

## Mini Review

# Obesity, Metabolic Syndrome and the Laboratory Diagnosis of Covid-19 Infection

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## Introduction

The Coronavirus Disease 2019 (COVID-19) is the most widely identified coronavirus-triggered respiratory disease [1]. The new virus and epidemic were suspected, that before the outbreak, they had already started in Wuhan, China, in December 2019 [2]. An anomaly is the speed of its spread around the world, and the varying mortality in different countries. Its signs vary from moderate, self-limiting fever to frank pneumonia, condition of severe respiratory failure, and death. It has been recommended that old patients, frail patients, patients with diabetes and hypertension- the two key elements of metabolic syndrome – and patients with comorbidities report worse clinical outcomes and survival.

Several obese patients develop at least one obesity-related comorbidity, by the most severe being type 2 diabetes and cardiovascular diseases [3]. Several comorbidities related to obesity include hyperlipidemia, chronic kidney failure, cancer with a history of cancer and non-rheumatoid arthritis [3]. This list of chronic diseases details the number of disorders that we see in our patients every day.

Although it is already early to provide conclusive evidence to confirm that in this pandemic, it is safe to conclude that some patients with obesity - especially severe obesity with a body mass index over 40 - will have several health issues correlated with obesity that could be related to a more serious mechanism of COVID-19. Patients with severe obesity usually are a more difficult demographic to treat in the intensive care environment and can fail to live if they experience a serious illness, particularly a respiratory infection like COVID-19 [4]. Traditionally, in human beings with metabolic syndrome, viral influenza was not good.

Metabolic syndrome is a name assigned to a group of components or risk factors that position individuals at an elevated risk of contracting diseases like cardiovascular disease and type 2 diabetes. As it is a clustering of different risk factors, and its pathogenesis is not well understood, this has given rise to the development of multiple concurrent definitions. Central obesity and insulin resistance

are acknowledged as important causative factors, together with other associated conditions, including physical inactivity, ageing and hormonal imbalance such as polycystic ovary syndrome or testosterone insufficiency [5]. Components of metabolic syndrome or risk factors include: 1) hypertension (having high blood pressure); 2) abdominal obesity (a large waistline or being apple shaped); 3) insulin resistance or high blood sugars (signs that prediabetes may be developing); 4) high triglycerides; 5) low High-Density Lipoprotein (HDL) cholesterol (low 'good' cholesterol). A diagnosis of metabolic syndrome requires a patient to have 3 of these risk factors. Hypertension was the most frequently reported underlying condition in older COVID-19 patients, but obesity was the most common underlying condition in those under 65 years of age [6].

Researchers also found that among those most likely to get critically ill were patients with signs of inflammation. It is important to note that metabolic syndrome is followed by an inflammatory condition and that chronic low-grade inflammation is often associated with obesity [7].

Inflammation was described as a complication of main concern in COVID-19 patients and is associated with the formation of blood clots (thrombosis). A pro-thrombotic condition also constitutes a part of metabolic syndrome. According to a study conducted in people with deep vein thrombosis, metabolic syndrome puts people at increased risk of developing further blood clots [8].

Although healthy diet and lifestyle will provide health benefits in the future, prevention is the key for people with metabolic syndrome, cardiovascular disease and diabetes during the COVID-19 pandemic right now [9].

When it comes to minimizing your risk of catching COVID-19, the disease caused by the new coronavirus SARS-CoV-2, it is best to follow the advice of the Centers for Disease Control and Prevention and: a) stay at home as much as possible and avoid close contact with others; b) practice social distancing and wear a mask when you go out; c) wash your hands.

The diagnostic tests may be done in patients with pneumonia or fever-induced respiratory syndromes to determine the origin of the disease and distinguish the disorder from COVID-19. Internationally, various real-time RT-PCR protocols have been suggested for COVID-19 diagnosis [10-13]; these protocols vary in the genes that they identify. We need further studies to define the appropriate RT-PCR protocol for COVID-19 diagnosis in real time. Among the different protocols, others use a two-step analysis method to test two genes [14,15]. The detection of one gene is used as a screening method in these procedures, whereas that of the second gene is used as confirmatory examination. By comparison, the findings of certain procedures that test three or more genes can only be deemed accurate if both genes are found. In these protocols, when one of the genes is

not identified, the results are often interpreted as undetermined or negative.

Currently the timing of virus detection in COVID-19 cases is very limited. Therefore, it is difficult to rule out COVID-19 based solely on one negative result, especially when using a suspected case with an upper respiratory tract specimen.

However, careful cardio metabolic monitoring may be expected in patients who have experienced severe COVID-19 disease.

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