



BLEEDING FROM THE GASTROINTESTINAL TRACT DURING CORONAVIRUS DISEASE

Satvoldiev Rustamjon

Assistant of Fergana Public Health Medical Institute

Mirzaev Baxtiyor

Professor of Fergana Public Health Medical Institute, Doctor of Medical Sciences

Abstract: *We reviewed literature about the effects of novel coronavirus disease COVID-19 on the digestive system. The review analyses the pathogenesis, the natural history, and the frequency of gastrointestinal and hepatobiliary complications in patients with COVID-19. We briefly overviewed therapy for intestinal, liver, and pancreatic damage by COVID-19.*

Keywords: COVID-19, SARS-CoV-2, diarrhea, digestive system, liver, gastrointestinal tract

Annotatsiya: *Biz yangi koronavirus kasalligi COVID-19 ning ovqat hazm qilish tizimiga ta'siri haqidagi adabiyotlarni ko'rib chiqdik. Sharhda COVID-19 bilan kasallangan bemorlarda oshqozon-ichak va gepatobiliar asoratlarning patogenezi, tabiiy tarixi va chastotasi tahlil qilinadi. Biz COVID-19 tufayli ichak, jigar va oshqozon osti bezi zararini davolashni qisqacha ko'rib chiqdik.*

Kalit so'zlar: COVID-19, SARS-CoV-2, diareya, ovqat hazm qilish tizimi, jigar, oshqozon-ichak trakti

Аннотация: *Представлен обзор данных литературы о влиянии новой коронавирусной инфекции COVID-19 на пищеварительную систему. В первой части обзора проанализированы патогенетические особенности гастроэнтеротропного действия вируса SARS-CoV-2, характер и частота симптомов поражения желудочно-кишечного тракта и гепатобилиарной системы у инфицированных больных. Приведены данные о клинической значимости и возможностях лекарственной коррекции поражений желудочно-кишечного тракта, печени и поджелудочной железы при COVID-19.*

Ключевые слова: COVID-19, SARS-CoV-2, диарея, пищеварительная система, печень, желудочно-кишечный тракт.

In December 2019, in the city of Wuhan, Hubei Province, People's Republic of China (PRC), an outbreak of a new coronavirus infection caused by a new strain of coronavirus February 11, 2020 was named SARS-CoV-2 (Severe acute respiratory syndrome-related coronavirus 2). In 2020, the infection acquired the character of a pandemic - recognized as such by the World Health Organization (WHO) on March 11, 2020; she was assigned to title COVID-19 (Coronavirus disease 2019). Finally January 2021 more than 97 million cases recorded infection with COVID-19 (more than 3.6 million in the Russian Federation) with a death toll of over 2 million. A typical manifestation of a new infection is the rapid development of bilateral pneumonia with characteristic clinical and radiological symptoms, in some cases (up to 4%) accompanied by the development of acute respiratory distress

syndrome (ARDS) [1, 2]. However, along with respiratory symptoms, a large number of patients with COVID-19 showed symptoms of damage to the gastrointestinal tract (GIT), often occurring in the debut of the disease [1, 3, 4].

Their appearance is due to the pathogenetic features of the impact of the SARS-CoV-2 virus on the human body and has an important clinical and prognostic meaning [2]. SARS-CoV-2 is a single-stranded RNA virus of the Coronaviridae family, probably recombinant between bat coronavirus and a virus of unknown origin. The genetic structure of SARS-CoV-2 is close to the SARS-CoV coronavirus, the causative agent of SARS, an outbreak of which was recorded in November-December 2002 in South China; up to 73% of patients had gastrointestinal symptoms, most commonly diarrhea [5]. The SARS-CoV-2 virus is assigned to pathogenicity group II; different from other viruses of the family higher contagiousness. The main mode of transmission of the virus is airborne, but not excluded contact and fecal-oral transmission paths. The initial stage of penetration virus into the human body is the interaction with angiotensin-converting enzyme receptors type 2 (ACE2), which are present not only in the alveolar cells of the lungs (which explains the rapid development pneumonia), but also in a number of other cells, including cells of the gastrointestinal tract - the esophagus, ileum, large intestine [1, 2, 6]. Nucleocapsid protein virus was determined in epithelial cells of the salivary glands, stomach, duodenum and rectum intestines (Fig. 1).

As the main pathogenetic mechanisms of gastrointestinal lesions in patients with COVID-19, the direct effect of the virus on epitheliocytes, indirect neurotropic effect on mechanisms of intestinal neuroregulation, cytokine "storm" [4]. Two other coronaviruses related to SARS-CoV-2 - SARS-CoV and MERS-CoV - also had a distinct affinity for the gastrointestinal tract (clinical symptoms were present in 20 and 32% of cases, respectively).

