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SPECIAL REPORT

Kidney transplantation during mass disasters—from COVID-19 to other catastrophes: a Consensus Statement by the DESCARTES Working Group and Ethics Committee of the ERA

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ABSTRACT

Mass disasters are characterized by a disparity between healthcare demand and supply, which hampers complex therapies like kidney transplantation. Considering the scarcity of publications on previous disasters, we reviewed transplantation practice during the recent coronavirus disease 2019 (COVID-19) pandemic, and dwelled upon this experience to guide transplantation strategies in the future pandemic and non-pandemic catastrophes. We strongly suggest continuing transplantation programs during mass disasters, if medical and logistic operational circumstances are appropriate. Postponing transplantations from living donors and referral of urgent cases to safe regions or hospitals are justified. Specific preventative measures in anticipated disasters (such as vaccination programs during pandemics or evacuation in case of hurricanes or wars) may be useful to minimize risks. Immunosuppressive therapies should consider stratifying risk status and avoiding heavy immune suppression in patients with a low probability of therapeutic success. Discharging patients at the earliest convenience is justified during pandemics, whereas delaying discharge is reasonable in other disasters, if infrastructural damage results in unhygienic living environments for the patients. In the outpatient setting, telemedicine is a useful approach to reduce the patient load to hospitals, to minimize the risk of nosocomial transmission in pandemics and the need for transport in destructive disasters. If it comes down to saving as many lives as possible, some ethical principles may vary in function of disaster circumstances, but elementary ethical rules are non-negotiable. Patient education is essential to minimize disaster-related complications and to allow for an efficient use of healthcare resources.

Keywords: COVID-19 pandemic, disasters, earthquakes, kidney transplantation, vaccination

INTRODUCTION

Both natural disasters (e.g. earthquakes, hurricanes, epidemics/pandemics) and man-made disasters (e.g. wars, nuclear accidents, terrorist attacks) cause widespread human,

Table 1: Reasons for discontinuation of transplantation programs during pandemics and other disasters [9–12, 53].

Status	Reasons
Decreased transplantation activity	• Chaos, panic, heavy workload, burnout, administrative disorganization[a] • Logistic drawbacks (shortage of hospital beds, medical supplies, personnel and personal protective equipment)[a] • Medical uncertainties (controversies on immunosuppressive approach, risk of interruption in delivery of immunosupressive drugs)[a]
Decreased number of deceased donors	• Limited availability of ICU beds, and reluctance to maintain hemodynamic stability in potential donors blocking ICU positions that could be needed for disaster victims[a] • Restrictions in air transport interfering with organ transport and potentially with cold ischemic times[a] • Decline in deceased donors due to trauma[b]
Decreased number of living donors	• Concerns of living donors about risk to contract nosocomial infection[b]

[a] Applies to all (pandemic or non-pandemic) mass disasters.
[b] Applies specifically to pandemics.

material, economic and environmental losses. If massive, the number of victims may overload the local healthcare systems. Some victims, e.g. children, pregnant women, the frail and individuals with chronic conditions, are more vulnerable [1]. Among these, transplant recipients deserve special consideration because of their immunosuppressed status and requirements for uninterrupted medication intake, close laboratory monitoring and access to expert healthcare.

Until the emergence of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) pandemic, there was limited information about outcomes of kidney transplantation during mass disasters, possibly due to the short duration of suboptimal circumstances in restricted geographic areas for most natural disasters (e.g. earthquakes, tsunamis, hurricanes). Alternatively, the complete infrastructure disruption with protracted disasters (e.g. wars), makes complex therapies (like transplantation) very problematic [2]. The recent invasion of Ukraine and the long-lasting war raised even more concerns on how to manage transplantation practice in austere dire circumstances. Therefore, the numerous publications on lessons learned during the coronavirus disease 2019 (COVID-19) pandemic may be useful for guiding the delivery of transplantation care in future catastrophes.

Herein, we summarize the transplantation experience during the COVID-19 pandemic and, if available, previous mass disasters, and provide suggestions for strategic approaches to transplantation in future pandemic and non-pandemic catastrophes.

