several months after an episode of acute pancreatitis [14,22]. It isalso localized to the spleen's flexures and, like mechanical obstruction, may result from an intimate anatomical relationship with the tail of the pancreas and the flexure of the spleen. Since the tail of the pancreas is adjacent to the phrenolienal and phrenocolonic ligaments, which touch the splenic flexure of the colon, such

contact promotes the direct spread of material rich in inflammatory enzymes to the flexure of the spleen with gradual contraction of the colon segment [30].

A similar anatomical relationship also exists between the anterior surface of the pancreas head and body and the transverse colon. Therefore, an enzyme-rich inflammatory exudate can easily access the transverse colon, leading to local complications (including mechanical obstruction), as well as to the mesentery of the small intestine, leaving the small intestine vulnerable to inflammatory complications [14,25].

And, finally, the same process, through an indirect visceral reflex inside the superior mesenteric plexus, can contribute to the development of secondary inflammation of the retroperitoneal space and/or transient ischemia of the colon, ultimately leading to paralytic intestinal obstruction, which is a relatively more common and less severe complication of acute pancreatitis than actual mechanical obstruction [3]. When the mesenteric vessels become involved in the inflammatory process, the blood supply to the involved intestinal segment is disrupted, resulting in ischemia and ultimately necrosis, characterized by thinning of the intestinal wall with or without pneumatosis.

Delayed transit of intestinal contents and intestinal paresis in acute pancreatitis, contributing to the development of enteral insufficiency syndrome, turn the gastrointestinal tract into a source of endogenous intoxication of a bacterial and dysmetabolic nature. As a result of a violation of the intestine's barrier function, a sharp change in the intraluminal and parietal microflora's quantity and quality, the translocation of their toxins and microorganisms themselves into the bloodstream, and the lumen of the abdominal cavity [2].Besides, gastrostasis, peritoneal edema, pronounced intestinal paresis, compressionof the duodenum, the presence of fluid accumulations in the abdominal cavity and retroperitoneal space, as well as the rigidity of the anterior abdominal wall as a result of its edema and pain syndrome are the reasons for a persistent increase in intra-abdominal pressure in patients with acute pancreatitis [10].

An increase in intra-abdominal pressure is considered one of the most critical pathogenetic reasons for the development of organ dysfunctions in the early phase of acute pancreatitis. Since it is always accompanied by the abdominal vessels' compression, a decrease in abdominal perfusion pressure negatively affects such abdominal organs' functional states as the kidneys, liver, and intestines [33]. Moreover, even in the absence of pancreatitis, high intra-abdominal pressure in itself can cause this disease. Since intra-abdominal pressure is inverselyproportional to abdominal perfusion pressure, with increasing pressure inside the abdominal cavity, ischemia occurs in the organs located there. On this basis, Russian authors created the invention wherein patients with severe concomitant

trauma resulting from a fall from a height or an accident; it is proposed to determine the risk of acute pancreatitis in assessing the increase in intra-abdominal pressure [1].

Intra-abdominal hypertension and abdominal hypoperfusion are closely related to the severity of organ disorders and the prevalence of retroperitoneum- necrosis. Therefore, monitoring the intra-abdominal pressure is of great clinical importance in assessing the disease's severity and prognosis and the choice of treatment tactics [12,38].

Results and discussion

Moreover, its combination with the syndrome of enteral insufficiency, which is always observed in severe acute pancreatitis as a result of damage to the intestinal barrier, becomes the main cause of infection of the pancreas, pancreatic necrosis, and the development of abdominal sepsis.

The mechanism of damage to the intestinal barrier in acute pancreatitis is complex and has not yet been fully elucidated. To date, it is known that early dysfunction of the intestinal barrier in acute pancreatitis is facilitated by an increase in intestinal permeability in combination with a high level of serumendotoxin and cytokines [39,50].

In the early stages of acute pancreatitis, damage to the intestinal barrier occurs due to intestinal ischemia secondary to local and systemic inflammatory reactions and hypovolemic shock. The resulting noticeable decrease in intestinal microcirculation and the development of capillary endothelial damage [42] leads to an increase in intestinal permeability and causes endotoxemia [21]. In addition, an increased level of intestinal permeability secondary to damage to the intestinal barrier, induced within 28-72 hours after the onset of pancreatitis, can cause systemic endotoxemia. Moreover, endotoxins, mast cells, and inflammatory mediators, including tumor necrosis factor (TNF-α), interleukin (IL-6), and platelet-activating factor, also contribute to the development of damage to the intestinal barrier at the same stage of pancreatitis [8,44]. In other words, an interconnected process of an avalanche-like nature arises with factors that reinforceeach other. As a consequence, the ingestion of toxins of the intestinal flora into the circulation after damage to the intestinal barrier can cause sepsis and multiple organ failure, which are the main causes of death in patients with acute pancreatitis[26].