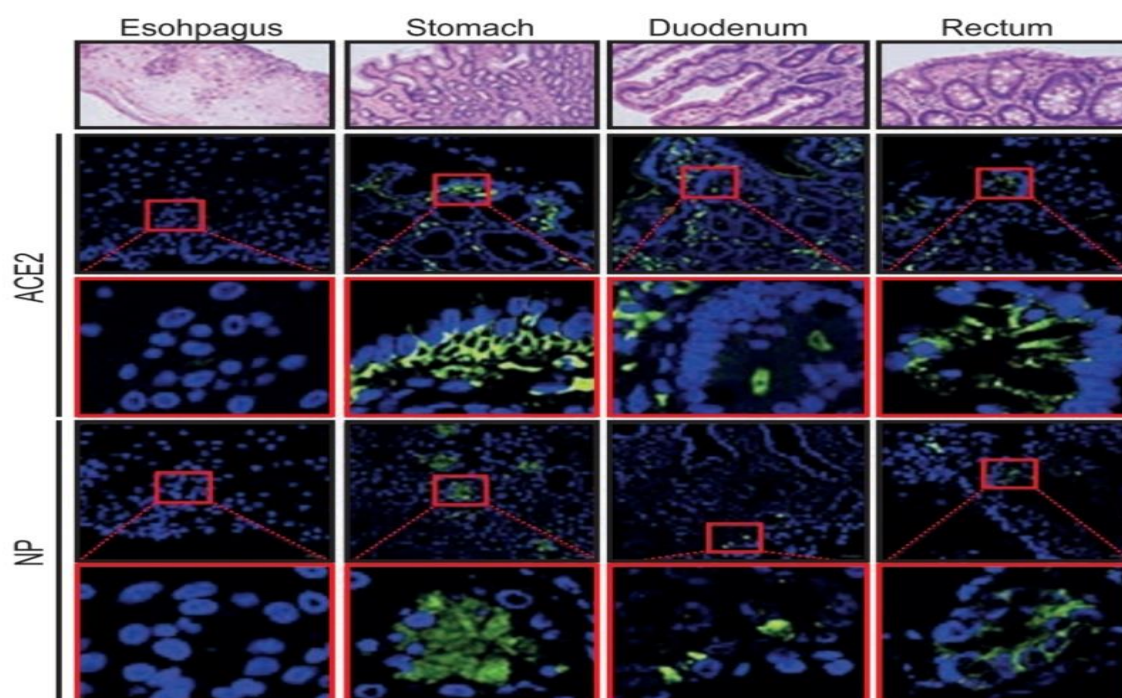




Fig. 1. Images of histologic and immunofluorescent staining of gastrointestinal tissues of the patient with COVID-19.

In addition, during the study by T. Zuo et al., conducted in China and included 15 patients with a new coronavirus infection, persistent faecal microbiome disturbances with enrichment opportunistic pathogens (*Coprobacillus*, *Clostridium ramosum* and *Clostridium hathewayi*) and depletion of beneficial commensals; changes persisted after elimination of the virus and resolution of respiratory symptoms. The presence of the fecal-oral route of transmission of the virus is recognized as probable by many authors based on detection by the polymerase chain method. reactions (PCR) in the feces of high levels of the pathogen, including live strains of the virus, in a significant number (about 50%) of patients [3, 4]. Cases of negative analyzes of the pharyngeal swabs in patients with typical clinical respiratory symptoms (shortness of breath, dry cough) and with a positive stool test for SARS-CoV-2. At the same time, the detection of the virus in the feces is not always correlates with the presence and severity of gastrointestinal symptoms, as well as with the severity of respiratory symptoms [5].

In a study of 73 pagehematochesis patients with COVID-19, 53.4% had a positive stool test and remained so for 1-12 days, and in 23.3% of patients - after a negative analysis of respiratory samples. Similar the picture is observed in children - in 8 out of 10 children who participated in the study, a smear from a direct gut for SARS-CoV-2 was positive even with negative swabs from the nasopharynx. This suggests that viral shedding from the gastrointestinal tract may be profuse and persist after resolution. clinical symptoms. Dyspeptic syndrome and other gastroenterological symptoms, according to publications Chinese researchers were present in 2-40% of cases [4]. As a rule, gastrointestinal symptoms were somewhat "late" compared to respiratory symptoms, appearing on average 7.3 days before hospitalization (respiratory symptoms - 9 days). There is also evidence that these patients have more pronounced clinical manifestations of non-gastroenterological symptoms of the disease. The leading symptom (except for nonspecific symptom of anorexia) had diarrhea - in 15% of patients, according to a study that included 1012 patients mild forms of COVID-19, it was often the first manifestation of infection. Another Chinese study analyzing the pattern of complaints in 204 patients with COVID-19 from 3 hospitals in Hubei Province found complaints from Gastrointestinal tract in 48.5% of them. 83.8% had anorexia, 29.3% had diarrhea, 8.1% had vomiting, 4% had abdominal pain; often there was a combination of several symptoms. According to another large study based on the analysis of 1141 case histories from one of the hospitals in Wuhan with a 7-week period of observation of patients, gastroenterological complaints with COVID-19 were noted in 16% (n=183) patients and have the following frequency of detection: nausea and vomiting - in about 60% of patients, diarrhea - in 37%, abdominal pain - in 25% of patients. In 7 examined patients, dyspeptic syndrome was the only manifestation of the disease without signs of damage to the bronchopulmonary system.

The presence of gastroenterological symptoms that are not quite typical for COVID-19 was the reason for the later diagnosis in most patients. According to Chinese authors, the presence of symptoms of gastrointestinal lesions is associated with more severe variants of



the course of coronavirus infection [5]. as a casuistry case of the debut symptom of COVID-19, a case of hematochesis is described. Symptoms of damage to the digestive system with a new coronavirus infection COVID-19 usually remain in the shadow of respiratory symptoms, coming to the fore of the clinical picture, should not be underestimated. Virus tropism SARS-CoV-2 to epithelial cells of the gastrointestinal tract, the presence and duration of the virus in feces, frequent detection of gastrointestinal symptoms in infected patients, frequent involvement of the liver and pancreas in the pathological process determine the importance of clinical and laboratory assessment of the state of the digestive system due to its undoubted impact on the current status, course and prognosis of the disease in general.

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