KIDNEY TRANSPLANTATION PRACTICE DURING THE COVID-19 PANDEMIC

Patient and graft survival

Many reports describe very high mortality in kidney transplant recipients (KTR) acquiring COVID-19, especially during the first wave. The ERA COVID-19 Database (ERACODA), which included 1670 dialysis and transplant patients, revealed that 16.9% of the 496 included KTRs died within 28 days of presentation with COVID-19; in a fully adjusted model, mortality risk after infection was 78% higher when compared with hemodialysis patients [3]. Adverse outcomes may be due to immunosuppression, comorbidities (e.g. hypertension, diabetes mellitus, chronic kidney disease, cardiovascular disease), frailty and suboptimal healthcare [3–6].

Considering graft-related outcomes, a retrospective UK analysis showed that primary non-function, delayed graft function, acute rejection, re-operation, length of hospital stay and graft survival were similar in transplantations performed before and during the COVID-19 pandemic [7], whereas in another report increased risk of rejection was reported as well [8].

To transplant or not to transplant

During the first wave of the pandemic, live-donor kidney transplantation activity decreased, or was temporarily stopped due to several reasons (Table 1) [9–12]. An international survey showed that in 67% of North American centers and 91% of European centers, living donor kidney surgery was put on hold, and that 46% of North American to 86% of European centers stopped new living donor evaluations, with an additional 23% of centers reporting an important decrease in evaluations [13].

Deceased donor programs differ from living donor programs, because even the shortest suspension of transplantation activity translates into a loss of suitable organs [14]. Nevertheless, a significant decrease in deceased donor kidney transplantation activities was also noted [9], albeit with substantial differences among various centers and also countries [6, 14].

The consecutive waves had a significant, but smaller impact as well [15, 16]. Chaos, panic, and medical and logistic drawbacks during the first wave [9] were less prominent subsequently [15], possibly due to gained experience.

To resume transplantation activity, a phased approach accounting for local healthcare conditions has been suggested, beginning with the most urgent transplantations, and subsequently transplanting selected cases where safe living donation without risk of active COVID-19 is assured, before restarting overall activity [11].

Strategy for waitlisted patients

The data on the impact of COVID-19 on the outcomes of waitlisted patients versus those already transplanted is controversial. In a retrospective cohort study in the UK, mortality rates after testing positive for SARS-CoV-2 were

Table 2: Screening methods during the COVID-19 pandemic for each specific type of involved person. Methodology of imaging and laboratory assessments varied significantly among transplantation programs [6, 11, 20].

Who / How		History, physical examination, chest X-ray[a]	SARS-CoV-2 PCR[b]		SARS-CoV-2 Antibody screening[e]	Thorax CT scan[f]
			NP, P, throat Swab[c]	BAL[d]		
Donor	Deceased	+	+	+	+	+
	Live	+	+	-	+	+
Patient		+	+	-	+	?
Health care personnel		+	+	-	+	-

[a]Should be applied to all involved persons to define the risk status and clinical signs.
[b]Mostly sufficient for patients without respiratory symptoms.
[c]Simple, most common and reliable screening test in most cases.
[d]The most reliable (90% positive) specimen for testing.
[e]Has been questioned due to technical drawbacks. In addition, the time to seroconversion (ranging from 3 to 7 days for IgM, and from 11 to 14 days for IgG) does not allow a recently acquired infection to be properly ruled out.
[f]Appropriate for those with respiratory symptoms, even if minor. Majority, but not all protocols suggest this also in asymptomatic donors.
CT: computed tomography; NP: nasopharyngeal; P: pharyngeal, BAL: bronchoalveolar lavage; IgM/IgG: immunoglobulin M/G.

10.2% for waitlisted patients versus 25.8% for transplanted patients [17]. However, in another analysis, COVID-19-related mortality was higher in waitlisted patients than transplant recipients (34% versus 16%) [18]. Multivariate analysis found that waitlist status, age and male sex were independently associated with mortality. In the ERACODA database, which included 1073 patients (305 kidney transplants and 768 dialysis patients), the 28-day probability of death was 21.3% in kidney transplants and 25.0% in dialysis patients, although adjustment for sex, age and frailty abolished this mortality difference [5]. Simulator models, quantifying the benefit/harm of immediate versus delayed kidney transplantation for different patient phenotypes under various pandemic scenarios, suggest an advantage of kidney transplantation if local resources allow it [19]. Importantly, urgent indications for transplantation may override possible concerns, allowing patients to be transplanted even in case of risks.

