Original Article

Measures for the Prevention and Treatment of Covid-19 Infection

Nilufar Rasulova[1], Gulchehra Djalilova[2], Nigora Mukhamedova[3], Salima Nazarova[4], Viktoriya Iskandarova[5]

[1]Associate Professor of the Department of Public Health, Healthcare Management of the Tashkent Pediatric Medical Institute, Uzbekistan.
E-mail: rnilufar1971@mail.ru

[2]Associate Professor of the Department of Public Health, Healthcare Management of the Tashkent Pediatric Medical Institute, Uzbekistan.

[3]Associate Professor of the Department of Public Health, Healthcare Management of the Tashkent Pediatric Medical Institute, Uzbekistan.

[4]Associate Professor of the Department of Public Health, Healthcare Management of the Tashkent Pediatric Medical Institute, Uzbekistan.

[5]Assistant of the Department of Public Health, Healthcare Management of the Tashkent Pediatric Medical Institute, Uzbekistan.

Abstract

This article discusses measures to prevent and treat Covid-19 infection. Collaboration at the local, regional, national and international levels, with a focus on high-quality research, evidence-based practice, the sharing of data and resources, and upholding all ethical standards in the face of unprecedented challenges, will be key to the success of these efforts. In addition, the demand for unproven therapies can lead to shortages of drugs that are approved and indicated for other conditions, leaving patients who rely on these drugs for chronic conditions without effective therapy.

Keywords: Central Nervous System, Myocardium, Kidneys, Liver, Gastrointestinal Tract, Endocrine, Immune Systems, International Levels, high-Quality Research, Evidence-based Practice.

DOI: 10.47750/pnr.2022.13.S03.275

Introduction

In December 2019, cases of pneumonia of unknown etiology were detected among the local population in Wuhan (Hubei Province, People's Republic of China (PRC)) among the local population, which were reported by the PRC to WHO on December 31, 2019. The etiological agent of viral pneumonia COVID-19 was the new coronavirus SARS-CoV-2. Despite the preventive and anti-epidemic measures taken, China has become a source of COVID-19 importation to many countries of the world. On January 30, WHO declared the novel coronavirus outbreak a public health emergency of international concern.

In the context of the threat of the importation and spread of COVID-19 in different countries, response measures have been taken, which by now can be characterized by the degree of their potential effectiveness.

The emergence of COVID-19 has presented healthcare professionals with the challenges of rapidly diagnosing and providing medical care to patients. Currently, an intensive study of the clinical and epidemiological features of the disease, the development of new means of its prevention and treatment continues. The most common clinical manifestation of a new variant of coronavirus infection is bilateral pneumonia (viral diffuse alveolar damage with microangiopathy), 3-4% of patients have developed acute respiratory distress syndrome (ARDS). Some patients develop a hypercoagulable syndrome with thrombosis and thromboembolism, other organs and systems are also affected (central nervous system, myocardium, kidneys, liver, gastrointestinal tract, endocrine and immune systems), sepsis and septic shock may develop.

The Main Findings and Results

Microscopic examination pays attention to intra-alveolar edema with an admixture of erythrocytes, macrophages, desquamated alveocytes, single neutrophils, lymphocytes and plasma cells in the edematous fluid; intraalveolar hyaline membranes, sometimes extending to the inner surface of the bronchioles; desquamation of the alveolar (in the form of individual cells and their layers) and bronchiolar epithelium; the appearance of large, irregularly shaped type II alveocytes, with enlarged nuclei with coarse-grained chromatin and distinct nucleoli (in some of them, a halo is visible around the nucleus, and in the cytoplasm rounded basophilic and eosinophilic inclusions characteristic of viral cell damage); proliferation of type II alveolocytes, the formation of their symplasts.

In the pathogenesis of COVID-19, damage to the microvasculature plays a crucial role. Lung damage in COVID-19 is characterized by pronounced plethora of capillaries of the interalveolar septa, as well as branches of the pulmonary arteries and veins, with erythrocyte sludge, fresh fibrin and organizing thrombi; intrabronchial,

intrabronchiolar and intraalveolar hemorrhages, which are the substrate for hemoptysis, as well as perivascular hemorrhages.

