



Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.



## LETTER TO THE EDITOR

## Feasibility and safety of kidney transplantation from deceased donors during the COVID-19 pandemic: Insights from an Italian academic center<sup>☆</sup>



### Viabilidad y seguridad del trasplante renal de donante fallecido durante la pandemia por COVID-19: perspectivas de un hospital universitario italiano

V. Li Marzi<sup>a</sup>, R. Campi<sup>a,\*</sup>, A. Pecoraro<sup>a</sup>, A. Peris<sup>b,c</sup>, S. Serni<sup>a</sup>

<sup>a</sup> Unidad de Cirugía Robótica Urológica y Trasplante Renal, Hospital de Careggi, Universidad de Florencia, Florencia, Italy

<sup>b</sup> Intensive Care Unit and Regional ECMO Referral Centre, Azienda Ospedaliero-Universitaria Careggi, Florencia, Italy

<sup>c</sup> Tuscany Transplant Authority, Tuscany Regional Administration Office, Florencia, Italy

Dear Editor:

Virtually all kidney transplantation (KT) Centers worldwide have been forced to rapidly adapt to the challenges raised by the COVID-19 pandemic.<sup>1</sup> Notably, KT recipients diagnosed with COVID-19 have experienced adverse clinical outcomes,<sup>2,3</sup> posing concerns on the safety of KT during this period. As such, the number of donations and KTs from deceased donors has suffered a critical reduction in several Countries.<sup>4</sup>

In this scenario, while KT programs from living donors have been suspended at most Centers (including ours), whether KT programs from deceased donors should be continued during such an emergency scenario is still matter of

debate.<sup>5</sup> Moreover, there is still lack of data on the rate of COVID-19 after KT, as well as on the safety of minimally-invasive surgery in this setting. Yet, being KT from deceased donors a highly valuable “urgent” surgical procedure, maintaining this activity even during emergency scenarios is paramount.

To provide insights in this regard, herein we report our experience of KT from donors after brain death (DBD) during the trimester February–April 2020 (*COVID-19 period*), comparing its outcomes with those of KT performed in the same timeframe in the years 2017–2019 (*no-COVID period*) (*Fig. 1*).

At our Center, located in one of the Italian Regions that have been hit the most by COVID-19, a series of logistical and clinical measures were implemented early after the spread of the epidemic aiming to prevent transmission of the disease to KT recipients (*Fig. 2*).

Overall, the kidney procurement and transplantation activities did not change significantly during the COVID-19 period (*Fig. 3*).

Thirty-three KTs were included in the analytic cohort (12 in COVID vs. 21 in the no-COVID period) (*Table 1*). While

<sup>☆</sup> Please cite this article as: Li Marzi V, Campi R, Pecoraro A, Peris A, Serni S. Viabilidad y seguridad del trasplante renal de donante fallecido durante la pandemia por COVID-19: perspectivas de un hospital universitario italiano. Actas Urol Esp. 2020. <https://doi.org/10.1016/j.acuro.2020.03.016>

\* Corresponding author.

E-mail address: [riccardo.campi@gmail.com](mailto:riccardo.campi@gmail.com) (R. Campi).

**Table 1** Characteristics related to donor, recipient and graft, and postoperative functional outcomes related to the patients included in our study.

	Overall (n = 33)	Trimester Feb-Apr 2017–2019 (no COVID period) (n = 21)	Trimester Feb-Apr 2020 (COVID period) (n = 12)	p
<i>Patients on the waiting list and on dialysis</i>				
Patients on the waiting list for KT (n)	210	/		
Patients on the waiting list for KT diagnosed with COVID-19 (n,%)	0 (0)			
Patients with ESRD currently in dialysis at our Center (n)	140			
Patients in dialysis diagnosed with COVID-19 (n,%)	7 (5.0)			
Patients in dialysis dead due to COVID-19 (n,%)	2 (1.4)			
KT recipients currently on follow-up (n)	860			
KT recipients on follow-up diagnosed with COVID-19 (n,%)	2 (0.2)			
<i>Donor characteristics</i>				
Donor age (years) (median, IQR)	54 (44–61)	57 (48–64)	50 (40–58)	0.4
Donor BMI (kg/m <sup>2</sup> ) (median, IQR)	26.0 (24.4–27.5)	26.3 (24.6–27.7)	25.3 (24.4–27.3)	0.5
Donor sex (male) (n, %)	22 (68.8)	13 (65.0)	9 (75.0)	0.6
Expanded criteria donor (n, %)	11 (33.3)	8 (38.1)	3 (25.0)	0.4
Donor eGFR (ml/min/1.73 m <sup>2</sup> ) (median, IQR)	82.0 (66.0–94.0)	88.8 (61.8–98.5)	81.0 (69.0–100.5)	0.9
<i>Recipient characteristics</i>				
Recipient age (years) (median, IQR)	49 (44–58)	49 (42–58)	50 (46–56)	0.8
Recipient BMI (kg/m <sup>2</sup> ) (median, IQR)	24.3 (22.0–27.0)	23.4 (21.6–24.9)	26.8 (23.6–28.0)	0.014
Recipient sex (male) (n, %)	17 (51.5)	13 (61.9)	4 (33.3)	0.1
Recipient Charlson Comorbidity Index (CCI) (median, IQR)	2 (2–3)	2 (2–3)	3 (2–4)	0.3
Recipient ASA score (median, IQR)	3 (2–3)	3 (2–3)	3 (3–4)	0.07
Previous transplantation (n, %)	2 (6.1)	2 (9.5)	0 (0)	0.2