Technical aspects

Pretransplantation evaluation

The principles for donor and patient preparation remain valid during disasters. However, due to immunosuppression in transplant recipients, evaluation for infections requires even greater attention than routine practice during pandemics. Regarding COVID-19, performance of several screening tests for detecting previous/current COVID-19 [e.g. chest X-ray, thoracic computed tomography-scan, SARS-CoV-2 reverse-transcriptase polymerase chain reaction (RT-PCR) and SARS-CoV-2 antibody screening] were not always useful, mostly due to inappropriate implementation (Table 2) [11, 20, 21]. Algorithms based on the COVID-19 status of the donor and the recipient have been created to direct transplant decisions [6, 22]; however, directives in these guidelines may necessitate adaptations depending on specific circumstances. Therefore, the reader is referred to national or local guidelines/links or institutional publications for detailed discussion on all possible options [6, 22, 23]. A similar, disaster-specific approach may be justified in future pandemics or other disasters as well, considering the particular circumstances of each event.

Importantly, all approaches are still open for adaptations depending on new insights. As an example, in some preliminary reports, the course of kidney transplantations performed from donors with active COVID-19 was smooth, and graft function satisfactory [24], albeit there were few patients with a short follow-up. Nevertheless donor-derived transmission has also been reported [25] and transplantations from donors with active COVID-19 in general remains contraindicated for the time being [11, 20, 22, 23], although this view may be adapted as novel, more solid evidence is provided.

Immunosuppression

The interaction between immunosuppression and COVID-19 is complex, starting with an attenuated initial direct SARS-CoV-2-mediated injury, followed by a hyperintense immune response resulting in serious tissue damage. Therefore, immunosuppression may be beneficial or harmful [4, 12, 26]. Lymphopenia resulting from immunosuppressants may promote severe illness, but routinely decreasing or withholding immunosuppression on the other hand may trigger rejection. Although the optimal strategy is unclear, reducing immunosuppression has been considered during moderate to severe COVID-19 [27]. Clinical picture, comorbidities, previous immunosuppressive regimen, posttransplantation timing, immunological risk and graft function should be considered when adjusting immunosuppressive medication. A useful approach, which may also provide a basis for management in future pandemics, has been published by the DESCARTES Working Group of ERA (Table 3) [27].

The timing of resuming previous immunosuppression is also controversial; being symptom-free for 5–15 days, resolution of radiologic pulmonary lesions or having a negative PCR test have all been suggested [6, 28]. Reinitiating antiproliferatives in low doses with a gradual increase is

Table 3: Suggestions by the DESCARTES Workgroup of ERA on immunosuppression in swab (+) COVID-19 patients >3–6 months[a] after transplantation [27] (may need to be adapted in different variants).

Clinical Feature	Risk status	Admission to hospital	Previous immunosuppression	Suggested change in immunosuppression
Asymptomatic, swab (+) COVID-19	High[b]	No	Triple therapy	- Reduce/stop AZA/MPA/mTORi
Mild disease[c]	Low[c]	No	Triple therapy	- Dual therapy (with steroids)
			Dual therapy (with steroids)	- Continue dual therapy
			Dual therapy (steroid-free)	- Dual therapy with CNI + steroids
Mild COVID-19[d] pneumonia	High	Yes	Dual or triple therapy	- Stop MPA/AZA/mTORi or CNI - Increase (or start) steroids 15–25 mg/day
	Low	Individualize	Triple therapy	- Stop MPA/AZA/mTORi - Maintain dual therapy with low dose CNI + steroids in maintenance dose
Severe COVID-19 pneumonia[e]	High[e]	Yes	Dual or triple therapy	- Increase/start steroids at 15–25 mg/day - Discontinue all other immunosuppressive drugs

[a]The time window is flexible to make it adaptable depending on the local situation and condition of the individual.
[b]Risk status high, e.g. in case of age ≥70 years, comorbidities or risk factors (diabetes, cardiac/pulmonary disease, eGFR <30 mL/min/1.73 m^2), lymphocyte depletion therapy within previous 3–6 months. In low-risk patients, therapy should not be adapted.
[c]Alert patient with mild symptoms, O_2 saturation in room air >95%; no evidence of pneumonia on imaging. Mild disease is always low risk.
[d]SAT O_2: 94–95% in room air; respiratory rate 25–29/min; or suspect lesions on chest X-ray or computed tomography scan.
[e]SAT O_2 <94% in room air, unstable or deteriorating course or requiring non-invasive ventilation or transfer to ICU. Severe COVID-19 pneumonia is always high risk.
AZA: azathioprine; MPA: mycophenolic acid; CNI: calcineurin inhibitors.

justified, but risk status of the patient, course of the disease and type and extent of complications should be considered. Graft function should be taken into account, because acute or chronic kidney dysfunction is associated with high mortality in COVID-19; too much immunosuppression can only worsen this unfavorable prognosis [29].

