



# Strategies to Mitigate the Impact of COVID 19 Pandemic on Organ Donation and Kidney Transplantation in Latin America

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## Abstract

**Purpose of Review** COVID-19 pandemics have severely affected Latin America. It has resulted in SARS-CoV-2-associated clinical adverse outcomes, but also in social and economic deterioration. Consequently, it generated a significant negative impact on organ donation and kidney transplantation (KTx) activity in our region, leading to a negative impact on these patients' survival and quality of life. For this reason, this article aimed to describe applicable logistics, organizational and clinical strategies to mitigate the effect of the COVID-19 pandemic on kidney donation and transplantation in our region.

**Recent Findings** Absenteeism to hemodialysis sessions in patients with end-stage renal disease has been described in up to 54% in Latin America. Not surprisingly, there was a reduction in organ donation and transplants between 21 and 59%. Also, there is a higher incidence of COVID-19 positive tests in the waiting list population than KTx recipients (9.9%). However, there was a higher mortality rate in KTx recipients than the waiting list population (32%).

Additionally, 59% of living donor kidney transplant programs suspended the evaluation of new donors due to the COVID-19 pandemic.

**Summary** Throughout this manuscript, we summarize some practical tips to resume organ donation and KTx during pandemics in Latin America, such as selecting healthy donors and recipients, universal SARS-CoV-2 screening, implementing COVID-19 accessible pathways, and telehealth as a standard, and postpone all non-urgent visits.

**Keywords** Tissue and organ procurement · Organ transplantation · Kidney transplantation · SARS-CoV-2 · COVID-19

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## Abbreviations

KTx	Kidney transplantation
SARS-CoV-2	Severe acute respiratory syndrome coronavirus 2
RT-PCR	Reverse transcriptase polymerase chain reaction
CXR	Chest X-ray
CT	Computed tomography
eGFR	Estimated glomerular filtration rate

## Introduction

During the first year of the COVID-19 pandemics, millions of people have been affected, and more than 2 million deaths worldwide were recorded. Many regions worldwide experienced two or three waves of the pandemic, which has led to the vast majority of health systems' oversaturation by the burden of clinical care imposed by the virus.

Latin America is one of the most affected regions. Its consequences have resulted in adverse outcomes associated with the SARS-CoV-2 (cases of infections and deaths) and the negative impact on the socio-economic field. The vaccination process has been relatively slow in the region. Although some countries have made significant vaccination progress, the impact of new pandemic outbreaks continues to put on our health systems in crisis.

For years our region has maintained stable deceased donation rates that do not supply the demand for transplants. In 2017, there were 667 cases per million inhabitants of patients in need of renal replacement in Latin America [1], while the majority of the region had a deceased donation rate that did not exceed 19 donors per million inhabitants [2]. Only 12,806 kidney transplants were performed (34.2% with living donors) [3].

All these factors can generate a significant negative impact on organ donation and kidney transplantation (KTx) activity in our region, negative effects on the survival and quality of life of those waiting for a kidney transplant, and limitations in accessing organ donation as a specialized end-of-life care option for patients with brain death. For this reason, this article aims to collect some helpful logistic and clinical strategies to mitigate the effect of the COVID-19 pandemic on kidney donation and transplantation in our region.

### Effects During the First Year of COVID-19 Pandemics in Organ Donation and Kidney Transplantation in Latin America

There are no consolidated official regional data, but there are many regional experiences published with a common denominator: a significant decrease in organ donation and kidney transplant rates. In Argentina, there was a 59% reduction in deceased organ donation [4]. Similarly, in some Brazilian regions, there was a reduction of 67.9% and 89.3% in organ donation and transplant procedures, respectively [5]. In Uruguay, there was a decrease of 23.2% in kidney transplant procedures [6]. In Mexico, the organ procurement and transplant procedures were stopped for 6 months, between April and August [7], and, according to official data, there was a decrease of 52.3% in the total amount of cadaveric heart-beating organ donors and 52.6% in the kidney transplant procedures that were made during 2020 [8]. In Chile, there was a decrease of 21.43% in organ transplantation [9]. In Ecuador, there was a reduction of 69% in the total number of transplants that were performed compared to the previous year; there, the decrease in kidney transplants that were made with cadaveric graft was 77% [10, 11]. In Colombia during the first half of 2020 there was a 47% decrease in the number of deceased organ donors a 44% decrease in the

number of kidney transplants and a 37% decrease in solid organ transplants performed [12].

### Collateral Damage to Organ Donation and Kidney Transplantation During the COVID-19 Pandemic

This pandemic has affected the capacity for in-hospital care in many regions around the world, has shifted the clinical care with prioritization for the patients severely affected by COVID-19, and has imposed fears in patients on the waiting list for organ transplantation due to the risk of acquiring COVID-19 infection [13, 14]. Many patients on the waiting list prefer to be transplanted after the pandemic is over [15, 16, 17]. All these factors have increased mortality rates on the transplant waiting lists.

