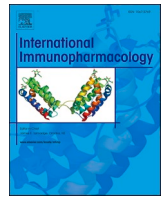




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Short communication

Individual risk management strategy for SARS-CoV-2 infection: A step toward personalized healthcare

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ABSTRACT

Lethal or critical COVID-19 occurs most in infected hosts with certain risk factors such as advanced age or pre-existing disease. Host metabolic status significantly affects the clinical presentations of SARS-CoV-2 infection. Individual risk management is thus crucial for preventing severe COVID-19. Such susceptibility is individual, depending on a multitude of factors. Personalized risk assessment requires the inclusive analysis of big health data to stratify individual risk and derive a customized action plan. Personalized medicine requires shifting from the virology aspect *per se* to the whole individual's consideration, including dietary pattern, nutritional status, supporting lifestyle, co-existing diseases, and environmental factors. In this short communication, we discuss the individual management strategy for SARS-CoV2 infection as a step towards future personalized healthcare.

1. Introduction

The clinical pictures following SARS-CoV-2 infection could vary from asymptomatic or mild symptoms to severe and critical forms of COVID-19 [1]. The lethal clinical situations likely occur in infected hosts with certain risk factors such as advanced age or pre-existing diseases [2]. Despite these risks, the COVID-19 clinical fates are not uniform, and most infected persons, up to 81%, remain asymptomatic or suffer from mild conditions [3]. The host metabolic status significantly influences clinical presentations of SARS-CoV-2 infection. Such susceptibility varies by underlying medical illnesses, age, sex, diet, nutrition, lifestyle, and environmental conditions. Individual risk management is thus crucial for preventing critical COVID-19. The individual risk management strategy of COVID-19 has been discussed, emphasizing the personal risk assessment of various host factors [4]. Risk prioritization leads to a comprehensive management strategy involving dietary and nutritional improvement, lifestyle modification, supplementations, edible herbs, natural products, and antiviral medications [5]. This inclusive data analytic model is an essential characteristic of the personalized medicine approach, which derives appropriate management specific to each individual [6]. Personal risk stratification is a prerequisite for such customized interventions that often include mitigating individual risks

while combining potential therapeutic options. An individualized plan potentially differs from those of others, even those with the same diagnosis.

2. Discussion

The trend toward personalized medicine is emerging in the 21st century [7]. Despite the similar goals for optimal healthcare, populational medicine's perspectives posit particular challenges for adopting a personalized care plan [8,9]. As for SARS-CoV-2 infection, personalized medicine requires shifting from the virology aspect *per se* to the whole individual's consideration, including dietary pattern, nutritional status, supporting lifestyle, co-existing diseases, and environmental factors. The host immunologic tolerance influences various clinical presentations as much as the transmission, the strain, and the virulence of SARS-CoV-2.

An individual with specific nutritional deficiencies is prone to severe clinical SARS-CoV-2 infection, and nutritional repletion is beneficial for such a situation [10–13]. The common micronutrient deficiencies that compromise the host viral immunologic tolerance are vitamin A, C, D, zinc, and selenium [12,14]. A recent study indicates the important role of Zn²⁺ and human Zn-proteome in the interplay between SARS-CoV-2

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and humans [15]. While an individual may have several micronutrient deficiencies and multiple micronutrients interplay in the viral immunomodulatory responses, a single supplementation recommendation is likely ineffective for the general population [12,16]. Without personalized risk assessment, the concerns about the safety and efficacy of nutritional supplementations in the general public are understandable, as addressed by Young and Zampella [17]. However, this notation signifies the focus differences between the approach with disease-specific and the whole person approach of personalized medicine.

While the studies and developments of anti-SARS-CoV-2 medications are active [18], South Korea and China released their national recommendations for herbs and natural products with potential beneficial antiviral properties for COVID-19 management [19]. Researchers are also studying the antiviral properties of the ingredients from these products [20–23]. In China, over 85% of SARS-CoV-2 infected patients received these products complimentary to their treatment [24]. These pieces of evidence suggest the safety of these products' usage under the experts' supervision. While there is no definite anti-SARS-CoV-2 treatment, the inclusion of natural products with potential antiviral properties is sensible for supporting individual tolerance to the pandemic. However, the perspective of directly eliminating the virus with these products is premature and possibly leads to harmful consequences, as being noted by Young and Zampella [17].

3. Conclusion

The conventional population approach extracts information and deduces the condition's common risks and causes. In comparison, the personalized risk assessment requires the inclusive analysis of big health data to stratify individual risk and derive a customized action plan [25]. Although every-one can be vulnerable to SARS-CoV-2 infection, the severity of COVID-19 varies among individuals, dependent on a complex interaction between the host, virus, and environment [26]. The host response to the virus is crucial to prevent severe clinical courses of the disease [27]. Personalized management strategy is then open to including dietary management, nutritional improvement, lifestyle, and environmental modification while considering the antiviral interventions but are not necessarily limited to pharmaceutical agents [12,13,28]. The discussion on the individual management strategy for SARS-CoV-2 infection is then a step toward the future of personalized healthcare.

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The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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