

The Day After

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1. Abstract

On February 21, 2020, at Codogno Hospital (in the Lodi's Province, Lombardy, Italy), Italy's Coronavirus 'patient one' was discovered. In the following week the cases within the Province of Lodi increased exponentially and it was interpreted as a disease cluster originating from the hospital.

We dedicated our attention to asymptomatic health employers. Among the diagnostic alternatives to nasopharyngeal swab, the qualitative serologic test exposes the incidence of infection in test subjects by detection of IgM/IgG antibodies produced against the virus. Thus, serologic test execution may allow the identification of clusters of contagious subjects, detect the incidence of infection beyond the swab-positivity time frame, monitor recovering patients, and possibly identify disease relapse. This paper is a report of our idea, using to detect asymptomatic carriers a qualitative serologic rapid test. It will be useful also to detect the presence of immunoglobulins in outpatients treating by specific anticancer therapy.

2. Short Communication

On February 21, 2020, at Codogno Hospital (Lodi's Province, Lombardy), Italy's Coronavirus [1] 'patient one' was discovered. On March 9, 2020, the Italian Prime Minister (PM) decided for lockdown in all over the country. The Coronavirus epidemic wave has so far affected 241,819 people and caused 34,869 deaths in Italy. At least 172 Italian doctors died during their work.

On 17 May, 2020, the Italian PM decided to reopen the Nation

stopping the lockdown.

The next day, May 18, 2020, would have been the day after.

What should we have done since that day?

According to previsions issued by the Government, we must use masks, monitoring fever and remain at least three feet far from other people.

But, is this the solution? The danger now will arrive from asymptomatic people [2].

To avoid the spread of the virus and not find ourselves unprepared as happened at the beginning of the pandemic, it is essential to be able to diagnose the infection and promptly isolate new clusters.

The gold standard for the diagnosis is viral RNA detection, through RT-PCR method, on nasopharyngeal swabs (80% sensitivity) [3], that we use in Lombardy to test symptomatic subjects even among healthcare population. This method has limitations: sometimes it gives false negative; it costs in time and instruments. At to date in Italy the cost of a nasopharyngeal swab for a private citizen is 75\$. The swab must be performed by trained personnel as it is a dependent operator method.

Since May 4, 2020, serological quantitative IgG test has been introduced in Lombardy (the region most affected by the infection) to monitor the population without symptoms. In other Italy's regions similar tests are active since three weeks or more. The method is cheaper (30\$) than swab. But test subjects have to go to laboratory or hospital for blood draw and it's impossible for Italian Government to do for 60 million people in Italy one or more times in year.

We are looking for another easier way to manage. We propose an alternative to nasopharyngeal swab strategy, supported by the initial data of a study we are conducting.

Among the diagnostic alternatives to swab, the qualitative serological test exposes the incidence of infection in subjects by detection of IgM/IgG antibodies produced against the virus. For this reason, we chose qualitative NADAL® COVID-19 IgG/IgM Rapid

Test (test cassette) REF 243001N-10, by Nal Von Minden GmbH (Germany); execution of test requires a finger-prick blood sample and provides a qualitative result (yes/no) within 15 minutes with a declared diagnostic sensitivity of 94.1% and specificity of 99.2%. The test can be done by a single individual without medical or laboratory skills. It costs 12\$ each.

At to date, we observed 275 people (Table1), some of them are outpatients. Our trial is actually ongoing.

Table 1: Clinical Characteristics of subjects

Covid19 + Confirmed group	IgM	IgM/IgG	IgG	Doubt
n=21	2	9	9	1*
Covid 19 unknown	Negative	Diagnosis	Quantitative detected+ in 25 positive patients	Swab +
n=254	229	25	14	7#
Covid19 negative	Confirmed - quantitative	Quantitative not done	Discordant quantitative	Swab control
n=229/254	45	184	5**	5 neg***

*Covid19+ with swab negative since March 20, 2020; ** Diasorin IgG pos, Abbott IgG neg; *** swabs negative in 5 Diasorin +, Abbott IgG neg; # only 7/25 serological test+ had a swabs detection.

21/275 people had known positive to Covid19 during the last weeks with swabs negative after disease. They were tested after discharge with negative swab. We used these subjects as control.

20 of them were IgG or IgM or IgG/IgM positive according to Sethuraman [4] as reported in Table1. The last of these subjects have had swab positive March 7 and negative March, 21. He had a qualitative test two months later with a doubtful outcome. Anyway the rapid test is useful to confirm an immune response in people with known disease.

We also diagnosed 25/254 healthy subjects; 5/25 were people close to Covid19 + patients. This last subgroup [5] was not before tested by swab because asymptomatic. They just respected a quarantine period.

We also had 229/254 negative people without signs of disease detecting by rapid test.

In 59 of them (59/254) rapid test negative (45) or positive (14) was confirmed by qualitative method too [5]. In the other cases we couldn't do the double test. On the contrary in 5/250 cases we had qualitative negative response but quantitative IgG positive (Diasorin). Anyway all these 5 subjects have had swabs negative and a IgG negative with other quantitative test (Abbott).

In summary we can affirm that rapid test:

- 1) is able to always show an immune response in subjects with previous disease diagnosed with nasopharyngeal swab;
- 2) is able to define how many people have been infected by having been cohabitants of positive subjects;
- 3) identifies the paucisymptomatic or asymptomatic subjects who have had recent or previous unknown contact with Covid19;
- 4) identifies subjects who have never had a documented infection and can be considered healthy;
- 5) there is equivalence between rapid qualitative and quantitative serological tests in 59 of 64 cases observed.

As in the case of ascertaining a state of pregnancy, the woman

uses a rapid test and then goes to the hospital for a quantitative test followed by a specialist visit, even in the case of Covid19 we will have to get used to personally monitoring the state of our health and that of our family members at least monthly or more frequently.

Furthermore, this diagnostic method could be used in patients attending our day hospitals to perform anticancer treatments. It would not be just a cancer population screening because if the patients were found to be positive for IgM they could be quickly started to a nasopharyngeal swab.

Using before treatment in outpatients could give us further useful information to keep our work clean.

Thinking to the Poet, how many roads must a man walk down, before you call him healthy?

The answer is our scientific knowledge, using an autonomous, inexpensive and rapid quality test that with mask, fever monitoring and social distancing could do the difference.

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