In terms of observations, changes were also found in other organs (in addition to vasculitis), which can be presumably associated with the generalization of coronavirus infection: intestines (catarrhal and hemorrhagic gastroenterocolitis), brain and pia mater (encephalitis and meningitis), heart (myocarditis), pancreas, kidneys, spleen. Direct viral lesions of the placenta are also very likely; single observations show the possibility of intrauterine infection, the clinical significance of which requires further study. Severe lesions have been reported microvasculature due to the development of DIC, which were most pronounced in the lungs and kidneys. Skin manifestations typical of COVID-19 are described, from hemorrhagic syndrome to rashes of various types, the pathogenesis of which is not clear. There is evidence that SARS-CoV2 is able to activate previous chronic infectious processes.

The role of COVID-19 as a healthcare-associated infection has been established. Health care workers are at the highest risk of infection because they have prolonged aerosol contact in the course of their professional duties. The risk of airborne and contact transmission of the pathogen increases in conditions of non-compliance with the requirements of the sanitary and epidemiological regime, including infection safety rules (use of personal protective equipment).

There is a high risk of the formation of epidemic foci of COVID-19 in organized groups (military groups, educational institutions, nursing homes, neuropsychiatric dispensaries, hostels, medical organizations) in case of violation of the sanitary and anti-epidemic regime. There is also a risk of multiple diseases in the collectives of closed organizations in case of non-compliance with infection prevention measures.

Based on studies of autopsy material, taking into account the clinical picture of the disease, at least the following clinical and morphological masks of COVID-19 can be distinguished: cardiac, cerebral, intestinal, renal, hepatic, diabetic, thromboembolic (with pulmonary embolism), septic (in the absence of bacterial or mycotic sepsis), microangiopathic (with systemic microangiopathy), skin.

In order to make decisions aimed at preventing the spread of COVID-19, develop sanitary and anti-epidemic (preventive) measures aimed at reducing the risks of spreading COVID-19 and preventing the formation of foci with multiple cases of diseases, the following are carried out:

- Continuous and dynamic assessment of the scale, nature of the prevalence and socio-economic significance of the infection, including taking into account the severity of the course of the disease.
- Identification of trends in the epidemic process.
- Identification of a high level of morbidity and the risk of infection of the population in the constituent entities of the Republic of Uzbekistan, settlements, organizations and in connection with the activities of individual entrepreneurs.
- Study of population immunity in the population, taking into account the manifestations of the epidemic process.
- Identification of persons most at risk of developing the disease.
- Identifying the causes and conditions that determine the level and structure of the incidence of COVID-19.
- Control and reasonable assessment of the scale, quality and effectiveness of ongoing preventive and anti-epidemic measures for their adjustment, planning the sequence and timing of their implementation.
- Study and evaluation of the results of immunization of the population (after conducting specific prophylaxis).
- Study of the effectiveness of specific, non-specific and emergency prevention tools used in epidemic foci of COVID-19.
- Forecasting the development of the epidemiological situation.

Hygiene education of the population as a method of preventing COVID-19 includes:

- Providing the population with detailed information about COVID-19, the main symptoms of the disease and preventive measures using the media, leaflets, bulletin posters, conducting an individual conversation with the patient, and others.
- Clarification of the rules for wearing masks for respiratory protection, the use of disinfectants, including individual antiseptics.
- Clarification of the need to maintain social distance (1.5 m - 2 m from a person) during the period of rising incidence.
- Bringing to the attention of organized groups of adults and children the rules for organizing activities during the rise in the incidence of COVID-19.

Hygienic education of the population is carried out by the executive authorities of the constituent entities of the Russian Federation, employees of medical organizations with the methodological support of specialists from bodies and organizations that are part of the system of federal state sanitary and epidemiological surveillance.

If there are factors indicating a case suspected of COVID-19, patients, regardless of the type of medical care, undergo a complex clinical examination to determine the severity of the condition, including history taking, physical examination, examination of diagnostic material using NAAT, pulse oximetry.

Based on the results of the complex clinical examination, it is decided the question of the type of medical care and the scope of additional examination. The diagnosis is established on the basis of a clinical examination, epidemiological anamnesis data and laboratory results.

Detailed assessment of all complaints, medical history, epidemiological history. When collecting an

epidemiological history, the presence of foreign travel in the 14 days before the first symptoms, as well as the presence of close contacts in the last 14 days with people who are suspected of being infected with SARS-CoV-2, or who have a laboratory confirmed diagnosis of COVID 19, is determined.

