

hypertension (PAH), mainly because of an extremely high unaffordable cost. Furthermore, controversies exist regarding the treatment effect of the target drugs for different pulmonary hypertension (PH) types, demonstrated by the unknown effect of PAH-targeted drugs for combined pre- and post-capillary PH secondary to left heart failure. Taken together, more aggressive and non-medication-based treatment may be useful for PAH or PH. To do so, the NHC team first proposed and reported on pulmonary artery denervation (PADN) for both PAH and PH in 2013. Then a follow-up study confirmed the improvement in 6-min-walk distance, haemodynamics and exercise capacity.

Experimentally, PADN induces sympathetic nervous injury and subsequently inhibits pulmonary arterial remodelling, a major pathology of PAH. We are very happy to announce that a national FDA-oriented

PADN-CFDA study is ongoing and will report the benefits of PADN for Group I PAH in a randomized fashion. Any innovation is accompanied with concerns, suspicion, and questions. Those points are thought to be the main forces driving the scientific workflow.

Recently, Professor Hao Zhang reported significant improvement of surgical PADN for PAH animals, a finding that provided additional evidence for PADN within our community. Moreover, our PADN-V study has reported preliminary data showing significant improvements in 6-min-walk distance, haemodynamics, and mortality in Cpc-PH patients who are refractory to medication. However, it seems a long way to go before PADN will be approved by government(s).

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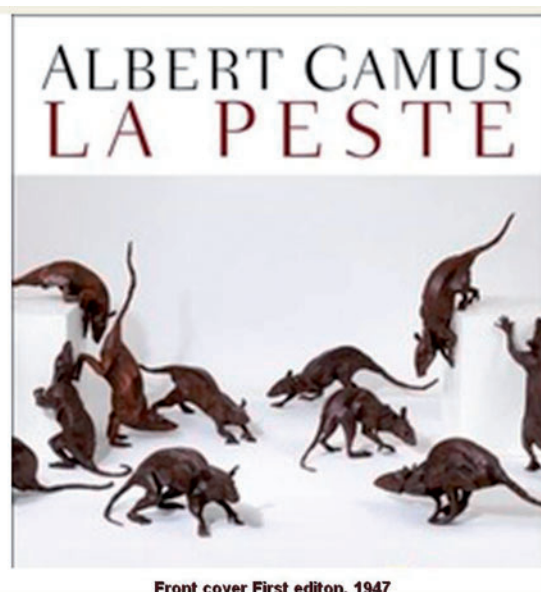
The Cardiologist at the time of Coronavirus: a perfect storm

"When leaving his surgery on the morning of 16 April, Dr Bernard Rieux felt something soft under his foot. It was a dead rat, lying in the middle of the landing": *The Plague (La Peste)* by Camus¹

This is the beginning of one of the most famous novels of the 20th century (*The Plague* by Albert Camus). The rats quickly became two, three, tens, and then hundreds, accumulating inside buildings and on roads. People became unsettled, but then finally, the death of the rats stopped them. 'The town breathed' says Camus, but only briefly.

Before long humans began falling ill and as the number of sick increased, the scenario became more ominous.

The novel (as is often the case with a true masterpiece) is strikingly contemporary, not only regarding the dynamic of the infection, but especially to the spectrum of psychological and anthropological consequences this has on the protagonists. Indeed, every epidemic has profound effects on the social fabric and the psychology of the individual that we should reflect upon.



Outline of a pandemic

From January 2020, COVID-19 infection has spread fast from China, mainly to South-East Asia and Europe (and Italy in particular) even though cases have by now been reported around the world. The clinical picture is that of a flu-like syndrome of mild severity in most cases, but in 15% of cases it is complicated by interstitial pneumonia and a variable degree of respiratory failure. Below are some numbers (from 9 March 2020) that give the idea of the virulence of COVID-19.

In the absence of specific treatment or a vaccine, there are only two possible remedies: (i) supportive treatment of the infection's respiratory complications, including admission to intensive care units (ICUs) and use of mechanical ventilation or extracorporeal membrane oxygenation; (ii) attempts to counter the spread of the infection with drastic and likely unpopular measures such as quarantine or restriction of free movement in a specific area, with the aim of letting the epidemic exhaust itself 'naturally', this hopefully facilitated by the coming of summer in the northern hemisphere.

Effects on the organization of Cardiology wards—new priorities

Most European hospitals are unprepared to manage such an intense and sudden request of beds dedicated to the treatment of severe respiratory failure and are necessarily trying to convert other wards to the treatment of those infected. In Northern Italy, the emergency is progressively involving all cardiology ICUs, not in order to manage cardiovascular complications of the viral infection, but simply to offer beds for treatment of the severe respiratory failure caused by viral interstitial pneumonia. However, the net effect of this reorganization that has been imposed by local and national health authorities is a significant reduction of sites and staff committed to the 'usual' treatment of cardiovascular disease. In particular, elective cardiothoracic operations and interventional procedures are being cancelled. The restriction of free movement between regions imposed by the central government adds to this, with a reduction of cardiology outpatients who—despite everything—decide to access our clinics. This viral emergency, limiting our ability to manage the medical repercussions in the first instance, could have detrimental effects on the entire health system.