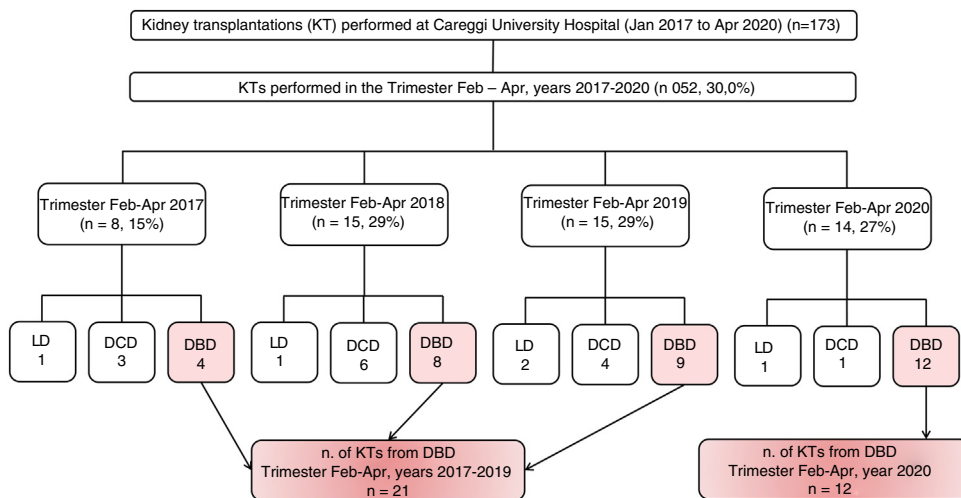
Table 1 (Continued)

	Overall (n = 33)	Trimester Feb-Apr 2017–2019 (no COVID period) (n = 21)	Trimester Feb-Apr 2020 (COVID period) (n = 12) <i>p</i>		
Pre-emptive recipient (n, %)	4 (12.1)	4 (19.0)	0 (0)	0.003	
Duration of dialysis (if not pre-emptive) (months) (median, IQR) n = 29	46 (23–56)	24 (15–48)	50 (37–66)	0.016	
<i>Graft characteristics</i>					
Cold Ischemia Time (hours) (median, IQR)	16 (13–16)	16 (14–17)	15 (12–16)	0.06	
Biopsy of the graft on the back table (n, %)	14 (42.4)	9 (42.9)	5 (41.7)	0.9	
Karpinsky score (at biopsy) (median, IQR)	4 (4–4)	4 (3–4)	4 (4–5)	0.8	
<i>Post-operative and functional outcomes</i>					
Robotic Surgical approach (n, %)	8 (24.2)	5 (23.8)	3 (25.0)	0.9	
Acute rejection (n, %)	1 (3.0)	1 (4.8)	0 (0)	0.4	
Postoperative blood transfusion (n,%)	5 (15.2)	2 (9.5)	3 (25.0)	0.2	
Major (Clavien-Dindo grade 3–5)	4 (12.0)	4 (19.0)	0 (0)	0.1	
Postoperative surgical complications (n,%)		n = 3 <i>Clavien-dindo 3a</i> n = 1 <i>Clavien-dindo 3b</i>			
Overall length of hospitalization (days) (median, IQR)	13 (11–15)	12 (10–14)	13 (11–16)	0.1	
Delayed Graft Function (n, %)	4 (12.1)	0 (0)	4 (33.3)	0.001	
eGFR (ml/min/1.73 m <sup>2</sup> ) (median, IQR)	POD 7	30 (13–49)	30 (18–52)	27 (10–50)	0.7
	At hospital discharge	42 (35–58)	41 (36–57)	43 (35–65)	0.9

