Azienda Ospedaliero Universitaria Careggi

Percorso donatore a cuore battente e a cuore fermo

Dtt.ssa Guetti Cristiana
SODc Cure intensive del trauma e delle gravi insufficienze d'organo
Dipartimento Neuromuscoloscheletrico e degli Organi di senso


di cosa
parliamo
quando
parliamo
di...


DONOR

Liste di Attesa al 31 Dicembre 2017*

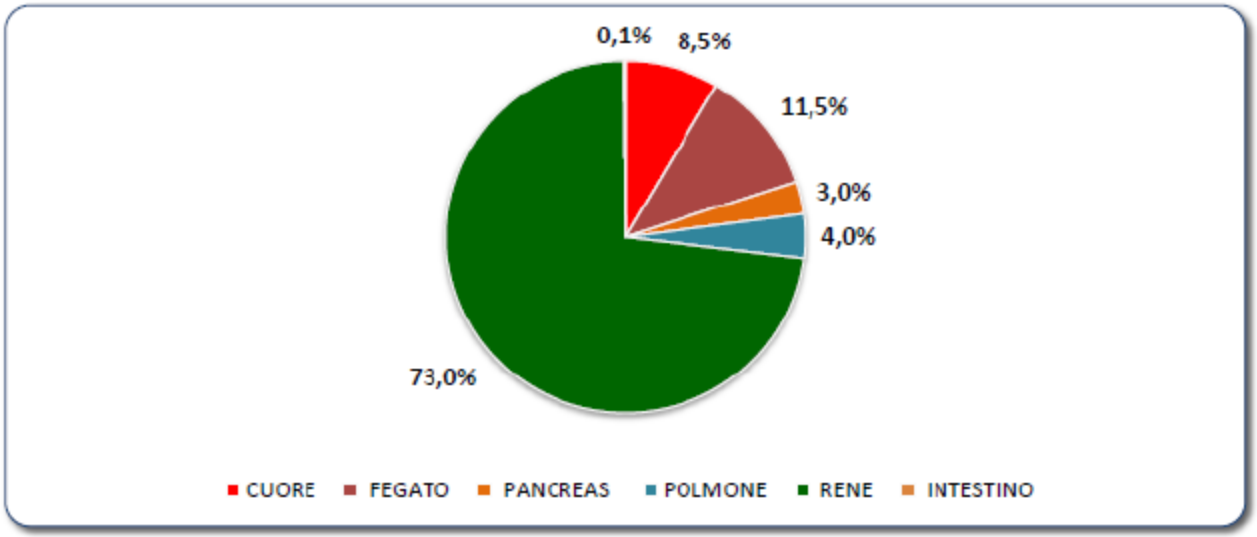
PAZIENTI in lista d'attesa in ITALIA al 31/12/2017 :

