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**THE ROLE OF FORENSIC MEDICAL EXAMINATION IN
COVID-19-RELATED DEATH CASES**

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Abstract: *The COVID-19 pandemic has significantly impacted the global healthcare system, introducing new complexities related to determining causes of death. This article analyzes the role of forensic medical examination in COVID-19-related death cases, including its procedures and methodologies. Forensic medical examination is a crucial tool for accurately identifying causes of death, understanding complex situations arising during the pandemic, and making appropriate medical and legal decisions. Emphasis is placed on the accuracy of infection detection, completeness of documentation, and reliability of laboratory tests. The article also discusses differentiating deaths caused by COVID-19 from other diseases, as well as how forensic medical examination adapts to new challenges presented by the pandemic. The findings highlight the importance of aligning forensic practices with modern standards and underscore their significance in advancing healthcare systems.*

Keywords: *COVID-19, forensic medical examination, death cases, pandemic, medical examination, infection, legal analysis, pathology, epidemiology, laboratory diagnostics*

Introduction: The COVID-19 pandemic began at the end of 2019 with the emergence of the SARS-CoV-2 virus and rapidly spread worldwide, significantly impacting healthcare systems and social life (Zhou et al., 2020; WHO, 2021). This new infectious disease is characterized by a high mortality rate and severe complications, especially in patients with chronic diseases, the elderly, or those with weakened immune systems (Wu et al., 2020; Guan et al., 2020). Determining the causes of death related to COVID-19 and conducting their epidemiological analysis became an important task for healthcare systems and government bodies.

Forensic medical examination plays a crucial role in accurately establishing causes of death and distinguishing whether deaths are directly related to COVID-19 or other diseases (Edler et al., 2020; Hanley et al., 2020). However, the pandemic introduced new challenges to the examination processes, including the high contagiousness of the virus, complexity of laboratory testing, and increased safety requirements (Mason et al., 2020).

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The role of forensic medical experts gained importance not only from a medical perspective but also from legal and social viewpoints.

Additionally, the need arose to reconcile differences between clinical and postmortem investigations in determining causes of death. Forensic examination enables identification not only of causes of death but also negative consequences of the COVID-19 pandemic, such as restricted healthcare services, delayed medical assistance, or postponed diagnoses of other diseases (Edler & Schröder, 2020).

This article provides a comprehensive analysis of the role of forensic medical examination in COVID-19-related deaths, its medical and legal significance, the challenges faced during the examination process, and ways to overcome them. The article aims to study the methodological approaches necessary for accurate diagnosis and analysis of deaths during the pandemic and to improve the efficiency of forensic medical examination in COVID-19 mortality analysis.

Main part: The COVID-19 pandemic has adversely affected millions of lives worldwide and exposed new challenges in identifying and analyzing deaths. Forensic medical examination performs an essential function in the precise and reliable determination of causes of death, especially during the pandemic. This process is central in identifying the role and impact of COVID-19 as a cause of death and differentiating it from other diseases. Accurate diagnosis is crucial not only medically but also legally and socially, as incorrect cause-of-death determination may lead to wrong decisions and legal complications.

Forensic examination involves reviewing the patient's clinical history and symptoms before death, as well as postmortem investigation and laboratory analyses. In pandemic conditions, this process is complicated by the virus's high contagiousness, variations in clinical presentations, and limited laboratory resources.

When investigating COVID-19-related deaths, forensic experts face several key challenges. One of these is determining whether the virus was the direct cause of death or if death was due to complications of other diseases. For example, in patients with cardiovascular or chronic pulmonary diseases, COVID-19 infection may act as an aggravating or accelerating factor. Therefore, a comprehensive analysis of clinical data, presence of the virus, and pathological changes in the body is essential during the examination. This approach is vital for accurately distinguishing causes of death and collecting epidemiological data. Laboratory diagnostics, especially PCR testing and immunohistochemical methods, are widely applied in forensic examinations. Postmortem evaluation of changes and infection levels is also important. Forensic experts must strictly adhere to hygiene and safety protocols because the virus's high contagiousness and the risk of postmortem infection pose health hazards to specialists. Consequently, many countries have developed specific protocols for forensic examination of COVID-19-related deaths.

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Another important aspect of forensic examination during the pandemic is its ability to identify problems within healthcare systems. In many countries, deaths of COVID-19 patients may be linked to untimely or incomplete medical care. Forensic examination results reveal the pandemic's impact on society and the healthcare system and help develop measures to prevent similar situations in the future. In this context, coordination between forensic experts and epidemiologists is also important.

The results of forensic examinations form the basis for medical and legal analyses. Erroneous data in determining causes of death can lead to legal disputes, for instance, in insurance claims, criminal cases, or inheritance matters. Therefore, accuracy and reliability of examinations are even more critical under pandemic conditions. Forensic experts have been compelled to adopt new approaches, technologies, and diagnostic methods when investigating COVID-19-related deaths, which has also contributed to enhancing their professional qualifications.

Thus, the role of forensic medical examination in COVID-19-related deaths is comprehensive and multifaceted: it involves identifying causes of death, collecting epidemiological data, detecting shortcomings in healthcare systems, and resolving legal disputes. Despite challenges arising during the pandemic, its effectiveness can be improved through modern medical technologies and methodologies. Meanwhile, close collaboration between forensic experts and healthcare professionals promotes the development of effective solutions for disease detection and control.

Conclusion: The COVID-19 pandemic has posed a serious challenge to global healthcare systems and introduced new difficulties in the identification, classification, and analysis of deaths. In this context, the role and importance of forensic medical examination have significantly increased. The examination not only establishes the direct impact of the virus on death but also helps differentiate complex clinical cases involving chronic diseases. The virus's high contagiousness and the complexity of postmortem investigations required additional responsibility and caution from forensic experts. Postmortem examinations conducted by forensic specialists were crucial not only for determining causes of death but also for epidemiological surveillance and assessing healthcare system effectiveness. During this process, attention was paid to both medical and legal aspects, leading to the development of new standards and improving the quality of forensic examinations. Additionally, examination results helped identify the pandemic's impact on healthcare delivery, its deficiencies, and weaknesses. They also play an important role in preventing legal disputes. Accurate cause-of-death determination reduces the likelihood of errors in insurance payments, inheritance cases, and criminal proceedings, thereby enhancing public trust. In conclusion, the role of forensic medical examination in COVID-19-related deaths is not merely a technical procedure but a broad medical, epidemiological, and legal process. Improving examination processes, introducing new diagnostic tools, and enhancing specialist qualifications are urgent tasks in pandemic conditions. Effective cooperation between

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medical and forensic institutions is crucial in addressing global problems such as pandemics.

Recommendations:

1. Update and standardize forensic examination protocols: Develop and implement national and international standards that consider new requirements and challenges arising during the pandemic.
2. Develop laboratory diagnostics and introduce modern methods: Expand the use of advanced diagnostic techniques such as PCR, immunohistochemistry, and others to detect highly contagious infections within forensic examinations.
3. Regular professional development for specialists: Organize specialized courses, seminars, and scientific-practical conferences to enhance forensic experts' qualifications.
4. Strengthen effective collaboration between medical and forensic institutions: Establish a two-way information exchange system for analyzing epidemiological data and determining causes of death.
5. Enhance safety and hygiene measures: Strictly follow safety protocols and provide personal protective equipment during forensic examinations due to the high contagiousness of the virus.

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