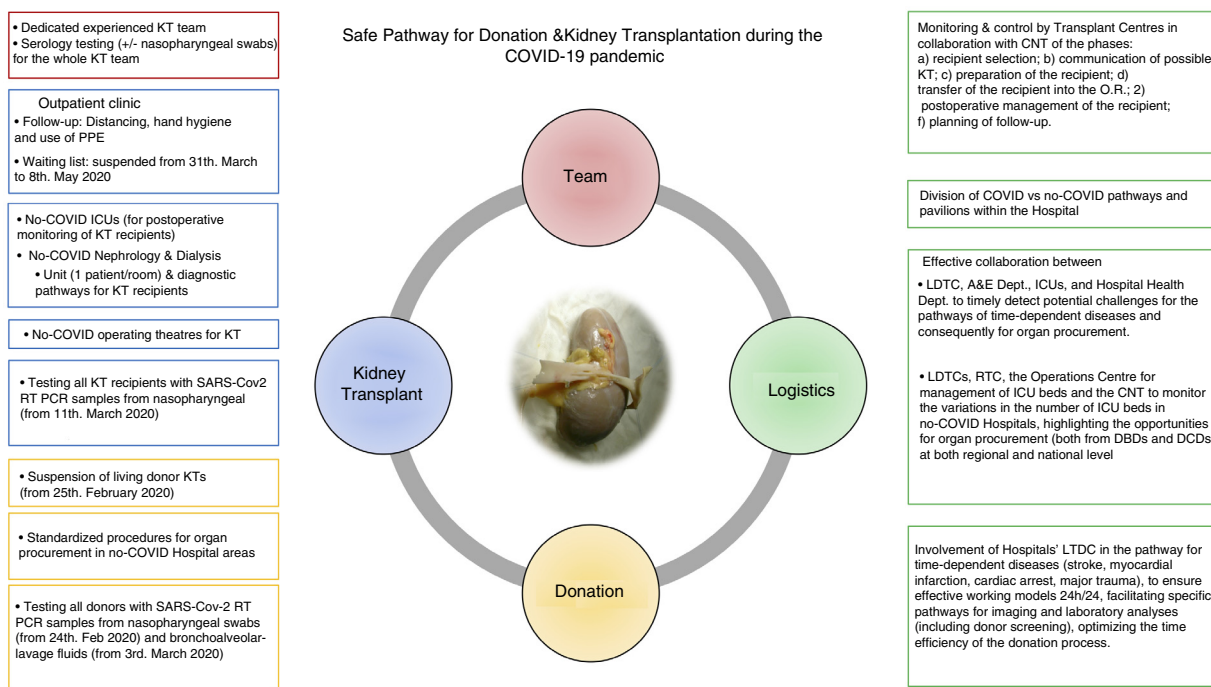
the donors' profile was similar between the two groups, we observed that recipients in the trimester Feb-Apr 2020 were less frequently pre-emptive (0% vs. 19%,  $p = 0.003$ ) and had longer median dialysis periods before KT (50 vs. 24 months,  $p = 0.016$ ). The proportion of robotic KTs was similar in the two groups (23.8% vs. 25%). Moreover, cold ischemia time, as well as intra/post-operative outcomes and median length of hospitalization, did not differ between the two study periods. While a higher rate of delayed graft function was recorded in patients undergoing KT during the COVID-19

period, median estimated glomerular filtration rate (eGFR) at hospital discharge was similar between the study groups (43 vs. 41 ml/min/1.73 m<sup>2</sup>,  $p = 0.9$ ).

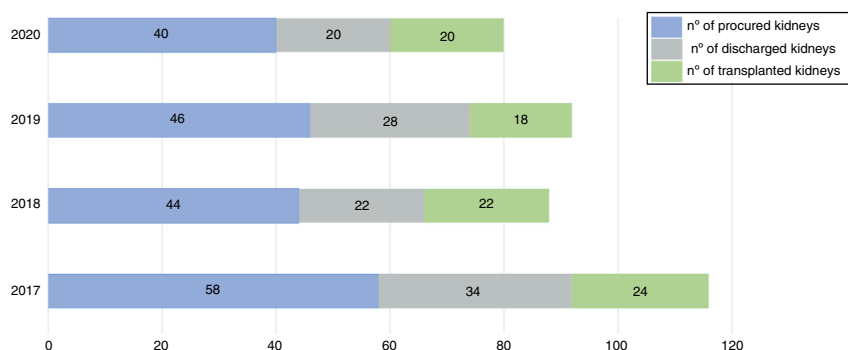
None of the 12 recipients undergoing KT in 2020 was diagnosed with COVID-19 during the postoperative course, as none of the 210 patients currently in the waiting list for KT at our Center. At last, to date, we recorded 7 COVID-19 cases among the 140 patients in dialysis (with 2 disease-related deaths) and 2 cases among the 860 KT recipients in the outpatient setting.