8743

Rene	6492**
Fegato	1019
Cuore	757
Polmone	354
Pancreas	264
Intestino	12

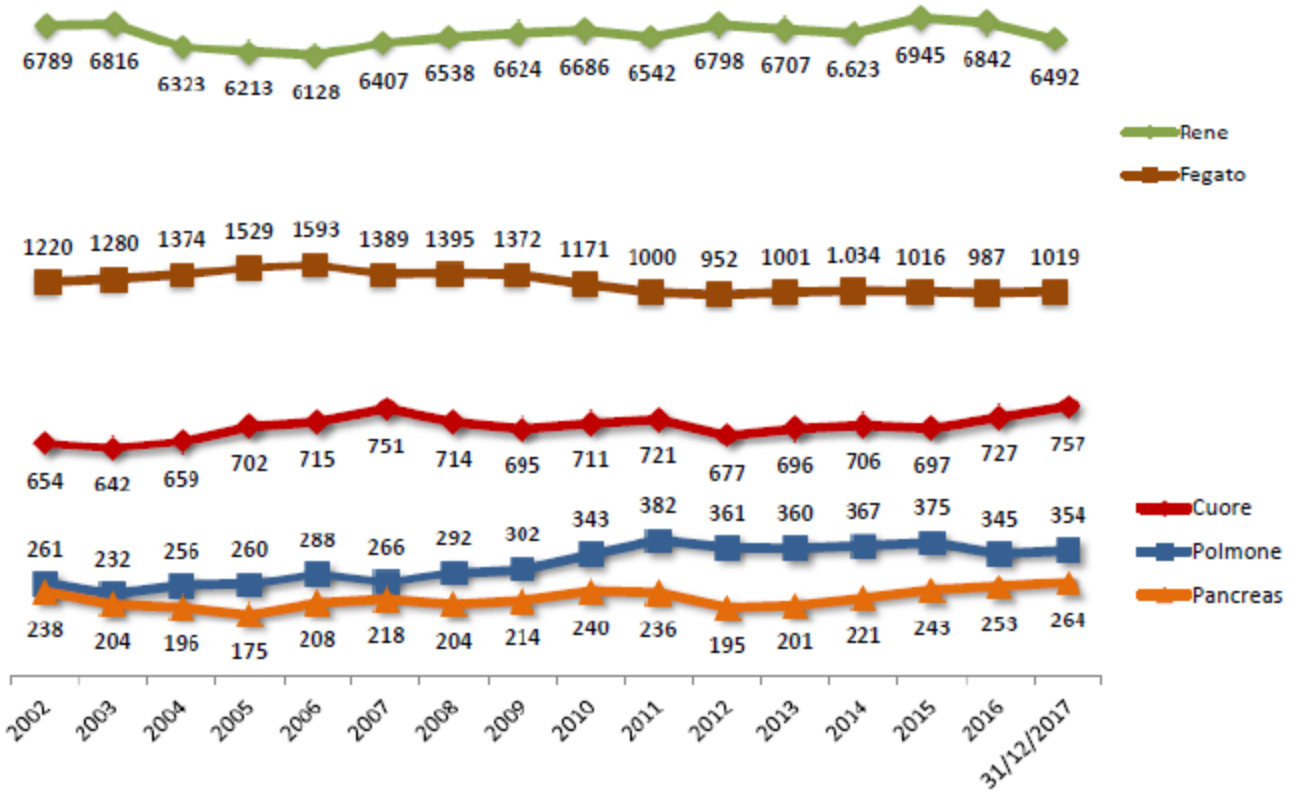
Iscrizioni rene 8449**

*** Per il rene ogni paziente può avere più di una iscrizione*



Andamento Liste di Attesa 2002 – 31/12/2017*

Pazienti iscritti in lista



Donazione / donatore a cuore battente:

Heart-beating donation / donor **HBD**

Donation / donor after brain death **DBD**

Donazione / donatore a cuore non battente in asistolia

Non heart-beating donation / donor **NHBD**

Donation / donor after circulatory death **DCD**

LA MORTE SI IDENTIFICA CON LA CESSAZIONE IRREVERSIBILE DI TUTTE LE FUNZIONI DELL'ENCEFALO

Art. 1 legge 23/12/1993 n°578

Arresto respiratorio e circolatorio

Danno cerebrale **secondario** irreversibile

Lesione cerebrale primitiva

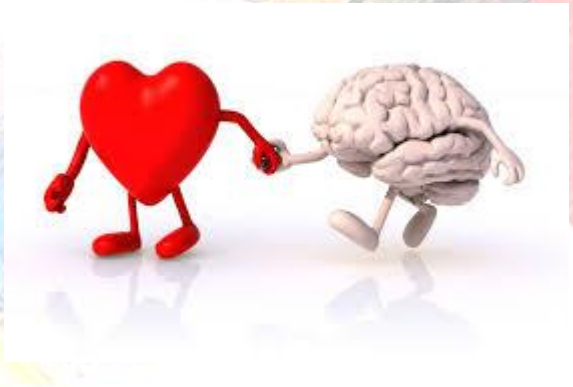
Danno cerebrale **primario** irreversibile

UNA MORTE SOLA

la morte è sempre la morte DI TUTTO l'ENCEFALO

DUE MODI PER ACCERTARLA

- ACCERTAMENTO CON CRITERI CARDIOLOGICI
- ACCERTAMENTO CON CRITERI NEUROLOGICI



Il percorso del donatore DBD

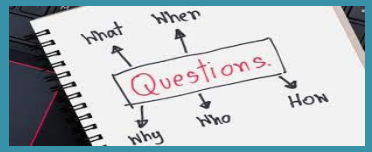
DEPARTURE

Terapie intensive

Identificazione Potenziale Donatore

Diagnosi di morte

Accertamento di morte

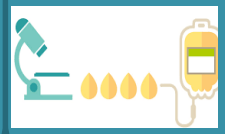


Richiesta di donazione

Cordinamento Locale Tx

Mantenimento del donatore

CRT



Valutazione di idoneità del Donatore

allocazione organi

CRT

Aspetti organizzativi

CNT

Cordinamento Locale Tx

Prelievo di ORGANI e/o TESSUTI

CNT

TRAPIANTO

Centri trapianto

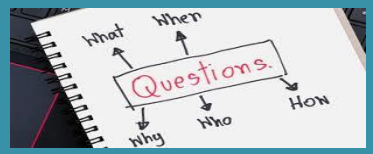
ARRIVAL

Il percorso del donatore uDCD

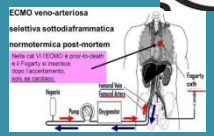
DEPARTURE EMERGENCY

Identificazione Potenziale Donatore

Diagnosi di morte



Cordinamento Locale Tx



CRT

allocazione organi

Accertamento di morte

Cordinamento Locale Tx

Richiesta di donazione

Mantenimento del donatore

Valutazione di idoneità del Donatore

CRT

Aspetti organizzativi

CNT

Cordinamento Locale Tx

CNT

TRAPIANTO

Prelievo di ORGANI e/o TESSUTI

Centri trapianto

ARRIVAL

Ex vivo Normothermic Machine Perfusion


di cosa
parliamo
quando
parliamo
di...