Importantly, suggested protocols for immunosuppressive strategies may show dynamic variation with regards to pathogenicity of the new variants, developments in the management and vaccination status of the patients.

Vaccination

Concerns still exist about the safety, immunogenicity and efficacy of SARS-CoV-2 vaccines in KTR.

Safety

In transplant recipients, rates of local and systemic reactions have been low with COVID-19 vaccines [30]. With a few exceptions [31], rejection episodes triggered by vaccination have been rare [32], although reduction of immunosuppression was a frequent strategy [30]. A major concern is the refusal of vaccination due to misinformation or incorrect beliefs. Patients should be informed about the consequences of their choice. Rejecting transplantation candidacy of the patients who refuse vaccination must be considered to avoid any risk of graft loss, other complications or even mortality.

Immunogenicity

Humoral or cellular response is not always representative of the preventive effect of vaccination; nevertheless, many studies still use antibody titers as a marker of efficacy after SARS-CoV-2 vaccination. Uniformly, serologic response is weaker in KTRs than in immunocompetent persons; the seropositivity rate is in the range of 80%–90% for the general population [33], whereas only 30%–54% of transplant recipients are seropositive after two vaccination doses [34]. Older age, more recent transplantation, graft dysfunction, diabetes, and treatment with antithymocytic globulins, mycophenolate, belatacept, calcineurin inhibitors or mTOR inhibitors are associated with worse serologic response [30, 35]. However, the immunosuppressive regime should not be changed to increase the antibody response in KTRs [32, 36].

Efficacy

Pretransplantation vaccination or delaying vaccination for 1–3 months after transplantation, intradermal injection, higher and/or repeated booster doses, a switch of vaccine type or use of adjuvants may improve efficacy in transplant recipients [36]. However, after a third dose, up to 51% of KTR who did not respond after two doses still remained without detectable antibody titers after 4 weeks [37]. Therefore, not surprisingly, many COVID-19 cases have been reported in fully vaccinated transplant recipients. Recently, it has been reported that a fourth dose of an mRNA-based vaccine may produce a satisfactory antibody response in KTR who did not respond adequately after three previous doses [38], although there is a risk that titers may diminish over time [39].

Unfortunately, the efficacy of current vaccines against emerging SARS-CoV-2 variants need to be evaluated continuously [39], and new vaccines have to be developed in case of inefficacy.

Other issues

Respecting non-vaccine preventive measures, e.g. face masks, hand hygiene and physical distancing, remains a must, even after vaccination [40]. The need to determine antibody levels for making decisions about additional booster doses above the standard practice is still controversial at the moment [32, 36]. Finally, patients who have recovered from COVID-19 still should be vaccinated.

Early posttransplantation follow-up

Transplant recipients require close early posttransplantation follow-up. Everyday principles for non-immunologic complications remain valid during disasters, while rejection treatment should be individualized by outweighing potential benefits versus (mainly infectious) risks. Treatment of severe rejections with a low probability for recovery should be avoided.

Since both the patients and the living donors may be infected, early discharge should be considered to minimize the risk of nosocomial transmission.

Outpatient follow-up

During the COVID-19 pandemic, the timing after transplantation defined control intervals:

First 3 months after transplantation

Routine in-person visits were justified, albeit less frequently than usual, to minimize risk of nosocomial transmission and avoid healthcare overload [9, 28].

More than 3 months after transplantation

Routine screening of asymptomatic patients is not recommended and increasing control intervals is justified to reduce hospital visits [9, 10]. Ambulatory appointments should as much as possible be replaced by telephone contacts or virtual visits (telemedicine) [22]. However, medical care in emergencies and diagnosing/treating complications may be challenging due to suboptimal monitoring, delays in hospital admission or atypical clinical presentation due to immunosuppression. Mild complications have been treated at home during the COVID-19 pandemic, although for critical indications hospitalization remained inevitable, e.g. invasive diagnostic procedures, including allograft biopsies [28].

