Uncontrolled Donation
After Circulatory Death

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Organización Nacional de Trasplantes (ONT), Spain
COORDINATION

KEY FOR SUCCESS

Emergency Medical Services

Emergency Department

Donor Transplant Coordination

PERFECT COORDINATION

PIONEER PROGRAMMES IN UNCONTROLLED DCD EMERGED IN BARCELONA, CORUÑA & MADRID DURING THE 80s
<table>
<thead>
<tr>
<th></th>
<th>UNCONTROLLED</th>
<th>CONTROLLED</th>
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</thead>
<tbody>
<tr>
<td>I</td>
<td>Dead on arrival</td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>Unsuccessful resuscitation</td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>Awaiting cardiac arrest</td>
<td></td>
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<tr>
<td>IV</td>
<td>Cardiac arrest while brain death</td>
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1st International Workshop on Non Heart Beating Donation (Maastricht 1995)

Modified Maastricht Classification on DCD donors
(Paris 2013)

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<tbody>
<tr>
<td><strong>I</strong></td>
<td><strong>Found dead</strong></td>
<td></td>
</tr>
<tr>
<td>Uncontrolled</td>
<td>IA. Out-of-hospital</td>
<td>IB. In-hospital</td>
</tr>
<tr>
<td></td>
<td><strong>II</strong></td>
<td><strong>Witnessed cardiac arrest</strong></td>
</tr>
<tr>
<td>Uncontrolled</td>
<td>IIA. Out-of-hospital</td>
<td>IIB. In-hospital</td>
</tr>
<tr>
<td></td>
<td><strong>III</strong></td>
<td><strong>Withdrawal of lifesustaining therapy</strong></td>
</tr>
<tr>
<td>Controlled</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>IV</strong></td>
<td><strong>Cardiac arrest while brain death</strong></td>
</tr>
<tr>
<td>Uncontrolled</td>
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</table>
‘uDCD could increase the potential donor pool by 22,000 a year in the US’

The IOM committee also supported initiatives to increase donations from people whose deaths are the result of irreversible cardiac failure, (…)

Derivation of the Uncontrolled Donation after Circulatory Determination of Death Protocol for New York City


The data were collected and posted in a collaborative Internet environment. Data were analyzed using an iterative coding scheme to discern themes, theoretical constructs and a summary narrative to guide protocol development. A clinically appropriate, ethically sound UDCDD protocol for out-of-hospital settings has been derived. This program is likely to be accepted by NYC residents since the protocol was derived through partnerships with government officials, subject experts and community participants.
Series of transplants from uDCD donors since 2000*

* Duplicated series not included.
Uncontrolled DCD (type IIa predominant) in Europe. 2015

Source: Organización Nacional de Trasplantes
Uncontrolled DCD in Spain

1,339 uDCD donors
1,586 kidney tx
150 liver tx
78 lung tx

Source: Organización Nacional de Trasplantes
Actual Deceased Organ Donors in Spain. 1989-2015

uDCD contributes to 6-8% of global deceased donation activities

Source: Organización Nacional de Trasplantes
Uncontrolled DCD procedure in Spain

Courtesy of Dr. Francisco del Río. Hospital Clínico San Carlos, Madrid, Spain
The uncontrolled DCD process in Spain

Retrospective assessment
Spain 2009-2013

- Medical contraindications: 31%
- Consent declined: 21%
- Problems during In situ preservation: 19%
- Time: 13%
- Declined judicial-coroner authorization: 9%
- Other: 7%

PATIENTS TRANSFERRED AS POTENTIAL uDCD DONORS: 919

POTENTIAL uDCD: 895

365 LOSSES

530 ACTUAL uDCD (60%)

376 UTILIZED DONORS (70%)
770 ORGANS TRANSPLANTED

Mateos A, et al.
7th International DCD Meeting, October 2016
Kidney transplants from DCD donors
Spanish experience

624 KIDNEY TX IN 2012-2015
379 type II / 245 type III

1 YEAR SURVIVAL
✓ PATIENT 98%
✓ GRAFT 89%

Source: Organización Nacional de Trasplantes
Liver transplants from DCD donors
Spanish experience

1 YEAR SURVIVAL
✓ PATIENT 84%
✓ GRAFT 79%

TX 2012-2015
N=118
42 uDCD and 76 cDCD

Is Normothermic regional perfusion the way to go?