However, the issue also has difficult ethical implications. With what criteria should we establish the allocation of resources to a specific hospital or geographic area? Based on the likelihood of benefitting from treatment? Chronological age? Geographic proximity? Bearing in mind the dramatic economic cost, how severely should restrictions to free movement, public venue and working place closures be enforced?

As physicians, our decision-making is generally based on the risk–benefit assessment of the single individual, but in this case three elements are involved, each with a different degree of validity and vicinity to the decision-maker:

- the first is the cardiac patient who has been (or should be) admitted under my care (very concrete),
- the second is the patient with Coronavirus to whom I should allocate an ICU bed (who is not in contact with me yet, or in any case, is not part of my usual clinical setting), and
- the third is the population of a specific area that I need to protect from the infection.

Making decisions for the good of a second-tier entity (such as the population to be protected) is not usual for the cardiologist who works in a hospital, who is intellectually more inclined to focus on and safeguard the here and now.

Effects on the cardiologist—The acute “congress and seminar deprivation syndrome”

In the last month, the vast majority (if not all) local, regional, and national medical congresses in Italy have been cancelled by government decree; international congresses in the rest of Europe are suffering the same fate. University lectures have been suspended or substituted with e-learning where possible. The common aim of these measures is to reduce the infection from countries at risk or with a high rate of infection and slow the infection rate by reducing interpersonal contact to a minimum.

The effect on the calendar of physicians in general, and cardiologists in particular, has been stunning since the Cardiology community has one of the highest number and frequency of medical meetings. It can be estimated that an academic cardiologist, one who is a department director, opinion leader or engaged in multicentric clinical trials, is involved with 40–60 events over the course of a year. The acute deprivation of these meetings leads not only to a sudden availability of time, but also to a reduction of intellectual (and thereby neurohormonal) stimulation related to these events, as well as a suspension of routine.

Time suspended

This is a condition in which a part of time is enucleated from the usual flow of days and months, and during this period, rules that generally apply are temporarily suspended. During 'normal' life, time

	World	China	South Korea	Italy	France	Germany	Spain	UK
Overall	1121517	80790	7755	10149	1784	1622	2124	383
Recovered	66941	61611	288	1004	12	136	136	18
Serious/critical	5753	4492	54	877	86	9	101	1
Deaths	4383	3158	61	631	33	3	61	6

suspended is generally something positive. Typical examples include school outings, short stays with grandparents during childhood, and vacations in general. If anything, even the classic flu can often generate time suspended, during which, one is not severely ill, aware of the benign prognosis, but at the same time somewhat tried by the illness and takes comfort in a warm bed and being taken care of by family members. On these occasions, one often wishes for the situation to be prolonged.

Over the course of this epidemic, it will be common for many to experience time suspended. On a strictly clinical level, since in most cases the clinical picture is very similar to that of classic flu, the psychological mechanisms mentioned above will be reproduced, but with the major limitation that the prognosis is more uncertain. In this way, despite the data showing that prognosis is benign in 90% of cases, the affected individual—and the physician particularly—needs to manage a variable but creeping burden of anxiety. Outside the clinical context, all (both affected and unaffected) will experience increased anxiety due to travel restrictions, change in working hours and habits and not being able to go out to a bar, café, or restaurant. The deafening silence in campuses and cities binds one in a strange relationship with oneself, and to make things worse, the duration of this period is far from certain.

Time regained

The large amount of time freed from congresses, seminars, academic, or other scientific work trips is unloaded onto the European cardiologist leaving him somewhat disorientated. Time dilates and the day suddenly lengthens. There is finally time to think, read, write, and make progress with research projects that are underway or need to be initiated, but also, to direct personal energy to a direct relationship with patients. In truth however, this change is by no means simple or automatic. The sudden excess of free time is surprising and leaves a hollow feeling. One realizes how much our usual rhythm, imposed by anxiety and our too many engagements, are actually necessary to maintain an active and productive intellect. Indeed, the restriction of personal contact—that is sometimes yearned for in times of excessive meetings



and boards—suddenly becomes a burden. One ascertains for oneself what we try to teach our children and students, i.e. that the internet and social media are not able to surrogate direct personal contact.

...and so

The crisis is too recent and acute to allow us to foresee easy solutions in the short-term and in the end all our psychological and anthropological considerations focused on the Cardiologist move to the background when compared to the need to save the lives of affected patients and control the epidemic. However, we think it is clear that only a Cardiologist who is aware and psychologically equipped to face the consequences (and not solely with a face mask and disinfected hands) can help to survive a perfect storm. 'So, this is the moment of truth. This is where they separate the men from the boys'. *The Perfect Storm*, 2000.²

The COVID-19 epidemic will pass, probably leaving behind a significant number of dead as well as serious financial difficulties. It would be a shame if it did not at least provide those involved with a reflection on what is truly important in their personal and professional life and should be safeguarded as much as respiratory function.

Conflict of interest: none declared.



References

1. Camus A. *La Peste*. Paris: Gallimard; 1947.
2. Junger S. *The Perfect Storm*. New York: W. W. Norton & Company; 1997.