Telemedicine

Telemedicine after kidney transplantation may decrease avoidable hospital visits, hospitalizations and healthcare costs, and improve quality of life [41]. During the COVID-19 pandemic, information provided by the patients on blood pressure, weight, urine volume and medication determined the efficiency of telemedicine visits [28]. Laboratory tests can be performed in a nearby facility or by a general practitioner, if needed. Although rare, major obstacles for telemedicine include illiteracy, lack of computer technology/familiarity and impossibility of connecting with the internet.

Ethical issues

During mass disasters, disparities between healthcare demand and supply, controversies about how to use limited resources [intensive care unit (ICU), dialysis, hospital beds, personnel], health risks for healthcare personnel and their relatives, and lack of information about medical/logistic determinants of outcomes cause ethical dilemmas [42, 43]. The COVID-19 pandemic left many ethical questions concerning transplantation unanswered, such as [12, 44]:

- Performing kidney transplantation despite high risk of morbidity and mortality
- Occupation of the ICU beds (that are needed for COVID-19 patients) by potential deceased donors
- Accepting SARS-CoV-2-positive donors or donors without known SARS-CoV-2 status
- Applying the same allocation rules as before the pandemic

Importantly, the classic ethical principles of non-maleficence, beneficence, distributive justice and respect for autonomy still remain as the basic principles to direct transplantation practices during mass disasters. These principles may provide guidance for continuation or suspension of (especially live donor) transplantation activity, selection of deceased-donor transplantation candidates, reducing the risk of nosocomial COVID-19 transmission between patients and healthcare personnel, and most effective usage of limited resources [12, 44].

Despite this guidance, however, during the recent pandemic, pre-existing multifaceted ethical considerations became even more complex and varied greatly among countries as a function of disease burden as well as local culture, beliefs and social attitudes, and the timeline of the pandemic [12, 44].

Clinical research

Until COVID-19, disaster-oriented clinical studies were scarce; therefore, management of disaster victims in general, and strategies for transplantation programs in particular, were ill defined [11]. During the pandemic, many reports were published, although the quality of some was questioned [45]. Despite several methodological drawbacks, the COVID-19 pandemic underlined that cost-effective and high-quality disaster-related transplantation research is still possible, and is essential for guidance in future disasters.

Continuing to ongoing clinical trials during disasters is desirable to avoid loss of resources, time and efforts; however, changes in protocols should be made to prevent study patients from contracting the disease or other risks of the disaster [11].

Patient education

To minimize medical and logistic problems, patient training before and during disasters is vital. Patient/family education via telecommunication, supported by electronic education material, helped to decrease transmission and risks of contracting COVID-19 [10, 28]. Stocking of critical medications for at least 2 weeks of therapy, and building an even larger stock in long-lasting disasters such as pandemics, allows treatment interruptions to be forestalled [28]. As has been underlined by a transplant recipient, “Simply telling patients to wear masks and socially distance will not be enough; patients should receive information that is specific to their particular circumstances and treatment regimes” [46].