MORTE
ENCEFALICA

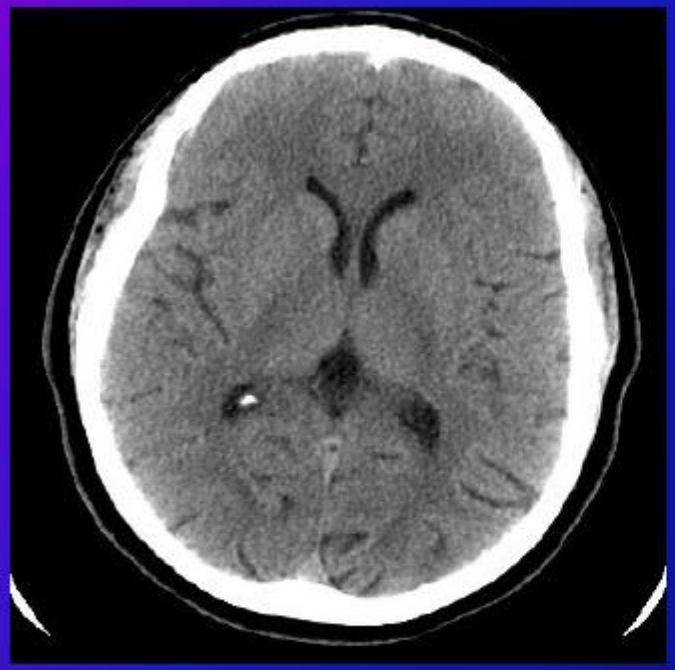
1. **CERTEZZA** della **DIAGNOSI EZIOPATOGENETICA DELLA LESIONE CEREBRALE**

2. **NEUROIMAGING COERENTE** per gravità ed evoluzione

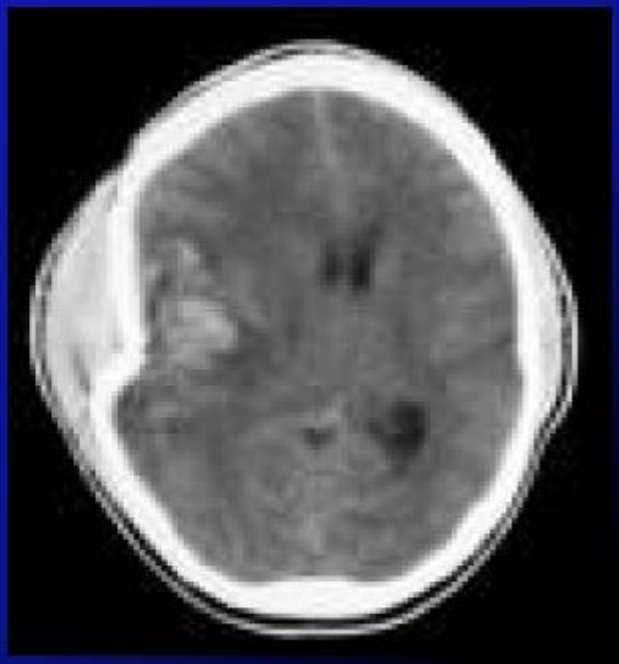
3. **STORIA CLINICA COERENTE** con l'andamento infausto

4. **ESCLUSIONE di TUTTE LE CAUSE DI COMA REVERSIBILE, RECENTI CRISI CONVULSIVE** ed **ATTIVITA' CRITICA SUBCLINICA**

itiva



normale



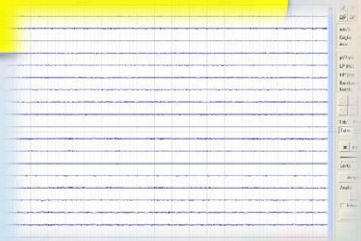
trauma cranico

cerebrale

ESAME CLINICO NEUROLOGICO

+

EEG



=

Le indagini strumentali non sostituiscono la diagnosi clinica ma completano la valutazione neurologica

ESAME CLINICO NEUROLOGICO

RIFLESSI DEL TRONCO ENCEFALICO

VIA AFFERENTE: NERVO TRIGEMINO (5°PAIO N.C .)
VIA EFFERENTE: NERVO FACCIALE (7°PAIO N.C .)

CORNEALE

VIA AFFERENTE: NERVO VESTIBOLARE (8°PAIO N.C .)
VIA EFFERENTE: NERVO OCULO MOTORE, ABDUCENTE (3°, 6°PAIO N.C)

OCULO VESTIBOLARE

FOTOMOTRE

VIA AFFERENTE: N. OTTICO (II)
VIA EFFERENTE: N. OCULOMOTORE (III)

FARINGEO CARENALE

Via Afferente: N. Glossofaringeo(IX PAIO N.C.)
Via Efferente: N. Vago (X PAIO N.C.)

RESPIRO SPONTANEO

Centro Bulbare

Morte cerebrale: collegio medico

COLLEGIO MEDICO

- **MEDICO LEGALE (O MEDICO DELLA DIREZIONE SANITARIA)**
- **MEDICO ANESTESISTA/RIANIMATORE**
- **MEDICO NEUROLOGO ESPERTO IN ELETTROENCEFALOGRAFIA**

PRINCIPALI ALTERAZIONI FUNZIONALI NELLA MORTE ENCEFALICA

- **ALTERAZIONI CARDIOCIRCOLATORIE**
  (ipovolemia relativa, vasoplegia, ipotensione arteriosa)
- **PERDITA DELLA RESPIRAZIONE SPONTANEA**
- **SQUILIBRI IDROELETTROLITICI**
- **ALTERAZIONI ORMONALI E METABOLICHE (defict ADH, diabete insipido, ipotiroidismo, ipocorticosurrenalismo, iperglicemia)**
- **PERDITA DELLA TERMOREGOLAZIONE**
- **GRAVE COAGULOPATIA**


di cosa
parliamo
quando
parliamo
di...

