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## Editorial

# Impact of the Covid-19 pandemic and lung transplantation program in France



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Severe acute respiratory syndrome coronavirus 2 infection is causing the ongoing Covid-19 pandemic, which has already killed thousands of people worldwide, especially older patients who have cardiovascular risk factors and live in large cities [1]. As in most countries, the French government has ordered confinement of the population (decree n° 2020-260 of March 16th). People can leave home only for vital daily activities, such as purchasing food, medical appointments, and work in sectors essential to survival of the population. Three weeks after, the impact on lung transplantation (LT) programs is already major.

The first consequence is that lung transplantation is no longer feasible. Usually 11 LT teams (including 2 paediatric teams) perform 350 to 400 LTs per year in France. Between March 17th and April 7th, 2020, the CRISTAL registry, which monitors transplantation activities in France (Agence de la Biomédecine) recorded 24 routine and 7 high emergency (HE) LT [2], compared to 0 and 2, respectively, during the same period in 2019. During the same three week period, lung donations declined from 120 in 2019 to 53 in 2020. Although, surgeons remain available for LT, donations have dropped because the extreme work pressure placed on intensivists precludes the implementation of organ procurement procedures. Many operating rooms have been transformed into intensive care rooms and only a few operating rooms remain available for emergent surgery. Using these rooms for 8-hour-long, LT procedures would constitute an unethical use of limited time and resources. Moreover, extra corporeal membrane oxygenation pumps are chiefly used for Covid-19 patients. On March 16th, the Société de Pneumologie de Langue Française working group on LT agreed that in the current situation, only patients on the HE list and those not on this list but deemed in urgent need by the LT team should receive LT, after a particularly rigorous assessment of the risk/benefit ratio. Indeed, concern exists about the safety of caring for LT patients in a crowded ICU, where the intensivists are less available than usual for meeting the challenges of post-operative care in LT recipients. Although, in theory, HE LT should

be performed, few such procedures have been carried out, chiefly due to technical obstacles in LT centers. There is also a risk of nosocomial Covid-19, which remains not well known, but has been frequently considered by physician or patients to be sufficient reason for refraining from evaluating LT eligibility and performing LT. Given that the main LT listing criterion is a greater than 50% risk of death within one year, delaying LT may cost lives. Thus, some LT candidates may become indirect victims of the Covid-19 pandemic.

Today, there are 2500 patients living with lung transplant in France. Reports of Covid-19 among them are increasing and will be recorded in specific registries, such as an ongoing Société Francophone de Transplantation registry. LT recipients have a long history of therapeutic education, and generally show a high level of concern for their health, which may result in their applying protective measures more rigorously than the general population. LT recipients usually attend regular outpatient clinic assessments to monitor lung function and the immunosuppressant regimen. Since the confinement decree, follow-up has been provided by telemedicine from one day to another. The lessons taught by this monitoring method will help to settle the long-standing debate about whether frequent outpatient clinic visits are necessary. Home spirometry is, of course, a crucial component of remote patient monitoring. Fear of contracting the virus has produced several unwanted behaviours among LT patients, such as failure to monitor the immunosuppressant levels or failure to attend hospital appointments that are sometimes needed to manage complications. We will need to monitor these indirect effects of the pandemic on our highly vulnerable patients. Moreover, inappropriate behaviours have also been noted among physicians. Rumours fuelled by the media that many drugs had beneficial effects on the disease resulted in massive numbers of prescriptions that have depleted the stocks of some drugs. Macrolides are an example. Azithomycin is taken by over half of all LT recipients to treat chronic allograft dysfunction (CLAD) according to guidelines [3]. As CLAD is the leading cause of mortality in LT recipients, its unavailability is clearly a cause of concern.

Finally, the impact of the pandemic on the economic resources available to our healthcare service is of great concern. LT programs are costly in terms of time, equipment, and human resources and they are consequently available only in wealthy countries. We will need to develop policies that make LT available to all candidates. Health professionals will have to maintain a high level of alertness regarding the need for equity.

We will learn many lessons from this catastrophe that is challenging the robustness of the complex organisation of LT programs.

First, we will have to continue to explain LT to our colleagues (both physician and other healthcare professionals) to maintain a high degree of awareness of this time consuming and emotionally challenging procedure. Second, LT organisation at the national level should in the future consider an alternative organization in order to preserve the access to LT in times of crisis.

Third, priority access should be put in place for major drugs such as azithromycin, immunosuppressants, and antibiotics required by specific populations of patients with chronic diseases. Fourth, although telemedicine tools and, artificial intelligence will no doubt change the way we interact with patients, we must remain alert to the limitations of these methods as compared to in-person visits. This pandemic is an opportunity to learn. We must evaluate, understand and move quickly to keep our programs efficient for the future.

#### Disclosure of interest

The authors declare that they have no competing interest.

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