COVID-19… What are drugs and strategies now?

Valentina Bellini[1], Andrea Cortegiani[2], Luigi Vetrugno[3], Francesco Potì[5], Francesco Saturno[1], Michelangelo Craca[1], Elena Bignami[1]

[1]Anesthesiology, Critical Care and Pain Medicine Division, Department of Medicine and Surgery, University of Parma, Parma, Italy; [2]Department of Surgical, Oncological and Oral Science (Di.Chir.On.S.), University of Palermo. Department of Anesthesia Intensive Care and Emergency, Policlinico Paolo Giaccone, Palermo, Italy; [3]Department of Medicine, University of Udine, Italy, Anesthesia and Intensive Care Clinic, Udine, Italy; University-Hospital of Udine, Department of Anesthesia and Intensive Care, Udine, Italy; [5]Department of Medicine and Surgery - Unit of Neurosciences, University of Parma, Parma, Italy.

To the Editor,

Since February 2019 Europe has been faced with the COVID-19 infection. WHO in March announced the global emergency, and, to today, the total COVID-19 cases in Europe are 24,917,775, and the deaths 548,256 (1). At present, the question is: what are the pharmacological and diagnostic evidences to manage this second wave in a better way? Can Artificial Intelligence (AI) and Machine Learning (ML) help us? (2) It is essential, through algorithms obtained with the technologies in our possession, to stratify the risk and create clinical diagnosis scores with real support of laboratory and instrumental diagnostics, all in order to reach curative therapy in an effective way.

The patients' clinic continues to be nonspecific. In contrast, some patients have specific characteristic symptoms, such as ageusia and anosmia (3). Comorbidities are often present (hypertension, diabetes, obesity, cerebrovascular accidents and oncological pathologies) (3).

Molecular testing represents the gold standard for diagnosis (3,4).

Laboratory test identifies an increase in C-Reactive Protein (C-PR), lymphopenia and specific markers may be altered, such as cardiac, renal and hepatic ones. The coagulation cascade is also affected, and microthrombi formation into pulmonary bed are described associated with increase in D-Dimer due to alteration of the coagulation process (3,4). This is a form of Acute Respiratory Distress Syndrome (ARDS) visible on the CT scan (3-5) with characteristic ground-glass opacities.

The Lung Ultra Sound (LUS) (3,4) can be used to follow the patient's trajectory and reduce ionizing radiation in terms of chest X-ray and CT scan, with less healthcare worker exposition to the COVID-19 area. The LUS (4) identifies an ARDS-like pattern, B lines converging even to the "white-lung" but alternating with savings areas (spared areas) (3,4). With the use of AI and ML, it is possible to compare the numerous diagnoses to identify similarities or pathognomonic characteristics of the pathology, with the aim of drawing clear scores. The use of LUS also guarantees, thanks to ML, a study of the pathology even at a distance and in real time by an experienced operator, even in absence from the patient's bed, thus avoiding further contagion problems (Tab. 1).

However, at the moment, there is no specific treatment for COVID-19 patients. Encouraging results come from *Corticosteroids, Heparin* (3,5).

Dexamethasone 6mg once a day for ten days seems to reduce the levels of cytokine storm in the acute phase of COVID pathology.

Heparin and antiplatelet find their rationale in the management of micro-thromboembolic complications (12,13). In addition, many patients require supportive care: *Paracetamol* (5), up to the support of vital parameters with *amine* (5), intubation and mechanical ventilation in intensive care (5).

Table 1.

Diagnosis									
Laboratory diagnosis						Instrumental diagnosis			
Molecular		Sierological		Biochemical		TC		LUS	
PROS	CONS	PROS	CONS	PROS	CONS	PROS	CONS	PROS	CONS
Diagnostic for COVID-19	NO Sensitive	Sensitive	NO Specific	Pathology and complications monitoring	NO diagnostic for COVID-19	Sensitive	Not Very Specific	NO X-Ray	Operator Sensitive
Fast	Annoying	Monitoring for Plasma		Diagnosis sepsis, MOF	NO Specific	Ground glass shadow and effusion and pulmonary infiltrating shadow	X-Ray	Pathology monitoring: Blines (multifocal, discrete, or confluent)	NO early diagnosis
						NO Operator Sensitive	High costs	Low costs	Not sensitive and specific for COVID-19
						Fast	Repeatable at the patient's bed		

Once again, AI and ML can support us in the processing of large numbers. Identifying in advance future critical patients, and also non-critical patients, means treating them better. Being able to precisely elaborate therapeutic strategies means being able to manage certain categories of patients at home, with a better use of resources and consequent savings for the health system. This was also shown by a retrospective study highlighting how the aid of technology and AI can be useful in differentiating critical and non-critical COVID-19 patients (2,6)

Future strategies involve processing big data through Biobanks, or the foundations of consortia and ad hoc committees.

In conclusion, in our opinion, prevention, consistent and rapid diagnosis and a shared therapeutic approach are certainly a way forward to first contain and subsequently eradicate coronavirus.

Pursuing this difficult and complex path, also considering the large numbers we are dealing with, new technologies could provide useful and valid supports in daily clinical practice in this new phase of the present health emergency (6).

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Elena Bignami,
Anesthesiology, Critical Care and Pain Medicine Division, Department of Medicine and Surgery, University of Parma
Viale Gramsci 14, 43126 Parma, Italy
E-mail: elenagiovanna.bignami@unipr.it