GRAFT SURVIVAL IN CONTROLLED DCD
BY PRESERVATION STRATEGY

RISK OF GRAFT LOSS WITH RR VS
NRP: 2.55 [1.131-3.740]; P=0.024

p=0.029

GRAFT SURVIVAL
ADULT LUNG TRANSPLANTATION IN SPAIN
Kaplan-Meier Survival by type of donor
(Transplants: January 2001– December 2015)

<table>
<thead>
<tr>
<th>TYPE OF DONOR</th>
<th>3 months</th>
<th>1 year</th>
<th>5 years</th>
<th>10 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>DBD donor (N=2,841)</td>
<td>82.2 (N=2,224)</td>
<td>74.0 (N=1,856)</td>
<td>51.2 (N=711)</td>
<td>35.5 (N=181)</td>
</tr>
<tr>
<td>DCD donor (N=91)</td>
<td>85.5 (N=74)</td>
<td>78.4 (N=58)</td>
<td>62.4 (N=21)</td>
<td>33.9 (N=3)</td>
</tr>
</tbody>
</table>

p = 0.330
WHY HAS THE UNCONTROLLED DCD PROCEDURE BEEN DEVISED THIS WAY IN SPAIN?
Treatment of OHCA in Spain

- Treatment of CA is based on national guidance issued by CERCP, periodically reviewed on the basis of international recommendations (ERC, AHA, ILCOR).
- Physician-lead EMS are in charge of aCPR at the scene of the CA and aim at ROSC. Patients are then transferred to the hospital for post-aCPR care.
- aCPR is performed identically regardless of whether the EMS participates in an uDCD programme or not.
- The decision to stop aCPR is only made by doctors having exhausted the measures recommended in the AHA and ERC guidelines.

Withholding or withdrawing CPR
Healthcare professionals should consider withholding or withdrawing CPR in children and adults when:

• the safety of the provider can no longer be sufficiently assured;
• there is obvious mortal injury or irreversible death [ROLE];
• a valid and relevant advance directive becomes available;
• there is other strong evidence that further CPR would be against patient’s values and preferences or is considered ‘futile’;
• asystole for more than 20 min despite ongoing ALS, in the absence of a reversible cause.

After stopping CPR, the possibility of ongoing support of the circulation and transport to a dedicated centre in perspective of organ donation should be considered.
**ROSC rate in patients with CPR attempted**

![Graph showing ROSC rate with 95% CI](image)

**Hospital survival rate in the Utstein Comparator Group**

![Graph showing percentage survival with 95% CI](image)

Abbreviations: ROSC = Return of spontaneous circulation. Abbreviations for Countries names are explained in Table 1.

**Fig. 2.** ROSC rate in patients with CPR attempted. The vertical lines represent the 95% confidence intervals (CI). The graph includes 6963 patients from 27 countries (range per country 4 – 1475). The overall result is 28.6%. **Abbreviations:** ROSC = return of spontaneous circulation. Abbreviations for Countries names are explained in Table 1.

**Fig. 5.** Hospital survival rate in the Utstein Comparator Group (cardiac cause, shockable rhythm, and collapse bystander witnessed). Hospital survival data was available for 733 patients (seven countries with less than 10 cases were excluded: Austria, Cyprus, Iceland, Luxembourg, Portugal, Slovenia, Switzerland; n= 25). The vertical lines represent the 95% confidence intervals. The percentage of patients per country who belong to the Utstein Comparator Group is marked with ‘x’. Abbreviations for Countries names are explained in Table 1.
Why isn´t death declared at the scene of the cardiac arrest?