Damage to the intestinal barrier cannot be diagnosed by endoscopic examinations or X-ray examinations, which are currently used in a clinical setting but are capable of detecting only gross and anatomical lesions [41].

Clinically diagnosing the intestinal barrier's damage and elucidating its relationship with bowel disease, bacterial translocation, and endotoxemia is possible using the PI functional test, which determines the level of intestinal absorption of a specific test substance that is not metabolized in the body [19]. Thistest is usually expressed as a percentage of the amount excreted in urine to the amount of test drug administered, the value of which is <2%. In clinical practice polysaccharides and lactulose, which are relatively large molecules and pass through the intestinal mucosa's intercellular space, are more commonly used, and monosaccharides lamosa or mannitol, which is relatively small molecules and move into the cell [27]. The PI test found that early damage to the intestinal barrieris a severe and dangerous factor and is mainly detected in patients with severe acute pancreatitis. Since the PI test values increased in these patients during the first 72 hours of illness, this had a close correlation with the clinical outcome [24,31]. They began to consider that it could predict the severity of acute pancreatitis.

Concerning endotoxemia, it has been shown that it is directly related to the severity of acute pancreatitis [4,9], but since this process is temporary and could not be detected by intermittent blood sampling, in clinical practice, diagnostic tests to determine the level of endotoxins have not yet found their use.

This served as an incentive for several scientists to focus their efforts on searching for a more constant indicator of endotoxemia - antiendotoxin antibodies circulating in the blood of patients. Thus, Namrata Singh et al. [32] found that increased IgG antibodies against endotoxins were more often associated with multiple organ failure patients with severe acute pancreatitis. At the same time, Windsor et al. [49], testing the serum levels of antiendotoxin IgG antibodies in such patients within seven days after admission to the clinic, on the contrary, reported a decrease in IgG titers predicted multiple organ failure. In these studies, there was no correlation between changes over several days in the concentration of IgM antiendotoxin antibodies and the clinical outcome of acute pancreatitis and differences in changes in IgM levels between mild and severe acute pancreatitis, in contrast to some previous studies [9,36].

Besides, according to Ammori et al. [4], systemic exposure to endotoxin in the early stage of acute pancreatitis was not associated with systemic bacterial translocation, and the study by Namrata Singh et al. [32] failed to show the relationship of antibody titers against endotoxins in the blood of patients with the subsequent risk of infection. On this basis, formed the opinion that endotoxemia can only be an epiphenomenon or an aggravating factor associated with organ failure caused by a cytokine storm at the early stage of acute pancreatitis, accordingly, is not directly associated with mortality. Therefore, a similar

phenomenon of increasing antiendotoxin antibodies was proposed by Maury et al. [27] as a marker of recovery in patients with severe sepsis.

Conclusion

Enteric insufficiency manifestations play a decisive role in the severity of the course and the danger of a fatal outcome of acute pancreatitis. Its timely detection serves as a guarantee for predicting the course and success of the treatment. However, at the moment, there are no clear and well-founded ideas about many links in the pathogenesis of enteric insufficiency in acute pancreatitis. Accordingly, clinically reliable methods for their diagnosis have not yet been determined, which significantly complicates the choice of the most rational therapeutic tactics.

With regard to the latter, it should be emphasized that in 65-85% of cases, acute pancreatitis is self-limited and does not require special treatment, except for parenteral administration of fluids, enzyme blockers, analgesics, and supportive therapy [45]. In the rest of the patients, in the early stages of the disease, it is necessary to identify enteric insufficiency syndrome and subject them to aggressive treatment to prevent mortality. Simultaneously, obstruction of the colon secondary to acute pancreatitis is usually resolved by conservative treatment. But in cases associated with retroperitoneal congestion or necrotizing pancreatitis, surgical intervention is necessary [15]. In general, the success of treating patients with acute pancreatitis complicated by the syndrome of enteric insufficiency will mainly depend on early diagnosis and elimination of intra-abdominal hypertension and intestinal barrier dysfunction and good detoxification [13,45].

