COVID - 19 infection Statistical analysis: gender and Age may explain mortality with covid – 19 infection.

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Abstract

Since March 11, 2020 and the World Health Organization announced that Covid -19 has become a pandemic and health organizations in the world have been racing to make statistics for the diseased and the dead to try to find out how the virus works. In addition, why males have higher mortality rates than females? In addition, the elderly for young people. In this paper, we will try to present an explanation of these statistics.

We concluded that RAS system play a role in the mortality rate.

We may suggest a further study on the covid – 19 effect on the nitric oxide / Ang II balance and if the treatment with low dose inhaled Nitric oxide and angiotensin (1, 7) may be beneficial.

Keywords: covid - 19 ; Ang II ; Ang (1,7); Ace2; NO ; male to female mortality rate

The manuscript

Introduction

Since March 11, 2020 and the World Health Organization announced that Coved 19 has become a pandemic, scientists have been trying to understand how the virus works, what factors should be available, and which medications should be given to reduce mortality. Others study the different effects of daily practices that may exacerbate the situation and increase mortality.

Data analysis

According to the CDC, analyzing a population of 327,167,434 patients. The provisional counts for coronavirus disease (COVID-19) deaths occurring within the 50 states and the District of Columbia updated in 17/4/2020, the male mortality rate by covid - 19 is 59.58%. However, the male mortality rate from All Causes is 51.5%. Which indicate a high mortality rate in male rather than female infected with covid – 19.

The male mortality rate of All Pneumonia Deaths is 53.04% and the male mortality rate with Pneumonia and COVID-19 is 58.78.

The mortality rate by the age of 55–64 years with covid -19 is 13.50%, the mortality rate by the age of 65–74 years with covid -19 is 22.23% , the mortality rate by the age of 75–84 years with covid -19 is 27.23% and the mortality rate by the age of 85 years and over with covid -19 is 28.12%.

According to the CDC, the rate of American patients admitted to the ICU with a cardiovascular disease was 20% among US coronavirus patients. The patients admitted to the ICU with pulmonary issues (chronic lung disease, smokers and former smokers) was more than 39%.

Discussion

As the virus, irreversibly bind to the ACE2 enzyme in the cell membrane. A drop in the ACE2 level, increase in the Ang II (Angiotensin II) level was reported (1, 2).

Sex differences in expression, activity, and tissue responsiveness of several RAS components are apparent, with estrogen downregulation of Ang II and upregulation of Ang (1-7) pathways (3).

Several studies showed that there is no difference in the ACE2 activity between male and female in lung tissues, but the Angiotensin (1, 7) levels in lungs and plasma were lower in males than females (5). Which may agree with the high mortality rate of males than females.

We may hypothesize that the use of angiotensin (1, 7) may be studied as a potential treatment to compensate the decrease caused by the viral infection.

Figure 1 : the covid 19 effect on the lung.

The ACE2 is reported to be elevated in young adults as compared to aged groups, which may contribute to the predominance in SARS attacks in this age group. in animal model (4). Yoon et al., (2016) reported that the ACE expression and the Ang II increase with age whereas the ACE2 expression and the nitric oxide decreased (6). Which also agree with the mortality rate age statistical pattern.

These assumptions disagree with other studies showed that No age-dependent differences in ACE and ACE2 were seen, suggesting that the age-dependent

differences in the pulmonary host response are not mediated by changes in pulmonary RAS (7).

Other studies suggested that Loss of ACE 2 leads to the Late Development of Angiotensin II-Dependent Glomerulosclerosis. In addition, increased Ang II and decreased Ang (1, 7) with decrease or the pancreatic Islets. (8,9). These studies agree with that Diabetes and other comorbidities are significant predictors of morbidity and mortality in patients with COVID-19 (10). Which may be the clue of the age related mortality.

The increased Ang II because of the inactivation of the ACE2 enzyme may affect the balance between Ang II and Nitric oxide, which may play an important role in the pathogenetic role in hypertensive end-organ injury (11, 12). Treatment with low dose inhaled Nitric oxide may affect the paracrine effect of the Ang II, restore the balance between them, also it may be beneficial to increases PaO₂ (2).

Conclusion

Angiotensin II play a role in the elevated male mortality rate.

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