- Legal restriction.
- **Adequate communication** with family members and assessment of patient’s wishes require time and specifically trained professionals.
- Possibility of **ROSC** during transfer.
- New assessment of the irreversibility of the CA and determination of death by a **professional independent** of the EMS and the donor teams.
Why isn´t the family systematically approached for organ donation at the scene of the cardiac arrest?

- While transparency is paramount, information needs to be provided progressively, adapted to the emotional situation of family members and their request for information.
- Information about organ donation might take place at the scene of the cardiac arrest or until in situ organ preservation measures have been initiated.
- The procedure preserves the option of organ donation while allowing:
  - Appropriate family care - the family being able to make decisions
  - Appropriate information to the family
  - Assessing the wishes of the patient about donation after death
Bioética de la información familiar en la donación en asistolia extrahospitalaria

*Ethics in approaching families about organ donation from patients in out-of-hospital asystole*

José Miguel Pérez Villares, Ramón Lara Rosales, Eladio Gil Piñero, Enrique Bravo Escudero, Francisco Alarco Martínez, Beatriz Domínguez-Gil

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**PUNTO DE VISTA**

**Intensidad de las emociones**

**Emocional control**

**Comunicación de la muerte**

**Capacidad para tomar decisiones**

**Petición de donación**

**Tiempo**

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*Pérez Villares JM, et al. Emergencias 2016; 28:55*
Why is the reestablishment of circulation after death allowed in uDCD in Spain?

- The determination of death preceding uDCD is based on the actual and demonstrated irreversibility of the CA, because aCPR has been exhausted and deemed unsuccessful as per international standards.

- Potential uDCD donors have been exposed to prolonged low-flow periods and at least two periods of complete absence of circulation, with an anticipated profound ischaemic injury to the brain.

- In this context, the reestablishment of circulation after the determination of death with the aim of organ perfusion is considered ethically appropriate and is legally permitted.

Times in uDCD in Spain

uDCD Donors 2012-2015
N=422

Cardiac arrest → aCPR started → aCPR unsuccessful → Hospital arrival → Determination of death → Preservation started → Organ recovery started

NO FLOW (max 15 min)

LOW FLOW

TOTAL WARM ISCHAEMIA TIME (max 150 min)

10 min

87 min

130 min

170 min

Continuous neurological assessment

Source: Organización Nacional de Trasplantes
Results of kidney transplants from uDCD donors: the Spanish experience

331 KIDNEY TX 2012-2015

Domínguez-Gil B, et al. 7th International DCD Meeting, October 2016

DEATH-CENSORED GRAFT SURVIVAL

Graft survival (%)

Days

Preservation/recovery

- In situ cooling (double balloon) (n=38)
- Hypothermic Regional Perfusion (n=137)
- Normothermic Regional Perfusion (n=150)
- Other (n=6)

p=0.002
Should all hospitals with an uDCD program develop an E-CPR protocol?

- Indications for E-CPR remain undefined and large prospective studies are still required to clarify patient selection, modifiable outcome variables, risk-benefit and cost-effectiveness - echoed by the ERC and the AHA.
- On current evidence there is no clinical or ethical imperative for hospitals to hurry and introduce such technology, even if they are engaged in an uDCD programme.
- Some hospitals may wish to do so as a means of increasing the evidence base for E-CPR.
- Resources for uDCD are necessary, but not sufficient for E-CPR.
No patient with a persistent shockable rhythm is ever considered as a potential uDCD donor.
Acceptance of the uDCD procedure by the Spanish community

CONSENT TO ORGAN DONATION IN THE AUTONOMOUS REGION OF MADRID
1/1/1996-7/31/2009
N=3248

- Uncontrolled DCD
  - Consent declined: 5%
  - Consent provided: 95%
  - N=577

- DBD
  - Consent declined: 19%
  - Consent provided: 81%
  - N=2,671

p<0.0001
The procedure of uDCD as devised in Spain respects all values at sake.
Thank you for your attention
bdominguez@msssi.es

Courtesy: Dr. Juan J. Egea-Guerrero, Virgen del Rocío Hospital, Seville, Spain