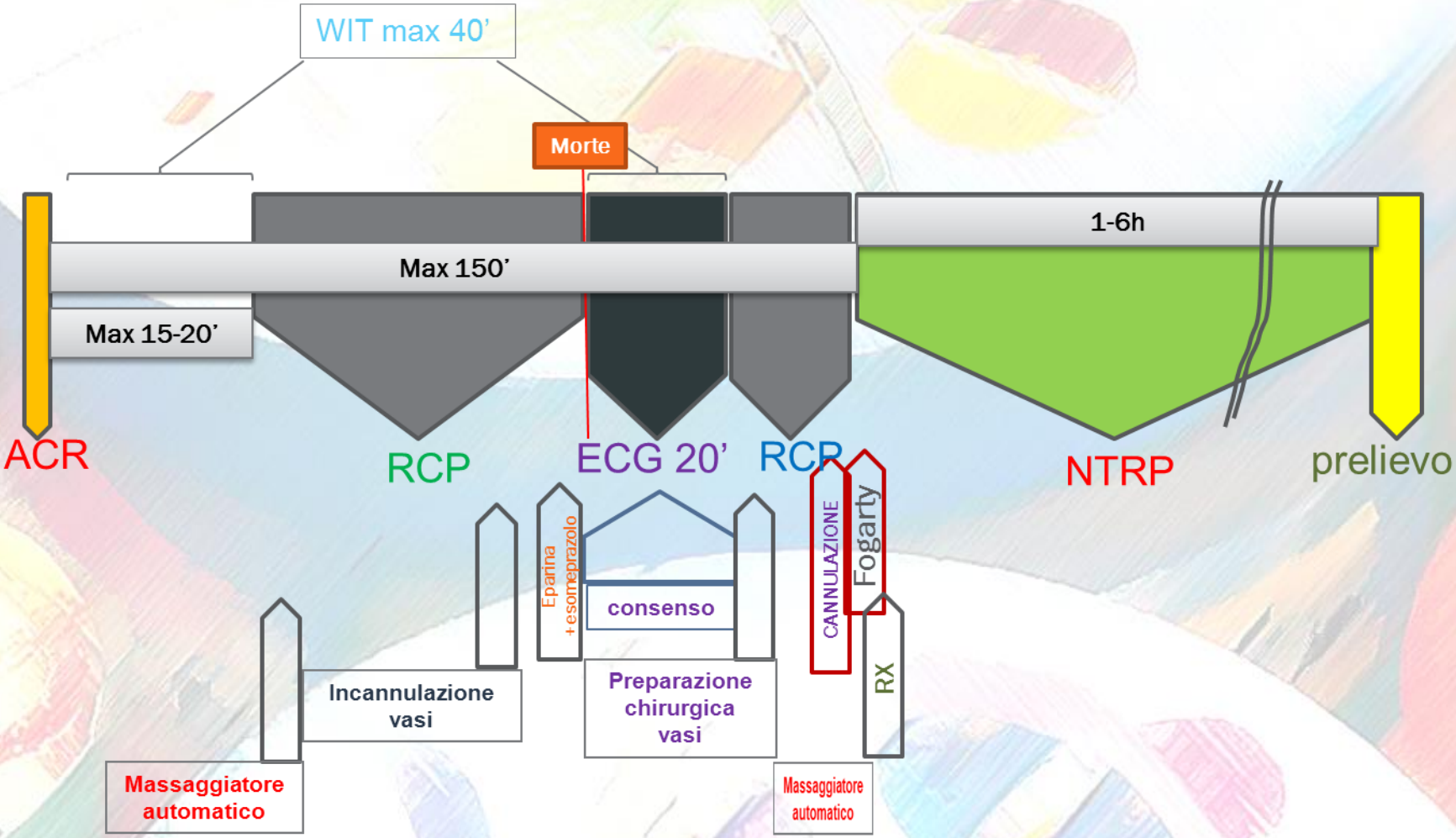

Modified Maastricht
Classification on DCD donors
(Paris 2013)

Modified Maastricht Classification on DCD donors (Paris 2013)

I **Uncontrolled**	Found dead IA. Out-of-hospital IB. In-hospital
II **Uncontrolled**	Witnessed cardiac arrest IIA. Out-of- hospital IIB. In-hospital
III **Controlled**	Withdrawal of lifesustaining therapy
IV **Uncontrolled** **Controlled**	Cardiac arrest while brain death

Thuong M, et al. Transplant Int 2016; 29:749-59

PROCEDURA NHBD



Protocollo AOUC : criteri di arruolamento

Donazione

15-65 aa

ACR-RCP <20'

