

March 22, 2020

Re:The NICaS System for monitoring Covid19 patients

The current 2020 epidemic with the new COVID19 virus has already caused medical and economic chaos around the globe. While in south-east Asia, the disease appears to be contained, in most European countries, as well as in the USA and large areas around the world the virus and the disease continue to disseminate and the fatalities increase daily.

In most younger and healthier individuals, the disease appears to be flu-like, however in close to 7-10% of cases the disease results in damage to the lungs – pneumonia with significant disability, and often hemodynamic compromise. In a recent urgent International gathering of cardiologists, intensive care and pulmonology specialists from China, Italy, Japan, Germany, France and the USA, intensive discussions took place regarding cardiovascular involvement of the COVID19 virus. Based on data presented from both China and Italy, in over 50% of cases resulting in mortality, the reason for death was cardiovascular and not lung disease. In addition there is growing evidence that fulminant myocarditis may occur (1-4).

The following are recommendations of these group of experts:

1. Echocardiography is recommended early in the disease course
2. Echocardiography is necessary in all patients with hemodynamic support
3. Hemodynamic monitoring is highly recommended
4. Troponin is a sensitive marker for cardiac involvement
5. BNP is useful but cannot replace echocardiography
6. Invasive hemodynamic measurements are useful but not practical in the current situation
7. Hemodynamic support by ECMO is useful, however only for short periods
8. Impella was used successfully mainly in Italy

Although using Echocardiography is recommended there are several challenges to perform this test on patients with COVID-19:

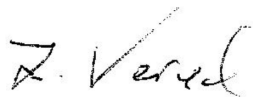
- 1) There is high risk of contamination to the Technician performing the test due to the need of very close contact with the patient for approximately 20 minutes.

- 2) The need to disinfect the equipment after each study together with limited time that medical personnel can stay in compromised area limit the number of patients that can be tested

The NICaS system, based on total body bio-impedance, is an ideal such device. With CE mark and FDA approval, the NICaS system provides, in a rapid, completely noninvasive, continuous and accurate fashion, stroke volume, cardiac output, total peripheral resistance – all very important in patients with hemodynamic compromise. These enable the calculation of cardiac power, which represents cardiac function, and also total body fluids, again a most important parameter in the assessment of the hemodynamic state and fluid balance. The system is currently used in many institutes around the world and has been shown to help in controlling resistant hypertension, hemodynamics during dialysis, monitoring sick patients in the ICU and more.

Therefore, the NICaS system appears to be an ideal tool for longterm hemodynamic monitoring of these sick patients, and I highly recommend its use for all patients suffering from Covid 19 infection, in particular those with dyspnea.

Sincerely,



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References:

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- 3) Chen, C et al SARS-CoV-2: a potential novel etiology of fulminant myocarditis. *Herz* (2020).
- 4) Zeng, J.H. et al First Case of COVID-19 Infection with Fulminant Myocarditis Complication: Case Report and Insights. *Preprints* 2020