In the USA, the KTx waiting list's mortality was 37% higher during the initial phase of the pandemic [18]. In Argentina, a 4% increase in mortality on the liver transplant waiting list was described too [4]. Some authors have suggested that the COVID-19 pandemic is responsible for an excess of death that was 50% higher on the KTx waiting list population than on the KTx recipients. This fact is closely related to the intensity of regional virus circulation [19]. In the UK, a higher risk for a positive test (RT-PCR) for SARS-CoV-2 was observed in patients on the solid organ transplant waiting list than in transplant recipients [20]. Despite the mitigation and isolation strategies implemented in a Brazilian center, up to 17% of KTx recipients acquired COVID-19 infection during their postoperative hospital stay [21].

In Colombia, 16.7% of patients on the solid organ waiting list for transplantation tested for SARS-CoV-2 were positive. The risk of mortality from SARS-CoV-2 infection in transplant recipients or patients on the waiting list was three times higher than in the general population [22].

In Latin America, hemodialysis sessions absenteeism has been described in up to 54% due to the COVID-19 pandemic. Also, 36% of the centers have had a shortage of immunosuppressive drugs [23].

Recently, Hilbrand et al. [24] determined through the analysis of the ERACODA database (European Renal Association COVID-19 database) that admission rates for in-hospital care are higher in dialysis patients or KTx recipients with SARS-CoV-2 than in the general population affected by COVID-19 (89 and 70%, respectively). The probability of death within 28 days after acquiring the SARS-CoV-2 infection was 25% in dialysis patients (95% CI: 20.2–30%), 21.3% in KTx recipients (95% CI: 14.3–30.2%), and 11.4% in the general population. Also, the mortality for SARS-CoV-2 infection was lower in patients on the waiting list or in dialysis than KTx recipients during the first year after transplantation (HR 0.16. 95% CI: 0.06–0.46,  $p$ : 0.001).

Mohamed et al. [25••] described an incidence of COVID-19 higher in the waiting list population compared to KTx recipients (9.9% vs. 1.9%,  $p < 0.001$ ), but the mortality rate was higher into the KTx recipients compared to the waiting list population (32% vs. 15%). Other authors [26••] have described mortality rates of 32% in KTx recipients with SARS-CoV-2, and variables as age, higher respiratory rate, and lower eGFR are predictors of mortality in this population. A French group [27] described higher rates of acute kidney injury and dialysis requirement in KTx recipients with COVID-19 compared to the general population (46.1% vs. 11.2%,  $p < 0.001$  and 12.7% vs. 8.1%  $p = 0.023$ , respectively). It has been determined that the risk of mortality is 28% higher in KTx recipients with SARS CoV-2 compared to selected patients on dialysis (HR: 1.28, 95% CI: 1.02–1.60) [28••].

Finally, a recent international survey approved by the American Society of Transplantation revealed that 59% of living donor kidney transplant programs suspended the evaluation of new donors due to the COVID-19 pandemic [29] (see Table 1).

### How to Guarantee a Safe and Rational Organ Donation and KTx Activity in Latin America During the COVID-19 Pandemic?

The saturation of the health systems, the in-hospital beds, the intensive care units, and the health personnel for clinical care during the pandemic are relevant and determining factors when considering the possibility of achieving a safe practice of organ donation transplantation today. There cannot be organ donation or transplantation activities if our national health systems are collapsing or if the donation and transplant care routes do not guarantee safety at three levels: safety for in-hospital activities and health personnel, the donor/recipient couple, and for the organ procurement and transplant team [30, 31].

It is necessary to understand the magnitude of the clinical problem generated by the suspension of KTx during the

pandemic. As a consequence of this behavior, the resources available for the routine care of dialysis patients can be saturated, and mortality and the number of patients on the waiting list may increase in our region [32]. There are experimental and simulated models in the COVID-19 pandemic to mitigate the negative impact. The previous demonstrates survival benefits for patients on the waiting list who access KTx in most possible pandemic scenarios [33] and support the idea that it is unnecessary to suspend all KTx surgeries during the COVID-19 pandemic. Some scientific societies have recommended the suspension of the transplantation activity only in selected settings and according to the local pandemic’s dynamics [34].

The selection of possible deceased donors should include risk categorization according to [35] the following:

History of exposure to COVID-19 (travel history, residence in an area with high viral circulation, recent and close contact with COVID-19 positive patients, length of hospital stay).

Clinical history (including lower respiratory symptoms, fever, anosmia during the last three weeks before the brain death declaration).

Radiological findings (CXR or CT chest) and SARS-CoV-2 RT-PCR results (It is recommended a universal screening protocol for all donors using samples of the lower respiratory tract obtained within the 24 h before organ procurement).