ACR to Hospital <90'

RCP complessiva <120'

ACR-no touch-NTRP <150'

ACR testimoniato
Paziente identificabile
Parenti rintracciabili

ECLS terapeutico

15-70aa

ACR-RCP <5'

FV come primo ritmo (qualunque tempo stimato ACR-RCP)

ACR to Hospital <40'

ACR-ECLS <60'

Consentiti tempi più lunghi se ipotermia o intossicazione da betabloccanti

ACR testimoniato

CRITERI ASSOLUTI DI ESCLUSIONE

Evidenza o alto sospetto di patologie neoplastiche*: es cachessia, presenza di colostomia, cicatrici visibili recenti Sepsi, evidenza di malattie infettive e trasmissibili acute o croniche*: es AIDS, cirrosi epatica, epatite

Malattie autoimmuni con diagnosi certa*

Emodialisi cronica

Decadimenti psico-cognitivi se con sospetto di una encefalopatia spongiforme

Donazione

Peso >1kg per cm

Dissezione aortica/insufficienza grave

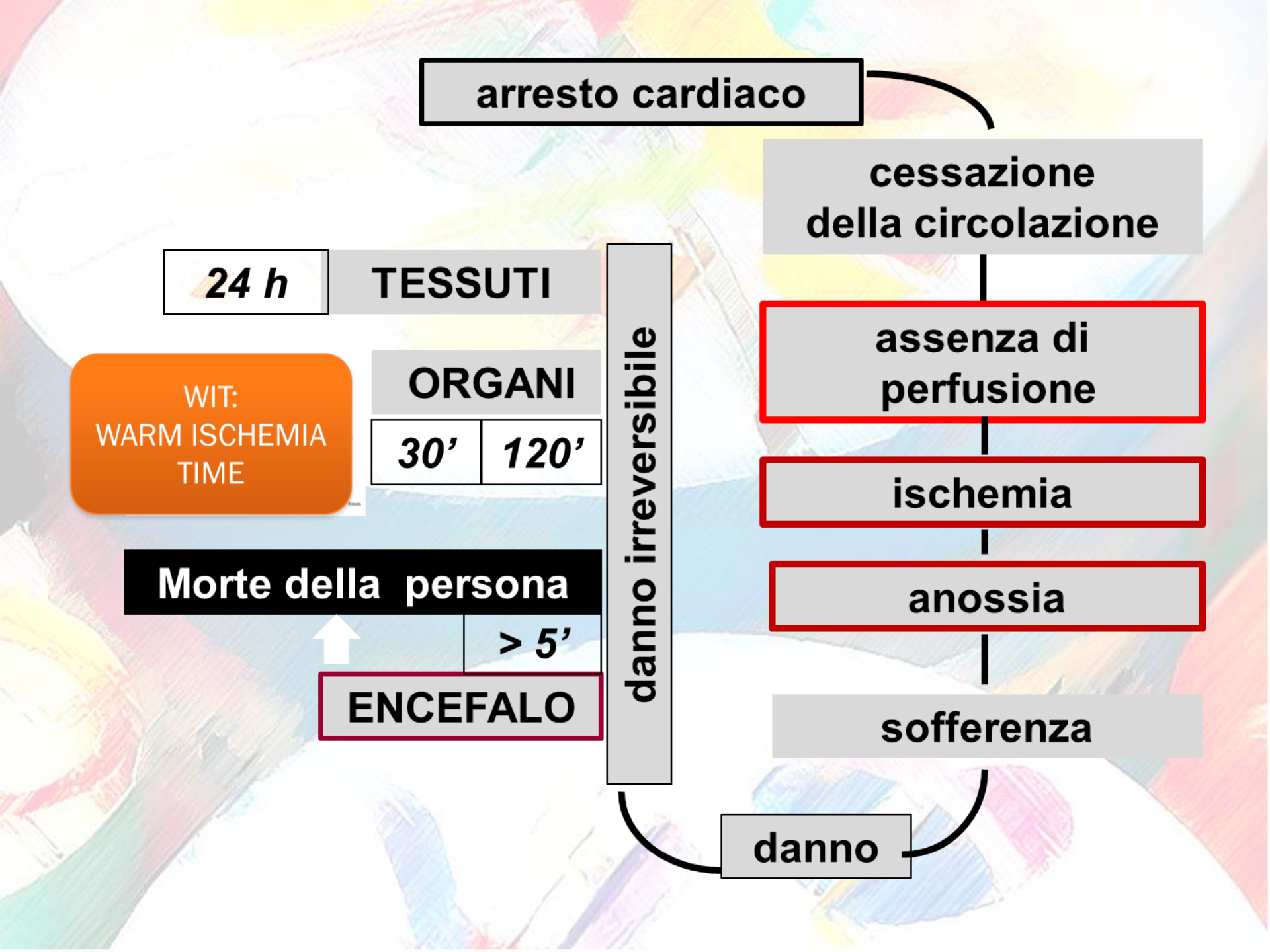
Aterosclerosi arti inf. nota sintomatica

«Comorbidità»

