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## SARS-CoV-2 virus detection options: current state

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SARS-CoV-2, COVID-19, RT-PCR, serological tests, imaging tests, treatment

### SARS-COV-2 VIRUS DETECTION OPTIONS: CURRENT STATE

Wuhan, Hubei Province, China – in December 2019 the first cases of unknown pneumonia were recorded (1). It was the beginning of the war in which we are now taking part. We fight against an invisible enemy – virus called SARS-CoV-2. Droplet route of infection, greater contagiousness compared to the SARS or MERS virus (2, 3) and induction of acute respiratory distress syndrome (ARDS) causes that we must have methods that allow us to detect and eliminate it.

### DETECTION OF SARS-COV-2 NUCLEIC ACID – RT-PCR

We can take samples from upper airway (pharyngeal and nasal swabs), lower airway (sputum, airway secretions, bronchoalveolar lavage fluid), blood, feces, urine and conjunctival secretions. The material of choice should be sample from the lower respiratory tract because of the highest content of viral nucleic acids (after 3-5 days from the onset of symptoms is the peak of secretion), which allows to avoid false negative results (4).

### DETECTION OF SERUM ANTIBODY

Serological tests are already available from many manufacturers for IgM and IgG antibodies. For example NADAL<sup>®</sup> COVID-19 IgG/IgM Rapid Test – 99.2% of specificity and 94.1% of sensitivity (5), or rapid test made by Novazym Poland – 96.4% of specificity and 91.8% sensitivity (6). Considering the huge number of tests for COVID-19 a great combination of tests should be developed immediately. Especially when we want to stop a pandemic. It turns out that serological tests might be useless in detecting infection in its early stag-

es. Based on studies of 173 patients with confirmed SARS-CoV-2 infection, median time of onset of IgM antibodies was 12 days, and IgG – 14 days. In the first 7 days, antibodies were found in < 40% of patients, after 15 days IgM were detected in 94.3% and IgG in 79.8% of patients (7). All this shows that serological tests are of limited use for the diagnosis of acute infection or are inaccurate.

### IMAGING TESTS

Huge importance in controlling the patient's condition as well as monitoring the effects of treatment. On admission, abnormalities in chest CT images are detected among all patients and 98% had bilateral involvement (8).

The recommended treatment for hypoxaemia associated with COVID-19 disease is high flow nasal oxygen therapy (HFNO). Routine use of non-invasive ventilation is not recommended (however it can be applied in mild and moderate non-hypercapnia cases (9)). Patients in a worsening condition (especially with ARDS) should be qualified for early tracheal intubation and lung protective mechanical ventilation (higher levels of PEEP – greater than 15 cmH<sub>2</sub>O; low tidal volume strategy – 4-8 ml/kg predicted body weight; limiting plateau pressures – to less than 30 cmH<sub>2</sub>O). Current reports suggest that prone ventilation is effective. In case of severe hypoxemia or hypercapnia can be considered neuromuscular blockade. If therapeutic options are exhausted, ECMO should be considered (10).

In summary, the world is now desperate to find ways to slow the spread of the novel coronavirus and to find effective treatments. We should constantly expand our knowledge about the virus and believe that we will quickly manage to control the world situation.

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