Physical examination with the establishment of the severity of the patient's condition, necessarily including:

- Evaluation of the visible mucous membranes of the upper respiratory tract.
- Auscultation and percussion of the lungs.
- Palpation of the lymph nodes.
- Examination of the abdominal organs with determination of the size of the liver and spleen.
- Thermometry.
- Assessment of the level of consciousness.
- Measurement of heart rate, blood pressure, respiratory rate.
- Pulse oximetry with SpO2 measurement to detect respiratory failure and assess the severity of hypoxemia.

Most patients with COVID-19 have a normal white blood cell count, one-third have leukopenia, and lymphopenia is present in 83.2% of patients. Thrombocytopenia is mild but more pronounced in severe cases and in individuals who have died from COVID-19.

An increase in D-dimer 3-4 times more than the age norm and a prolongation of prothrombin time, especially in severe cases (a decrease in the percentage of prothrombin), an increase in fibrinogen is of clinical importance. It is necessary to take into account age-related features: D dimer increases after 50 years due to the accumulation of chronic diseases. The calculation of the age level of the upper limit of the reference interval can be performed by the formula: age x 0.01 mg / ml (when measured in FEU units). Also, caution should be taken when examining D-dimer in pregnant women. Pregnancy, even physiologically proceeding, is characterized by an increase in D-dimer with a significant variation in values in this group. Outside SARS-CoV-2 infection D-dimer is not decisive in tactics and in the appointment of low molecular weight heparins. The clinical significance of its increase in COVID-19 in pregnant women has not been definitively determined.

The presence of organ dysfunction, decompensation of concomitant diseases and the development of complications, identified by a biochemical blood test, have a prognostic value and influence the choice of drugs and / or their dosing regimen. It is possible to increase the activity of aminotransferases and creatine kinase, the concentration of troponin, creatinine or urea.

The level of CRP correlates with the severity of the course, the prevalence of inflammatory infiltration and the prognosis for pneumonia. The concentration of CRP increased in most patients, along with an increase in interleukin 6 (IL-6) and ESR to varying degrees. IL-6, IL-10 and TNF-α increase during illness and decrease during recovery. Patients requiring hospitalization have significantly higher levels of IL-6, IL-10 and TNF-α and reduced CD4 and CD8 T cells. The level of IL-6, IL-10 and tumor necrosis factor-α is inversely correlated with the number of CD4 and CD8 associated with lymphopenia. An increase in the acute phase ferritin protein was noted in the unfavorable course of the disease.

Hyperinflammation in COVID-19 can manifest with cytopenia (thrombocytopenia and lymphopenia), coagulopathy (thrombocytopenia, hypofibrinogenemia, and increased blood D-dimer), tissue damage/hepatitis (increased levels of LDH and serum aminotransferases) and macrophage/hepatocyte activation (increased serum ferritin levels).

In the diagnosis and prognosis of the course of sepsis, the level procalcitonin: < 0.5 μg/l - low risk of bacterial co-infection and poor outcome; > 0.5 μg/l - patients at high risk, bacterial coinfection is likely. The analysis for procalcitonin at admission is additional information for early risk assessment and exclusion of bacterial coinfection in patients with COVID-19.

It is recommended to choose imaging methods for known / suspected COVID-19 infection differentially, in accordance with the available equipment and human resources of the medical organization, as well as the structure and number of examined patients.

The use of radiation methods in patients with mild ARVI symptoms and a stable patient condition is possible only for specific clinical indications, including the presence of risk factors, subject to sufficient technical and organizational capabilities. The method of choice in this case is CT of the lungs according to the standard protocol without intravenous contrast or RG with limited availability of CT. The use of ultrasound in these cases is impractical. The use of CT scans earlier than 3-5 days from the onset of symptoms of the disease is inappropriate. All radiographic findings, including CT symptoms, are not specific to any type of infection and are not allow an etiological diagnosis to be made. Outside clinical (epidemic) situation, they do not allow attributing the identified changes to COVID-19 pneumonia and differentiating them from other pneumonias and non-inflammatory diseases. X-ray findings do not replace RNA test results SARS-CoV-2. The absence of changes on CT does not exclude the presence of COVID-19 and the possibility of developing pneumonia after the study.

Radiological examination is recommended for patients with moderate, severe and extremely severe ARI for the purpose of medical triage, assessing the nature of changes in the chest cavity and determining the prognosis of the disease:

- Performance of CT scan of the lungs without intravenous contrast in stationary conditions or in outpatient settings - with indications for hospitalization.

- Performing lung X-ray in two projections, if CT is not possible in this medical organization/clinical situation.