**Figure 1** Flowchart showing the number of kidney transplantations (KT) performed at Careggi University Hospital in the period Jan 2017–Apr 2020 ( $n = 173$ ) and of KTs from donors after brain death (DBD) in the Trimester Feb-Apr of the year 2020 ( $n = 12$ , COVID period) vs. the years 2017–2019 ( $n = 21$ , no-COVID period), representing the analytic cohort. LD = living donor; DBD = donors after brain death; DCD = donors after circulatory death; KT = kidney transplantation.



**Figure 2** Overview of the pathway for donation and kidney transplantation at Careggi University Hospital in Florence, Italy, during the COVID-19 pandemic. The first priority of such dedicated pathways was to ensure the safety of kidney transplantation recipients, reducing the risk of donor-derived COVID-19. A&E = Accident & Emergency; CNT = Centro Nazionale Trapianti (Italian Transplant Authority); DBD = donors after brain death; DCD = donors after circulatory death; LTDC = local transplant and donation coordinator; KT = kidney transplantation; ICU = intensive care unit; O.R. = operating room; PPE = personal protection equipment; RTC = Regional Transplant Center.



**Figure 3** Overview of the kidney procurement activity at Careggi University Hospital (Trimester Feb–Apr, years 2017–2020). In the trimester Feb–Apr 2020 (COVID period), kidney procurement was performed by our local transplant team in the whole Florence area. In addition, in April we accepted for kidney transplantation 2 kidneys from another North-Italian Region that experienced severe logistical challenges in allocation of the graft in that period. Tuscany had officially declared that transplant activity should have been maintained active during the pandemic, being an “urgent procedure” (deliberation n. 572, May 4th 2020, Regional Council of Tuscany, available at: <https://www.regione.toscana.it>). In particular, transplant centers were asked to ensure the historical proportionality between offered organs (from both regional and extra regional procurement centers) and transplanted organs, respecting the safety principles released by the Regional Transplant Center and the Italian Transplant Authority.

Although the challenges caused by the COVID-19 pandemic may jeopardize the KT activity, our experience supports the feasibility and safety of KT from DBDs even during such emergency periods, provided both human and logistical resources allowing to achieve a timely and effective pathway for donation and transplantation.

## References

1. Ritschl PV, Nevermann N, Wiering L, Wu HH, Moroder P, Brandl A, et al. Solid organ transplantation programs facing lack of empiric evidence in the COVID-19 pandemic: a By-proxy Society Recommendation Consensus approach. *Am J Transplant*. 2020:1826–36, <https://doi.org/10.1111/ajt.15933> [published online ahead of print].
2. Akalin E, Azzi Y, Bartash R, Seethamraju H, Parides M, Hemmige V, et al. Covid-19 and kidney transplantation. *N Engl J Med*. 2020;382:2475–7, <https://doi.org/10.1056/NEJMc2011117>. Epub ahead of print.
3. Abrishami A, Samavat S, Behnam B, Arab-Ahmadi M, Nafar M, Sanei Taheri M. Clinical course imaging features, and outcomes of COVID-19 in kidney transplant recipients. *Eur Urol*. 2020;78:281–6. Available from: <http://www.sciencedirect.com/science/article/pii/S0302283820303328>
4. Loupy A, Aubert O, Reese PP, Bastien O, Bayer F, Jacqueline C, et al. Organ procurement and transplantation during the COVID-19 pandemic. *Lancet*. 2020;395:e95–6, [https://doi.org/10.1016/S0140-6736\(20\)31040-0](https://doi.org/10.1016/S0140-6736(20)31040-0) [in press].
5. Ribal MJ, Cornford P, Briganti A, Knoll T, Gravas S, Babjuk M, et al. EAU guidelines office rapid reaction group: an organisation-wide collaborative effort to adapt the EAU guidelines recommendations to the COVID-19 Era. *Eur Urol*. 2020;78:21–8 [in press]; Available from: <https://www.europeanurology.com/covid-19-resourceEAU>