Литература/ References

1. Евсеев РМ, Смолькина АВ, Зайцев АВ Способ оценки риска развития острого панкреатита у пациентов с повышенным внутрибрюшным давлением. RU 2 703816, Бюл. № 30: 22.10.2019.
2. Akash Bansal, Pankaj Gupta, Harjeet Singh et al. Gastrointestinal complications in acute and chronic pancreatitis. JGH Open. 2019;3(6):450–455. doi: 10.1002/jgh3.12185
3. Aldridge MC, Francis ND, Glazer G, Dudley HA Colonic complications of severe acute pancreatitis. Br J Surg. 1989;76(4):362–367.
4. Ammori BJ, Fitzgerald P, Hawkey P, McMahon MJ. The early increase in intestinal permeability and systemic endotoxin exposure in patients with severe acute pancreatitis is not associated with systemic bacterial translocation: Molecular investigation of microbial DNA in the blood. Pancreas.2003;26:18–22.
5. Banks PA, Freeman ML Practice Parameters Committee of the American College of, Gastroenterology. Practice guidelines in acute pancreatitis. Am. J. Gastroenterol. 2006;101:2379–2400. doi: 10.1111/j.1572-0241.2006.00856.x.
6. Banks PA, Bollen TL, Dervenis C et al. Classification of acute pancreatitis 2012: revision of the Atlanta classification and definitions by international consensus. Gut 2013;62: 102-111. https://doi.org/10.1136/gutjnl-2012-302779

7. Bollen TL, van Santvoort H, Besselink M. et al. Dutch Acute Pancreatitis Study Group, The Atlanta Classification of acute pancreatitis revisited. Br J Surg 2008;95(1): 6-21.
8. Bose SM, Verma GR, Mazumdar A et al. Significance of serum endotoxin and antiendotoxin antibody levels in predicting the severity of acute pancreatitis. Surg Today. 2002;32:602–607.
9. Buttenschoen K, Berger D, Hiki N. et al. Endotoxin and antiendotoxin antibodies in patients with acute pancreatitis. Eur J Surg. 2000;166:459–466.
10. Cheatham ML, Malbrain ML, Kirkpatrick A. et al. Results from the International Conference of Experts on Intra-abdominal Hypertension and Abdominal Compartment Syndrome, II: recommendations. Intensive Care Med 2007;33(6): 951-962.
11. Chen H, Li F, Sun J.B, Jia JG. Abdominal compartment syndrome in patients with severe acute pancreatitis in early stage. World J Gastroenterol 2008;14 (22): 3541- 3548.
12. Eibl G., Buhr H, Foitzik T. Therapy of microcirculatory disorders in severe acute pancreatitis: what mediators should we block? Intensive Care Med 2002;28(2): 139-146.
13. Enqiang Mao Intensive management of severe acute pancreatitis. Ann Transl Med. 2019; 7(22): 687.doi: 10.21037/atm.2019.10.58
14. Gardner A, Gardner G, Feller E. Severe colonic complications of pancreatic disease. J. Clin. Gastroenterol. 2003; 37: 258–262.
15. Gloor B, Uhl W, Muller CA, Buchler MW. The role of surgery in the management of acute pancreatitis. Can J Gastroenterol. 2000;14 (Suppl D):136D–140D.
16. Hideto Yasuda, Masayasu Horibe, Masamitsu Sanui Etiology and mortality in severe acute pancreatitis: A multicenter study in Japan. Pancreatology 2020; 20:307-317.
17. Johnson CD, Abu-Hilal M. Persistent organ failure during the first week as a marker of fatal outcome in acute pancreatitis. Gut 2004;53(9): 1340-1344.
18. de Jong PR, González-Navajas JM, Jansen NJ. The digestive tract as the origin of systemic inflammation. Crit Care 2016; 20: 279 doi: 10.1186/s13054-016-1458-3
19. Juvonen PO, Alhava EM, Takala JA. Gut permeability in patients with acute pancreatitis. Scand J Gastroenterol. 2000;35:1314–1318.
20. Kim HC, Yang DM, Kim HJ et al. Computed tomography appearances
of various complications associated with pancreatic pseudocysts. Acta Radiol. 2008; 49: 727– 734.
21. Koh YY, Jeon WK, Cho YK et al. The effect of intestinal permeability and endotoxemia on the prognosis of acute pancreatitis. Gut Liver. 2012;6:505–511.
22. Lal N, Whiting J, Hejmadi R, Raman S. Large bowel obstruction: a delayed complication of severe gallstone pancreatitis. Case Rep. Surg. 2016; 1034929.
23. Ling Ding, Hong-Yan Chen, Jin-Yun Wang et al. Severity of acute gastrointestinal injury grade is a good predictor of mortality in critically ill patients with acute pancreatitis. World J Gastroenterol 2020; 26(5): 514-523.
24. Liu H, Li W, Wang X et al. Early gut mucosal dysfunction in patients with acute pancreatitis. Pancreas. 2008;36:192–196.
25. Maisonnette F, Abita T, Pichon N et al. Development of colonic stenosis following severe acute pancreatitis. HPB (Oxford) 2003;5(3):183–185.
26. Marshall JC Inflammation, coagulopathy, and the pathogenesis of multiple organ dysfunction syndrome. Crit Care Med 2001;29(7) (suppl): S99-S106.
27. Maury E, Blanchard HS, Chauvin P et al. Circulating endotoxin and antiendotoxin antibodies during severe sepsis and septic shock. J Crit Care. 2003;18:115–120.
28. Mentula P., Kylänpää M.L., Kemppainen E. et al. Early prediction of organ failure by combined markers in patients with acute pancreatitis. Br J Surg 2005;92 (1): 68-75.
29. Mofidi R., Duff M., Wigmore S. et al. Association between early systemic inflammatory response, severity of multiorgan dysfunction and death
in acute pancreatitis. Br J Surg 2006;93(6): 738-744.
30. Mohamed SR, Siriwardena AK. Understanding the colonic complications of pancreatitis. Pancreatology. 2008; 8: 153–158.