The urgent need to prevent the spread of infection, as well as the development of severe forms of the COVID-19 disease, determines the high relevance of prescribing adequate etiopathogenetic treatment and interpreting the results of the selected drugs.

Thus, a number of authors criticize the prescription of several drugs from one group without simultaneous evaluation of efficacy in the control group, which ultimately does not lead to a final conclusion about efficacy or safety.

In addition, the demand for unproven therapies can lead to shortages of drugs that are approved and indicated for other conditions, leaving patients who rely on these drugs for chronic conditions without effective therapy.

It is also difficult to carefully assess the flow of information that has appeared regarding potential treatments for COVID-19 within months of early 2020. Several systematic reviews of the use of complex therapy, which included antiviral drugs, antibiotics, hydroxychloride Roquine and other medicines, preliminary very important conclusions were made, on the basis of which attempts were made to create national guidelines and recommendations, so necessary for practical medicine.

Doctors use special techniques to confirm endotracheal tube placement, observation of chest rise, and use of closed suction systems after intubation to reduce the risk of aerosols. The main focus of COVID-19 mechanical ventilation is to prevent ventilator-induced lung injury while facilitating gas exchange through lung protective ventilation.

The patient's prone position (position of the patient's body on the abdomen) should be applied already in the early stages of care, given its association with reduced mortality from other causes in severe ARDS. Despite the fact that there is not much systemic data on the use of this technique in COVID-19 (used in approximately 12% of ICU patients), currently, due to the characteristics of lung lesions in COVID-19 (there is no tendency to damage peripheral and dorsal areas), this position provides ideal conditions for successful oxygenation, as well as effective prone the position can be used up to 18-22 hours a day. In this case, it is necessary to use all available means to prevent compression of the soft tissues of the face and chest.

This applies to patients with and without COVID-19 as both groups will compete for the same ICU resources. Triaging of critically ill patients is ethically difficult and can be emotionally draining. Ideally, it should be coordinated at the regional or national level of health systems, and guidance documents and recommendations for COVID-19 have now been developed in many countries.

Properly organized triage of patients, carried out by clinicians who have undergone special training, supplemented by systematized recommendations guidelines for clinical decision-making, can identify patients in need of ICU care and, last but not least, those who are not eligible for intensive care. At the same time, when differentiating patients, it is necessary to take into account known factors of poor prognosis, such as advanced age, comorbidities, higher concentrations of D-dimer and C-reactive protein, low lymphocyte counts, etc. implementation of a triage policy that prioritizes critical care patients and the rational use of scarce resources owls.

In the event that the volume of research, the traditional pace of research in the ICU may not match the pace of the disease outbreak. It is necessary to use, optimize and adapt pre-approved protocols and procedures for conducting studies, applied methods and test systems close to the patient's bed.

CONCLUSION

As countries step up efforts to prevent or delay the spread of COVID-19, the world must brace for the possibility that containment and mitigation measures may fail. Even COVID-19 will infect a small fraction of the 7-8 billion people on Earth, many thousands of people will still become seriously ill and will need intensive care. The critical care community must prepare for this potentially overwhelming influx of patients and optimize workflows early for rapid diagnosis and isolation, clinical management and infection prevention. Hospital administrators and health authorities should work with critically ill medical staff to prepare for a significant increase in the number of ICU beds. Measures must be taken to protect healthcare workers from nosocomial transmission of infection, physical and mental overwork, disorders, "burnout syndrome", which can be exacerbated by the need to make ethically difficult decisions about the rationing of intensive care. Measures must be taken to protect healthcare workers from nosocomial transmission of infection, physical and mental overwork, disorders, "burnout syndrome", which can be exacerbated by the need to make ethically difficult decisions about the rationing of intensive care. Collaboration at the local, regional, national and international levels, with a focus on high-quality research, evidence-based practice, the sharing of data and resources, and upholding all ethical standards in the face of unprecedented challenges, will be key to the success of these efforts.

REFERENCES

Kurpayanidi, K. I., Abdullaev, A. M., Nabieva, N. M., Muminova, E. A., & Honkeldieva, G. S. (2020). Economic and social policies during Covid-19 period: Relief plan of Uzbekistan. International Journal of Advanced Science and Technology, 29(06), 5910-5921.

