Covid-19 diagnostic testing

There is an urgent need for a rapid, simple to use test to support the RT-PCR testing to quickly identify infected patients of SARS-CoV-2 to prevent virus transmission and to assure timely treatment of patients. A combination of nucleic acid RT-PCR and the IgM-IgG antibody test could provide more accurate SARS-CoV-2 infection diagnosis[1].

Real time PCR

The virus nucleic acid RT-PCR test has become the current standard diagnostic method for diagnosis of COVID-19. Yet these real-time PCR tests suffer from some limitations:

- PCR has long turnaround times and are complicated in operation; they generally take on average over 2 to 3 hours to generate results.
- The PCR tests require certified PCR laboratories, expensive equipment and trained technicians to operate.
- There are some numbers of false negatives for RT-PCR of COVID-19 for upper respiratory track samples[2].

These limitations make it difficult to use RT-PCR in the field for rapid and simple diagnosis and screening of patients and it can limit the outbreak containment effort.

Rapid test for SARS-CoV-2 IgG and IgM

Testing of specific antibodies of SARS-CoV-2 in patient blood can provide rapid support in diagnosis of COVID-19[1].

- Chinese government has added IgG/IgM testing to their updated guideline: according to their studies IgM begins to show positive after 3-5 days of onset [3].
- IgM is followed by the generation of adaptive, high affinity IgG responses that are important for long term immunity and immunological memory[1].
- Detection of IgM antibodies tends to indicate a recent exposure to SARS-CoV-2.
- Detection of IgG antibodies indicates virus exposure some time ago.
- Detection of both IgM and IgG could provide information on virus infection time course.

The rapid detection of both IgM and IgG antibodies adds value to the diagnosis and treatment of COVID-19 disease and provide an important immunological evidence for physicians to make the correct diagnosis along with other tests and to start treatment of patients.

References

1) Development and Clinical Application of A Rapid IgM-IgG Combined Antibody Test for SARS-CoV-2 Infection, Diagnosis Zhengtu Li et. al. https://onlinelibrary.wiley.com/doi/epdf/10.1002/jmv.25727

2) A familial cluster of pneumonia associated with the 2019 novel coronavirus indicating person-to-person transmission: a study of a family cluster, Jasper Fuk-WooChan et. al., The Lancet Volume 395, Issue 10223, 15–21 February 2020, Pages 514-523

3) Chinese guideline for COVID-19, General Office of the Chinese National Health Commission, 7th Edition released March 3rd 2020.

4) A video interview of the Chinese epidemiologist and pulmonologist professor Zhong Nanshan

5) https://www.bbc.com/news/health-51491763