ECLS terapeutico

Criteri in H
pH<6,9
Lattati>20mmol
Adrenalina>3mg
EtCO2<10

*informazioni disponibili e attendibili


arresto cardiaco
cessazione della circolazione
assenza di perfusione
ischemia
anossia
sofferenza
danno
danno irreversibile
24 h
TESSUTI
ORGANI
30’
120’
WIT:
WARM ISCHEMIA TIME
Morte della persona
> 5’
ENCEFALO

REVIEW

Maximum tolerable warm ischaemia time in transplantation from non-heart-beating-donors

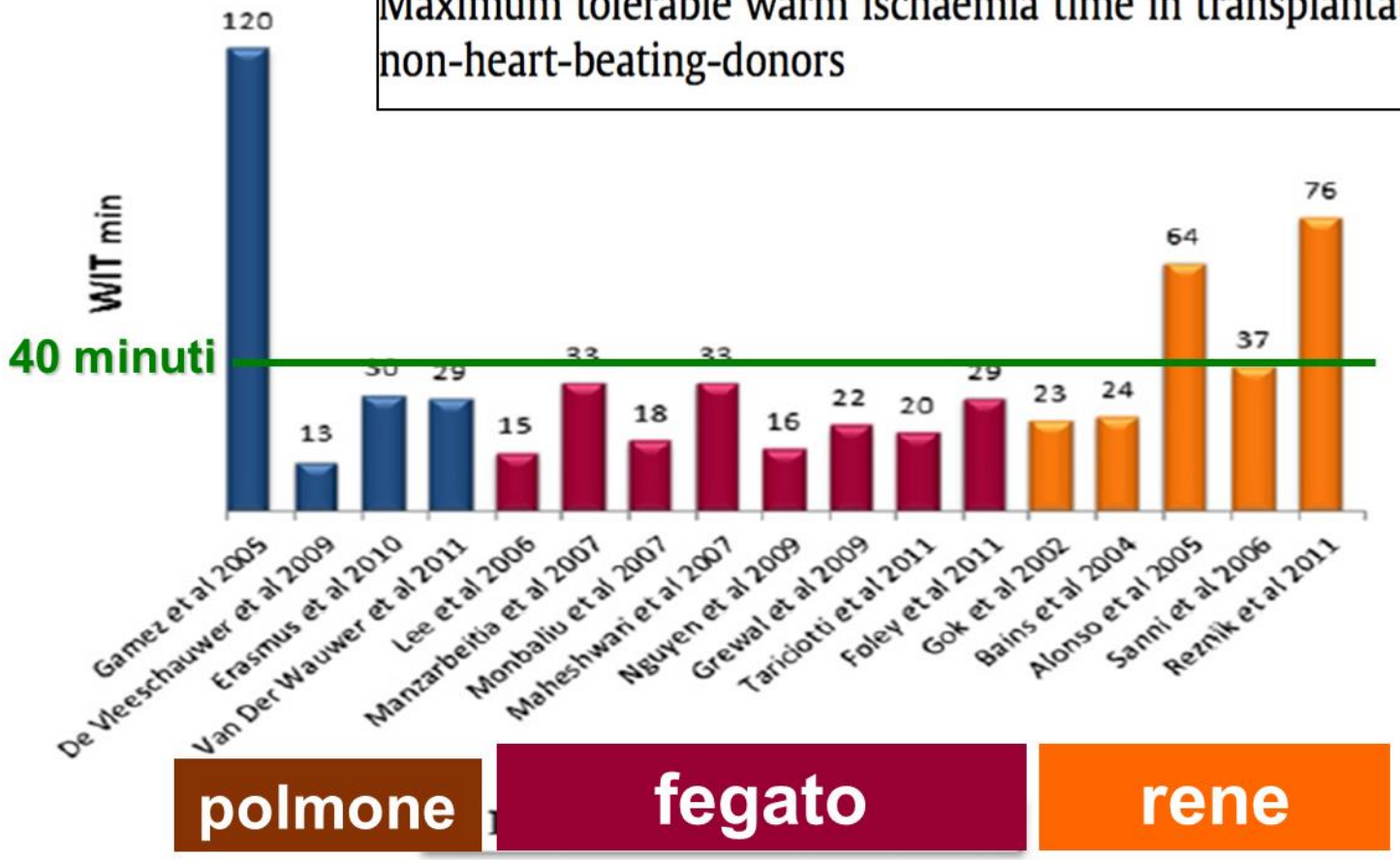
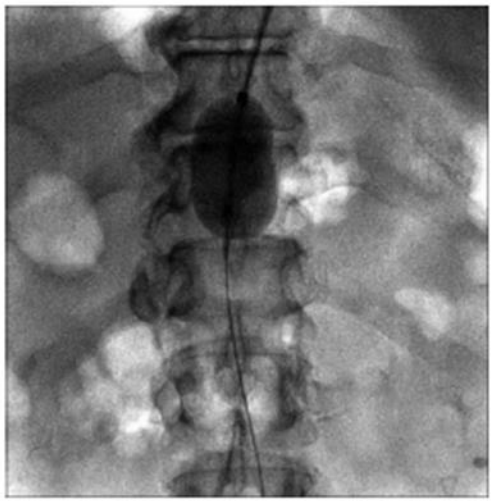


Fig. 1. Clinical experiences of WIT in lung, liver and kidney transplantations from non-heart-beating-donors (WIT: warm ischaemia time).