Popova, A. Y., Ruzhentsova, T. A., Khavkina, D. A., Tuychiev, L. N., Akhmedova, M. D., Madazimov, M. M., ... & Zhanibekov, Z. Z. (2021). Experience in International Cooperation on Organization of Anti-Epidemic Measures by Health Care Institutions under COVID-19 Pandemic in the Republic of Uzbekistan. Problems of Particularly Dangerous Infections, (3), 122-128.

Suyunova, D., & Shamsutdinov, B. (2021). Digitalization of Criminal Proceedings in the Context of the Coronavirus Pandemic (Covid-19) in Uzbekistan. Medico-Legal Update, 21(2).

Khudaykulova, G., Tuychiev, L., Muminova, M., Eraliev, U., Sadikov, H. M., & Djuraeva, N. (2021). GENERAL ANALYSIS AND EVALUATION OF THE STATUS OF COVID-19 CORONAVIRUS INFECTION (ON THE EXAMPLE OF THE REPUBLIC OF UZBEKISTAN).

Allaberganov, A., Preko, A., & Mohammed, I. (2021). Government commitment to tourism and hospitality sector during COVID-19 pandemic. Tourism Critiques: Practice and Theory.

Shamiev, G. U. (2020). Development trends of health capital in Uzbekistan: problems and realities. Economics and Innovative Technologies, 2020(5), 3.

Pardaev, K., Hasanov, S., Mamasoliev, S., Muratov, S., Kalandarov, R., & Nurullaev, U. (2021). Covid-19 impact to family food consumption and income in Uzbekistan: results of an online survey. Irrigation and Melioration, 2021(1), 63-68.

Tulyakov, E. (2020). COVID-19: Actions taken in Uzbekistan. Strategy of Uzbekistan, (2), 4-19.

Issanov, A., Amanbek, Y., Abbay, A., Adambekov, S., Aljofan, M., Kashkynbayev, A., & Gaipov, A. (2020). COVID-19 outbreak in post-soviet states: modeling the best and worst possible scenarios.

Ataniyazova, O. A. (2020). COVID-19: High risk groups for COVID-19 and challenges for medical universities. Asian Pacific Journal of Environment and Cancer, 3(S1), 21-23.

Ibadov, R. A., Sh, B. F., Matkarimov, Z. T., Komilova, D. N., & Elmurodova, N. B. (2021). MANAGEMENT OF PATIENTS WITH KIDNEY TRANSPLANTATION DURING THE GLOBAL PANDEMIC COVID-19: SITUATION IN UZBEKISTAN. British Medical Journal, 1(1.2).

Jaxongir, Z., Baxodir, K., & Aziza, K. (2021). Financial and Credit Support of the State Tourism Entrepreneurs as a Result Measures Taken to Prevent the Consequences Coronavirus Pandemics in the Reforming New Uzbekistan in the Case of COVID 19. Annals of the Romanian Society for Cell Biology, 6323-6336.

Komilova, N. K., & Mamatkulov, I. X. (2021). The Incidence of COVID-19 in Uzbekistan Geographical Aspects. Indian Journal of Forensic Medicine and Toxicology, 14(3), 2086-2092.

Yusupalieva, G. A., & Ismailov, U. S. (2020). Organization of assistance and training of healthcare personnel in medical facilities responding to COVID-19. Asian Pacific Journal of Environment and Cancer, 3(S1), 17-19.

Khodjieva, D. T., Khaydarov, N. K., Kazakov, B. S., & Khaydarova, D. K. (2020). Clinical and neurological factors in the formation of an individual predisposition to COVID-associated ischemic stroke. European Journal of Molecular & Clinical Medicine-2020.

Ergashovna, A. O., & Egamgamberdievna, N. S. (2021). LABOR MARKET PROBLEMS IN UZBEKISTAN IN THE CONTEXT OF COVID-19 PANDEMIA. Глобус, (8 (65)), 21-24.

Nurillaeva, N. M., Ibragimov, N. K., Bektemirova, N. T., Yarmuhamedova, D. Z., & Khasanova, N. A. (2021). ANALYSIS OF MANAGEMENT TACTICS FOR PATIENTS WITH CORONAVIRUS INFECTION (COVID-19) IN TASHKENT CITY. 湖南大学学报 (自然科学版), 48(10).

Alimov, A., Rakhimov, R., Alimov, U., & Azizov, A. (2020). Treatment of Patients with Asymptomatic and Mild Case of Covid-19 Infection and Its Prevention in Outpatient Basis by Using Infrared Resonance Therapy. European Journal of Molecular & Clinical Medicine, 7(03), 2020.