It is not recommended to accept for transplantation the organs of a brain-dead donor with RT-PCR positive for SARS CoV-2 or with a clinical picture highly suggestive of infection by COVID-19 [36–38]. However, it is possible to accept donors with a history of SARS-CoV-2 after at least 14 days (for non-lung donors) and 21 days (for lung donors) since the resolution of symptoms with the availability of a negative test (RT-PCR) for SARS-CoV-2 [39]. Some leading scientific organizations in this field recommend prioritizing the donation processes that include standard risk donors and avoiding processes with expanded criteria donors during the

**Table 1** Collateral damages of COVID-19 pandemic on kidney transplantation (Source: Original)

Clinical care phase	COVID-19 pandemic effect
Pre-transplant care	-Increased barriers to dialysis access -Fear in the patients related to the risk of acquiring COVID-19 infection -Increased mortality on the waiting list -Decreased living-kidney donors evaluations
Transplant surgery	-Decreased availability of deceased organ donors -Decreased in the number of transplant procedures performed -Temporary close of living-kidney donors programs -Increased non-acceptance rate to KTx surgery during the pandemic
Post-transplant care	-Increased mortality in KTx affected by COVID-19 infection -Increased rates of AKI in KTx affected by COVID-19 infection -Shortage and increased barriers to immunosuppressive agent access

**Table 2** How to achieve a safe organ donation and KTx process during COVID-19 pandemics (Source: original)

Practical tips to achieving a safe organ donation and KTx during COVID-19 pandemic	
Organ donation	<ul style="list-style-type: none"> <li>-To select standard risk and healthy donors</li> <li>-To implement universal screening for SARS-CoV-2 using samples (RT-PCR) from all donors' lower respiratory tract</li> <li>-To apply clinical and demographic risk assessments for COVID-19 infection</li> <li>-To implement COVID-19 accessible pathways for organ donation</li> <li>-To minimize the travels of organ procurement staff</li> <li>-To implement periodic screening for SARS-CoV-2 into the organ procurement staff</li> </ul>
Kidney transplantation	<ul style="list-style-type: none"> <li>-To select the candidate according to their immunological risk, comorbidity status, and risk of postoperative complications</li> <li>-To implement COVID-19 accessible pathways for KTx</li> <li>-To suspend temporarily the living-kidney donor program based on local pandemic dynamics</li> </ul>
Posttransplant follow-up	<ul style="list-style-type: none"> <li>-To implement telemedicine as the standard of care during the pandemic</li> <li>-To postpone all non-urgent consultations</li> <li>-To provide additional immunosuppressant medications for KTx recipients</li> <li>-To guarantee routes of care for respiratory symptomatic KTx recipients</li> <li>-To guarantee adequate protection and constant symptomatic monitoring of the medical staff</li> </ul>

COVID-19 pandemic [40•, 41]. Some international experiences recommend establishing COVID-19 accessible pathways to protect the donation processes [42].

Some authors suggest that it is necessary to minimize the travels of organ procurement teams to minimize the risk of exposure to COVID-19 and prioritize the donation processes, including young and healthy donors, based on the potential lives saved that could be generated through these processes [43•].

It is recommended to keep active and ready for KTx (according to the local pandemic's dynamics) to highly sensitized patients (in case to proceed to the KTx with a compatible donor), those with dialysis access problems, preemptive KTx, and those without comorbid conditions or advanced age (<60 years). All KTx candidates selected for potential surgery must be free of respiratory symptoms, not have been in close contact with COVID-19 positive patients for the past 2 weeks before the surgery, and should have a negative test (RT-PCR) for SARS-CoV-2 before the transplantation. They must be fully informed about the risks associated with the surgery during the pandemic, and they must know all the strict care needed after the KTx [44]. There should be a COVID-19 accessible pathway for the in-hospital care of KTx recipients. Different routes for access to medical care should be developed to care for KTx recipients with respiratory symptoms [45].

Regarding KTx with a living donor, it is necessary to understand that it is a non-urgent elective procedure; therefore, it is possible to postpone the surgical procedure for execution in a period with low viral circulation. It is necessary to advise the donor/recipient couple about the pandemic's inherent risks to carry out this procedure [46]. It is recommended to perform this type of surgery outside of a

peak of the pandemic and after guaranteeing the availability of in-hospital resources (including COVID-19 accessible pathways), the absence of respiratory symptoms, and the availability of negative tests (RT-PCR) for SARS-CoV-2 in the donor/recipient couple [47].

Other logistical recommendations for safe posttransplant care during the pandemic include the following (see Table 2):

Non-urgent transplant consultation should be postponed [41, 48].

To provide additional immunosuppressant medications for KTx recipients to mitigate the effect of unexpected delays resulting from scheduled closings and quarantines [41].

To implement telemedicine as part of standard post-transplant care during pandemic [49].

To protect the medical staff adequately, paying attention to their symptomatic status, and implement early isolation of any staff member suspected of COVID-19 infection. [50].

Do not forget the risk of interfacility transmission through the medical staff; periodic screening for SARS-CoV-2 is recommended according to the local pandemic's dynamics [41].

## Conclusions

The COVID-19 pandemic has significantly affected donation and transplantation worldwide; Latin America has social, demographic, and political variables that can increase this

negative impact. It is necessary to implement measures to mitigate the COVID-19 effect in our region's donation and transplant processes to continue bringing life to those who need it during the pandemic.

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## Compliance with Ethical Standards

**Conflict of Interest** None.

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