Trends in Anaesthesia and Critical Care 3 (2013) 72e76

NTRP nella pratica clinica:

- Introduzione di cannule ECMO in vena e arteria femorale



- Catetere di fogarty nella arteria femorale controlaterale (cuffiato al di sopre del diaframma)

- Connessione cannule a circuito ECMO (BF 2-3 l/min)

Abdominal regional in-situ perfusion in donation after circulatory determination of death donors

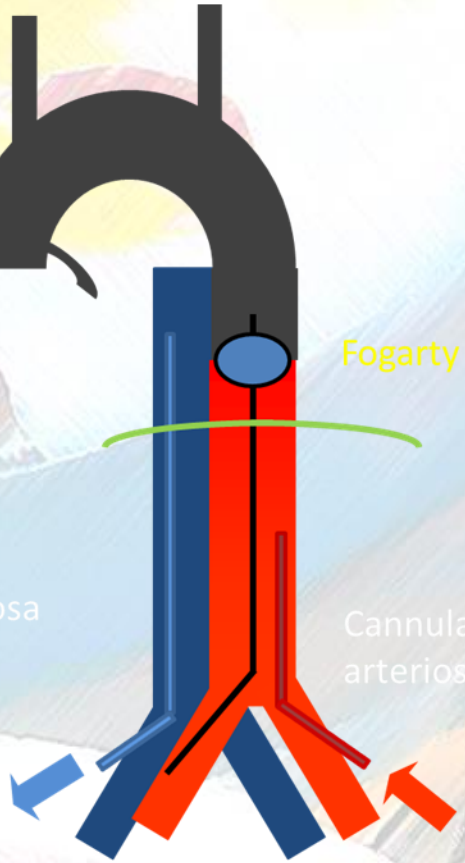
Amelia J. Hessheimer, Juan C. García-Valdecasas, and Constantino Fondevila

Curr Opin Organ Transplant 2016, 21:322–328

ECLS

+

CATETERE FOGARTY
aorta toracica discendente



NTRP: Normo-thermic Regional Perfusion
ANOR: Abdominal Normothermic Oxygenated Recirculation

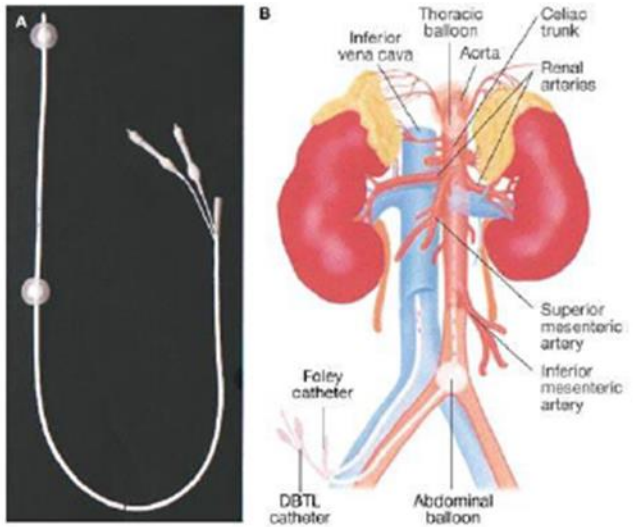
DCD: Metodiche di mantenimento organi

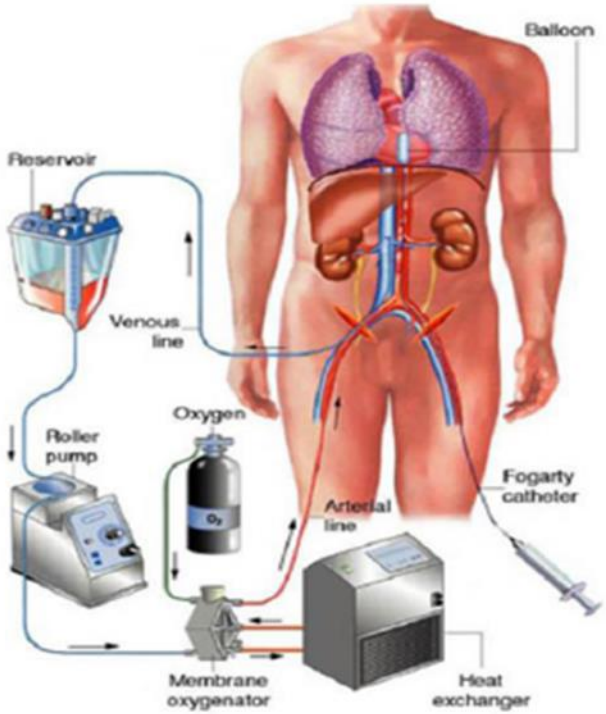
SUPER
RAPIDE
TECHNIQUE

ECMO:

- CORE COOLING (TOTAL BODY COOLING)
- **N-ECMO: NORMOTHERMIC-ECMO**

COLD IN SITU PERFUSION (ISP)