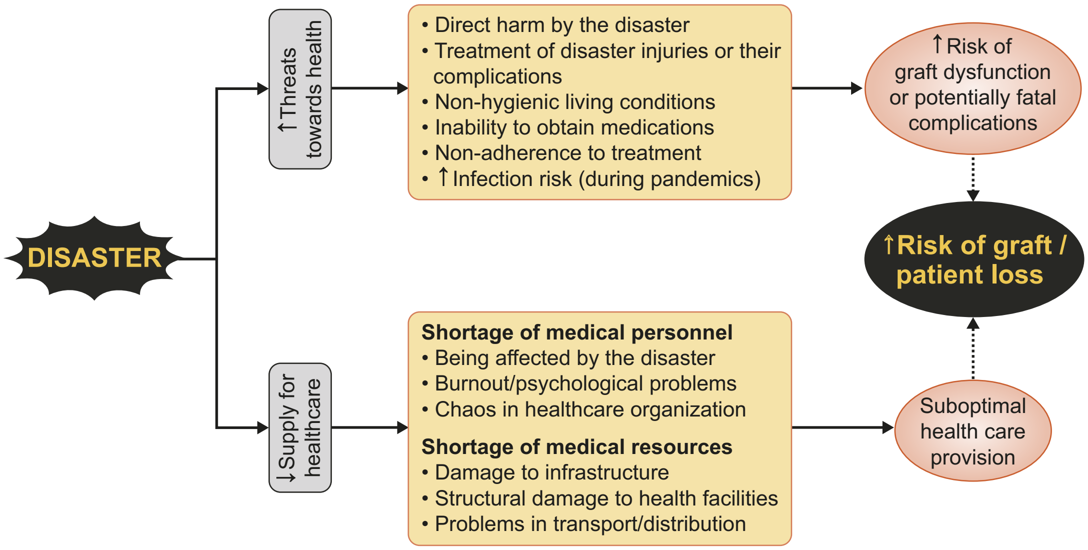

Figure 1: Reasons for increased risk of graft or patient loss in transplant recipients after mass disasters. Some risks are associated with specific disasters: e.g. structural damage is mostly seen after wars, earthquakes and tsunamis; non-hygenic living conditions are more frequent when it is necessary to live in shelters or tents, which is mostly the case after destructive disasters; increased risk of infection is most frequent during pandemics. Some risks are universal: e.g. being a disaster victim, inability to acquire medication, shortage of medical personnel and facilities. Also, the final consequences are universal: increased risk of patient and graft loss [4, 6, 47]. PPE: personal protective equipment.

OTHER MASS DISASTERS: PAST EXPERIENCE, FUTURE IMPLICATIONS

Overall transplantation activity

Significant information about transplantation performance appeared only after the Syrian civil war [47]. During the disaster period, the number of transplantations decreased significantly; the main reasons were a decrease in operational transplantation centers, physicians and surgeons, and the unavailability of immunosuppressive drugs [47]. Several other factors, characteristic for developing countries irrespective of disasters (e.g. lack of access to transplantation centers, quality and safety issues), only worsened the situation. Even if transplantation activity was continued, medical and logistic problems caused difficulties in monitoring. For example, obtaining laboratory results took 4–7 days, and allograft biopsies were made impossible by lack of expertise, equipment and facilities; thus, many complications were treated empirically [2]. Despite all these problems, it was suggested that kidney transplantation be continued during long-lasting mass disasters (e.g. wars), because it is less expensive and easier to manage than dialysis [2].

Pretransplantation evaluation

Since most kidney transplants in developing countries are from living donors, loss of the allograft affects both donor and recipient. Therefore, the decision to transplant should consider very carefully not only medical, but also logistic conditions. After mass disasters, KTR have a high risk of infections, due to water and air pollution, malnutrition and life in unhygienic shelters combined with immunosuppression (Fig. 1) [4, 6, 47]. Furthermore, healthcare infrastructure may be suboptimal for a complex procedure like transplantation. Therefore, strategies outlining transplantation programs in disaster periods should be flexible [2].

Pretransplant technical evaluation should consider not only standard medical principles, but also disaster-specific logistic circumstances. Consideration of methodology and various reasons when determining specific tools for screening as suggested during the COVID pandemic (e.g. Table 2), may be adapted to each particular disaster.

Posttransplantation management

Immunosuppressive protocol

Interruptions in availability of immunosuppressants jeopardized allograft function after the Great Eastern Japan Earthquake and tsunami in 2011 [48, 49]. Support by humanitarian organizations for delivery of immunosuppressants may help affected areas to cope with this problem [2]. Considering the high risk of infectious complications, avoiding heavy immunosuppression is defendable, especially in transplant recipients residing in risky environments.

Discharge and posttransplantation follow-up

Early discharge convenience to decrease the risk of nosocomial infection as applied during pandemics is not applicable to other disasters, where delayed discharge is preferred if patients are at risk of being subjected to unhygienic situations.

For outpatient follow-up, telemedicine may be very useful in other disasters as well [50]. If not hindered technically by damaged infrastructure, telemedicine is essential both for the management of transplant recipients, and to reduce injury and other risks for inexperienced medical personnel.

Ethical issues

Standard ethical principles for routine medical practice may not always be applicable to mass disasters, because extreme conditions may overrule the traditional moral values

[42]. Therefore, usual standards may need adaptations to optimize disaster response, survival probability of the affected population and health outcomes for the largest number of patients [28]. Considering that only functioning healthcare personnel can help patients, priority should be given to rescue and preserving functioning of healthcare personnel. Otherwise, all services to victims or patients should respect the principles of utility and equality. If resources are inadequate despite all efforts, allocation should preferably be based on preset objective triage criteria, although sometimes a first-come-first-serve principle may be applied. Some authors even suggest drawing lots [43].