31. Nagpal K, Minocha VR, Agrawal V, Kapur S. Evaluation of intestinal mucosal permeability function in patients with acute pancreatitis. Am J Surg. 2006;192:24–28.
32. Namrata Singh, Ujjwal Sonika, Praneeth Moka et al. Association of endotoxaemia & gut permeability with complications of acute pancreatitis: Secondary analysis of data Indian J Med Res. 2019; 149(6):763–770. doi: 10.4103/ijmr.IJMR_763_17
33. Panu Mentula, Piia Hienonen, Esko Kemppainen et al. Surgical decompression for abdominal compartment syndrome in severe acute pancreatitis. Arch Surg. 2010;145(8):764- 769.
34. Paulino J, Ramos G, Veloso F et al. Gomes together we stand, divided we fall: a multidisciplinary approach in complicated acute pancreatitis. J Clin Med. 2019; 8(10): 1607. doi: 10.3390/jcm8101607
35. Peery AF, Dellon ES, Lund J. et al. Burden of gastrointestinal disease in the United States: 2012 update. Gastroenterology. 2012;143:1179–1187. doi: 10.1053/j.gastro.2012.08.002
36. Penalva JC, Martínez J, Laveda R et al. A study of intestinal permeability in relation to the inflammatory response and plasma IgM levels in patients with acute pancreatitis. J Clin Gastroenterol.2004;38:512–517.
37. Pyun DK, Kim KJ, Ye BD et al. [Two cases of colonic obstruction after acute pancreatitis] Korean J Gastroenterol. 2009;54(3):180–185.
38. Rahman SH, Ammori BJ, Holmfield J et al. Intestinal hypoperfusion contributes to gut barrier failure in severe acute pancreatitis. J Gastrointest Surg. 2003;7:26–36.
39. Rezende-Neto JB, Moore EE, Melo de Andrade MV et al. Systemic inflammatory response secondary to abdominal compartment syndrome: stage
for multiple organ failure. J Trauma 2002;53(6): 1121-1128.
40. Rezende-Neto J.B., Moore E.E., Masuno T. et al. The abdominal compartment syndrome as a second insult during systemic neutrophil priming
provokes multiple organ injury. Shock 2003;20(4): 303-308.
41. Schietroma M, Pessia B, Carlei F et al. Intestinal permeability and systemic endotoxemia in patients with acute pancreatitis. Ann Ital Chir. 2016;87:138–144.
42. Sharma M, Sachdev V, Singh N et al. Alterations in intestinal permeability and endotoxemia in severe acute pancreatitis. Trop Gastroenterol. 2012;33:45–50.
43. Shyu JY, Sainani NI, Sahni VA et al. Necrotizing pancreatitis: diagnosis, imaging, and intervention. Radiographics. 2014; 34: 1218–1239.
44. Silva-Vaz P, Abrantes AM, Castelo-Branco M. et al. Multifactorial Scores and Biomarkers of Prognosis of Acute Pancreatitis: Applications to Research and Practice. Int J Mol Sci. 2020; 21(1): 338. doi: 10.3390/ijms21010338
45. Siregar GA, Siregar GP Management of Severe Acute Pancreatitis. Open Access Maced J MedSci. 2019; 7(19): 3319–3323. doi: 10.3889/oamjms.2019.720
46. Somani PO, Jain SS, Shah DK et al. Uncomplicated spontaneous rupture of pancreatic pseudocyst into stomach: A case report. World J. Gastrointest. Endosc. 2013; 5: 461–464.
47. Sunkara T, Etienne D, Caughey ME, Gaduputi V. Small bowel obstruction secondary to acute pancreatitis. Gastroenterol. Res. 2017;10: 42–44.
48. Turkvatan A, Erden A, Turkoglu MA et al. Imaging of acute pancreatitis and its complications. Part 2: complications of acute pancreatitis. Diagn. Interv. Imaging. 2015; 96: 161–169.
49. Windsor JA, Fearon KC, Ross JA et al. Role of serum endotoxin and antiendotoxin core antibody levels in predicting the development of multiple
organ failure in acute pancreatitis. Br J Surg. 1993;80:1042–1046.
50. Wu LM, Sankaran SJ, Plank LD et al. Meta-analysis of gut barrier
dysfunction in patients with acute pancreatitis. Br J Surg. 2014;101:1644–1656.
51. Xu Li, Xiaolin Guo, Huifan Ji et al. Relationships between Metabolic Comorbidities and Occurrence, Severity, and Outcomes in Patients with Acute Pancreatitis: A Narrative Review. Biomed Res Int. 2019; 2019: 2645926.doi: 10.1155/2019/2645926