- Trasporto paziente in SO
- Esplorazione addominale

- Stop ECMO e utilizzo delle cannule per perfusione con liquido freddo e raffreddamento con ghiaccio
- Prelievo degli organi

Perfusione ex-vivo del rene

Machine Perfusion Versus Cold Storage for the Preservation of Kidneys Donated After Cardiac Death

A Multicenter, Randomized, Controlled Trial

Transplantation Reviews 32 (2018) 1–9

Contents lists available at ScienceDirect

Transplantation Reviews

journal homepage: www.elsevier.com/locate/trre

Ex vivo machine perfusion for renal graft preservation

J. Moritz Kaths [a,b,c,*], Andreas Paul [a], Lisa A. Robinson [c], Markus Selzner [b]

[a] Department of General, Visceral, and Transplantation Surgery, University Hospital Essen, University Duisburg-Essen, Essen, Germany
[b] Multi Organ Transplant Program, Department of Surgery, Toronto General Hospital, University Health Network, Toronto, Ontario, Canada
[c] Division of Nephrology, The Hospital for Sick Children, University of Toronto, Toronto, Ontario, Canada

ABSTRACT

Kidney transplantation is the treatment of choice for end-stage renal disease. Despite its superiority over dialysis, the persisting organ shortage remains a major drawback. Additional sources to increase the donor pool are grafts recovered from extended criteria donors (ECD) and donation after circulatory death (DCD). Although transplantation of marginal grafts demonstrates promising outcomes, increased rates of primary non-function, delayed graft function, and reduced graft survival have been reported. Cold ischemic injury, caused by static cold storage is a significant risk factor for poor outcome. Machine perfusion (MP) at various temperatures bears the potential to improve organ preservation, assessment, and repair. While hypothermic machine perfusion (HMP) is well established in clinical practice, modified HMP, subnormothermic machine perfusion (SMP), and normothermic machine perfusion (NMP) are novel emerging strategies with the potential to significantly improve the outcome of marginal kidney grafts. This review summarizes findings and recent advances from pre-clinical and clinical machine perfusion studies, organized by temperature, and discusses potential future developments for graft assessment and repair.

Machine Perfusion:

- Reduced incidence and duration of DGF
- Higher CrClearence 1 month after transplantation

Transplant International 2016; 29: 749–759

PNF: PRIMARY NON FUNCTION

Non- and never functioning transplant, return to dialysis.

DGF: DELAYED GRAFT FUNCTION

Failure of renal graft function so there is a need for dialysis in the 1st week after kidney transplantation

NTRP: ESPERIENZE CLINICHE

RENE

One of the
main advantages of NRP-DCD kidney transplantation is marked reductions in DGF

Transpl Int 2000;13: 303-310. Clin Transplant 2011;25:511-516.
J Am Coll Surg 2008;206:1028-1037

Reducing DGF diminishing greater risk of graft failure and rejection

Curr Anaesth Crit Care 2010;21:220-223.

The recirculation of blood
at the homeostatic temperature (37°C) has been shown to reduce DGF and replenish antioxidant and ATP levels.

Am J Transplant 2010;10:1365-1374.
Transplant Proc 2007;39:249-252.

Transplantation Proceedings, 50, 533–535 (2018)

Postoperative Care in Kidney Transplantation: A Comparison Between Controlled and Uncontrolled Donation After Circulatory Death

Á.J. Roldán-Reina[a,*], J.J. Egea-Guerrero[b], N. Palomo-López[a], D.X. Cuenca-Apolo[a], M. Adriaensens-Pérez[a], M. Porras-López[a], Z. Ruiz de Azúa-López[c], Y. Corcia-Palomo[a], and L. Martín-Villén[c]

[a]Intensive Care Unit, Virgen del Rocío University Hospital, Seville, Spain; [b]Coordination of Transplants: Seville-Huelva Sector, IBiS/CSIC, Seville University, Seville, Spain; and [c]Coordination of Transplants: Seville-Huelva Sector, Seville, Spain

When comparing postoperative renal function between uDCD and cDCD transplants, some studies reported delayed graft function in uDCD [3,5], given that warm ischemic time is more prolonged in this patient subgroup.

However, different authors found that short- and long-term graft function normalizes in both donor groups [3,6], even when compared with grafts from donation after brain death. These studies demonstrate that DCD should remain a viable option in kidney transplantation, regardless of immediate postoperative renal function [4,5,7].

Hoogland et al [6] found that postoperative renal function could be similar in both patient groups, a finding that may be attributed to the use of expanded criteria in DCD.

Moreover, our results showed a relationship between higher lactate levels and the risk of poor outcome after kidney transplantation. Along this line, a recent study found that defective postreperfusion metabolic recovery, as determined by lactate levels, is a factor that could lead to delayed graft function [8].

hemodialysis [1]. In recent years, an increasing demand for organ transplantation, paired with a progressive decline in brain-dead donors, has made it necessary to seek new strategies for organ donation, including donation after circulatory death (DCD) [2]. However, recent research on

CHAIN OF SURVIVAL

CHAIN OF OPPORTUNITIES

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


THANK
YOU