Because of disparity between healthcare demand and supply, reducing standarts of healthcare has been considered during mass disasters to allow the provision of health service for more disaster victims. This practice carries the risk of downgrading standards infinitely and may increase the risk of malpractice, and be considered unethical [51]. However, no pragmatic solution exists for this concern, apart from referral of the patients or asking for help from other regions/countries.

Disaster-related research

Because of lack of experimental models, disaster research is critical to ensure preparedness for future disasters and prevent malpractice, which is frequent under chaotic conditions. Some rules can minimize scientific or ethical errors, e.g. (i) merely approving the studies that can only be conducted under disaster conditions, (ii) assuring that they are culturally acceptable for the affected population, (iii) not exploiting vulnerability of the already distressed victims, (iv) having a straightforward aim and methodology, and (v) having an adaptable design [42]. Importantly, although minor deviations from the usual principles may be tolerated, major ethical principles should be respected in the ethical review procedure.

Patient education

It is unlikely that many transplanted patients receive disaster education. A Californian survey showed that only 30% of transplant recipients stored drugs in case of disasters occurring [52]. In a retrospective analysis after the Great East Japan Earthquake and tsunami in Japan, 62% of transplant recipients had stockpiled oral medications before the earthquake, and only 44% always had their medication at hand [48], underlining lack of adequate training even in well-developed, disaster-prone countries.

SUGGESTIONS BY THE DESCARTES WORKING GROUP AND ETHICS COMMITTEE OF ERA

Considering the high risk of life-threatening complications during mass disasters, suspending kidney transplantation activity may be considered; however, denying a life-saving therapy may be considered as an overreaction. We therefore strongly suggest continuing kidney transplantation after mass disasters, carefully respecting the following principles.

(i) When making a decision to perform a transplantation, local operational resources (sufficient hospital and ICU beds, laboratory facilities, basic supplies, medical personnel and personal protective equipment) should be available.

(ii) In disasters with an overwhelming number of victims, postponing living donor transplantation until disaster circumstances improve may be considered. The strategy for deceased donor transplantation, for which delay means loss of organs and lives, should be individualized by considering that safety of patients and health personnel as the first priority. In urgent cases, or with unacceptably high risk, referral to safer regions/hospitals might be considered.

(iii) Before deciding in favor of transplantation, living donors, recipients and their families should be informed about the risks and benefits of transplantation in light of the disaster situation, and written informed consent must be obtained.

(iv) Detailed disaster-specific clinical and technical approaches should be used to minimize risks for living donors and for recipients. Transplantation personnel should take all possible measures to preserve self-safety, and, during pandemics, also to prevent transmission of the infection to immunosuppressed patients. If available and applicable, vaccination is compulsory for all involved (patients, their families and professionals) during pandemics. However, mass-vaccination programs are almost never needed after non-pandemic disasters.

(v) Although evaluation, surgery and posttransplantation management of recipients and donors are the same as usual, organ procurement, shipment and handling at reception may show significant variations. Decisions should be made on a per-case basis, depending on the circumstances.

(vi) Adaptations to immunosuppressive therapy should consider the severity of the infection, and also risk status, comorbidities and previous immunosuppression of the patient (Table 3). Heavy immunosuppression should be avoided in patients at high risk of infection. If such conditions are inevitable, referral to safer locations should be considered.

(vii) Discharging patients at the earliest convenience is justified to provide capacity for disaster victims, and to decrease risk of nosocomial transmission during pandemics. On the contrary, delaying discharge is justified if patients are at risk of being exposed to unhygienic living conditions.

(viii) Face-to-face consultations are justified but should be planned less frequently than usual. Telemedicine should be used to avoid overloading the healthcare system and, in case of pandemics, to minimize nosocomial transmission.

(ix) Weight of the ethical principles may vary according to the disaster conditions and should be aimed at saving as many lives as possible, but general robust and non-negotiable ethical rules (non-maleficence, beneficence, distributive justice and respect for autonomy) should always be respected.

(x) Patient education is essential in disaster-prone regions, not only for their health, but also to minimize risks for care providers and to promote efficient use of healthcare resources.

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DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article as no datasets were generated or analysed during the current study.

CONFLICT OF INTEREST STATEMENT

None declared. The results presented in this paper have not been published previously in whole or part, except in abstract format.

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