Donation after Circulatory Death: An Opportunity for Kidney Transplantation in Portugal

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Portugal has one of the world's highest incidences and prevalences of dialysis, steadily above 200 per million population (p.m.p.).[1] Transplantation is the best and most cost-effective therapeutic option for eligible patients with end-stage kidney disease. Even considering that Portugal occupies a prominent place in kidney transplantation at the international level, with 53.6 kidney transplants p.m.p. in 2023, the time spent on the active waiting list for transplantation in Portugal remains very long.[2]

In 2013, the Portuguese law expanded the possibility, beyond brain death, to the organ recovery from uncontrolled donation after circulatory death (uDCD) donors (Maastricht classification II).[3] Importantly, at the University Hospital of São João (Porto, Portugal), a university teaching hospital serving a urban area of ~1.5 milion inhabitants, an integrated management protocol for refractory cardiac arrest (CA) was implemented, consisting in a formal pathway of uDCD using extracorporeal membrane oxygenation (ECMO) for in situ preservation of the abdominal organs, whenever ECMO assisted cardiopulmonary resuscitation (ECPR) is not a viable.[4] The pilot phase occurred between October 2016 and May 2018, with 65-year-old or younger patients without significant bleeding or comorbidities, with witnessed nonasystolic (CA) triaged to ECPR if they had a reversible cause and high-quality CPR lasting < 60 min. Otherwise, they were considered for uDCD after a ten-minute no-touch period using normothermic regional perfusion. During this period, 58 patients were included, of which 41 (71%) were out-of-hospital cardiac arrests (OHCA) and 18 (31%) had ECPR initiated. Median age was 52 (IQR 45–56) years. Cannulation was successful in 49/58 (84%) cases. Compared to ECPR, patients referred for uDCD were more frequently OHCA (90 *vs* 28%), had bystander CPR (28 *vs* 83%), and prolonged low-flow period (40 (35–50) *vs* 60 (49–78) min). Survival to hospital discharge with full neurological recovery (cerebral performance category 1) occurred in 6/18 (33%) ECPR patients. uDCDD resulted in transplantation of 44 kidneys. These results demonstrated the feasibility of an integrated program for rCA, consisting of a formal pathway to uDCD referral in ECPR-ineligible patients, with ECPR-referred patients showing a reasonable survival with full neurologic recovery, and successful kidney transplantation being achieved with uDCD.

After the first results from the University Hospital of São João, the University Hospital of São José, and the University Hospital of Santa Maria,[5] in Lisbon, as well as the Coimbra University Hospital (Portugal), also developed integrated refractory CA programs for both E-CPR and uDCD with encouraging results. Since 2019, the Hospital Vall d'Hebron (Barcelona, Spain) has also successfully developed a multidisciplinary ECPR program for refractory OHCA and in-hospital CA (IHCA), and more recently, an integrated program for E-CPR and uDCD, in line with the one adopted by the University Hospital of São João.[6] In Portugal, the uDCD is increasingly contributing to kidney transplantation, with 92 kidneys harvested from uDCD for a total of 538 kidney transplants performed in 2024. Importantly, the long-term results of kidney transplantation from uDCD using this methodology were recently published.[7] Despite the increased risk of primary non-function and delayed graft function, functional and survival outcomes of uDCD kidney transplants at 7 years were comparable to those of standard-criteria brain-death donors. These results support the use of uDCD kidneys maintained under ECMO for in situ preservation of the abdominal organs as a successful resource to address organ scarcity.

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More recently, the Portuguese Medical Association (Ordem dos Médicos), through its Commission for the Regulation of Controlled DCD (cDCD; Maastricht classification III), has prepared a technical opinion aiming to update the criteria for diagnosing death by circulatory criteria. This document was prepared based on the best scientific evidence, the consensus of the members of the Commission, as well as in the broad debate in the Maastricht III Information Day, held on May 19th, 2025, at the Portuguese Medical Association. The document was framed within a broader technical and ethical context in line with the best practices already implemented in several European and North American countries, such as Spain, the United Kingdom, France, Belgium, Canada, and the United States. This contribution from the Portuguese Medical Association was delivered in September 2025 to the Ministry of Health, aiming for a legal initiative to expand organ donation to cDCD in Portugal, and therefore have more viable organs for transplantation.

Ethical Disclosures

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