52. Yadav D, Lowenfels AB. The epidemiology of pancreatitis and pancreatic cancer. Gastroenterology. 2013; 144: 1252–1261.
53. Yoo SS, Choi SK, Lee DH et al. [A case of colon obstruction developed as a complication of acute pancreatitis] Korean J Gastroenterol. 2008;51(4):255–258.
54. Zou ZD, Zhang ZZ, Wang L. et al. The role of mesenteric lymph in pathogenesis of systemic inflammatory response syndrome and systemic complications following severe acute pancreatitis in rats. Zhongguo Wei Zhong Bing Ji Jiu Yi Xue. 2010;22:206–209.

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БУЙРАК ТРАНСПЛАНТАЦИЯСИ: ТИББИЙ ҲАМДА ИЖТИМОИЙ МУАММОЛАРИ ВА УЛАРГА КЛИНИК ЁНДАШУВ

Сабиров Максуд Атабаевич[1], Бобокулов Максуд Бегматович[1], Хайитов Хайрулло Абдуганиевич[2], Мунавваров Бурхон Абдужалилович[3]

Республика ихтисослаштирилган нефрология ва буйрак трансплантацияси илмий-амалий тиббиёт маркази[1]

Республика ихтисослаштирилган нефрология ва буйрак трансплантацияси илмий-амалий тиббиёт маркази Сурхондарё вилояти филиали[2]

Тошкент давлат стоматология институти[3]

ТРАНСПЛАНТАЦИЯ ПОЧКИ: МЕДИЦИНСКИЕ И СОЦИАЛЬНЫЕ ПРОБЛЕМЫ И КЛИНИЧЕСКИЙ ПОДХОД К НИМ

Сабиров Максуд Атабаевич[1], Бобокулов Максуд Бегматович[1] Хайитов Хайрулло Абдуганиевич2, Мунавваров Бурхон Абдужалилович[3]

Республиканский специализированный научно-практический медицинский центр нефрологи и трансплантации почки[1]

Сурхандарьинский филиал Республиканского специализированного научно-практического медицинского центра нефрологии трансплантации почки [2]

Ташкентский государственный стоматологический институт[3]

KIDNEY TRANSPLANTATION: MEDICAL AND SOCIAL PROBLEMS AND A CLINICAL APPROACH TO THEM

Sabirov Maksud Atabaevich[1], Bobokulov Maksud Begmatovich[1] Khayitov Khairullo Abduganievich2, Munavvarov Burkhan Abdujalilovich[3]

Republican Specialized Scientific and Practical Medical Center of Nephrology and Kidney Transplantation[1]

Surkhandarya branch of the Republican Specialized Scientific and Practical Medical Center of Nephrology of Kidney transplantation [2]

Tashkent State Dental Institute[3]

ХУЛОСА

Мақолада транплантологиянинг тарихи, дунё ва юртимизда буйрак аллотрансплантацияси сохасидаги эришилган ютуқлар, унга қўйиладиган