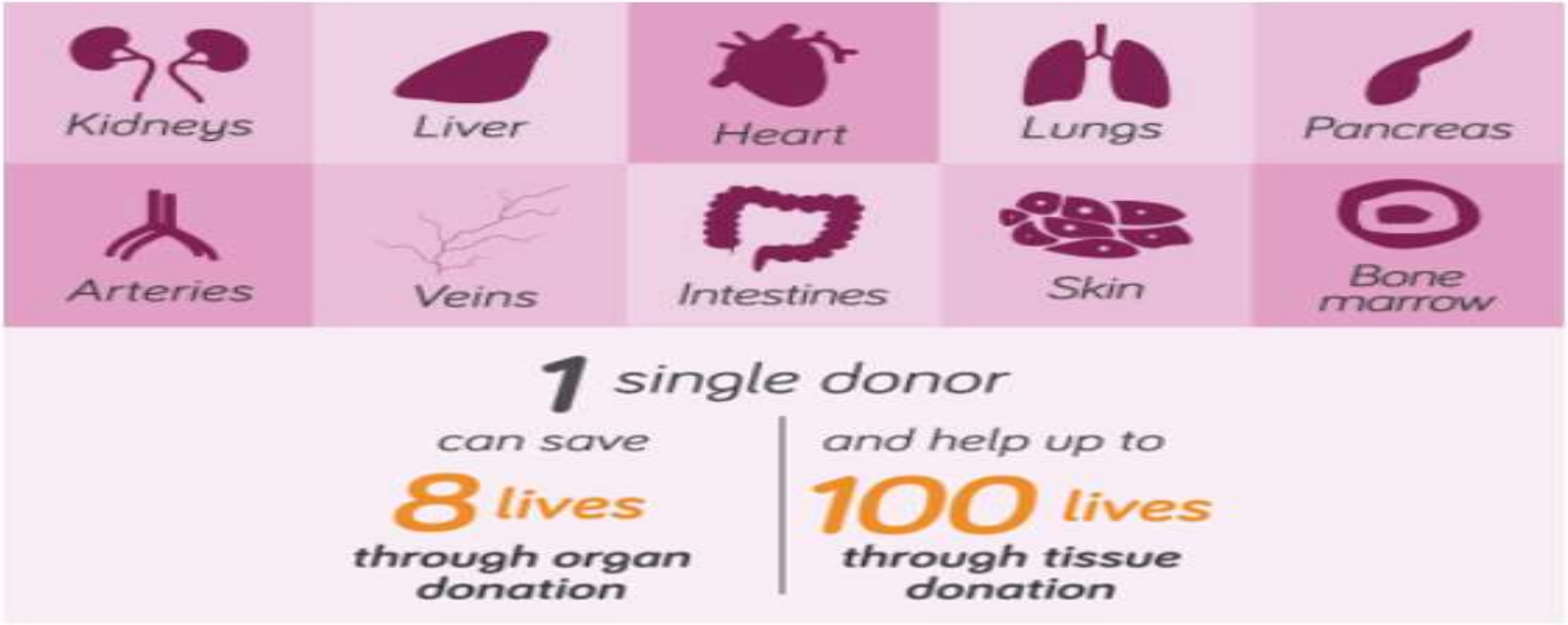
Trattamento intensivo del donatore di organi

Dott.ssa Ilenia Bonanno
Coordinatore Locale
ARNAS Garibaldi Catania

TPM Transplant Procurement Management

MORE DONORS = MORE HOPE!



Every single person has a role to play in helping others.

TRATTAMENTO DEL DONATORE

Attività complessa

In ICU

Durante trasporto in S.O.

In S.O.

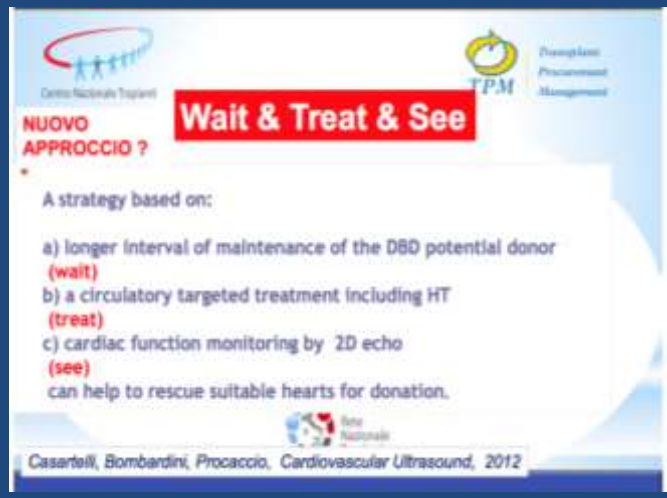
Obiettivo Primario

PERFUSIONE
E
OSSIGENAZIONE DI ORGANI
E TESSUTI PRELEVABILI

NUOVO APPROCCIO

Wait & Treat & SEE

Aspetta tratta e guarda



Una strategia basata su:

a) intervallo di mantenimento più lungo del potenziale donatore DBD (attendere)

b) un trattamento mirato circolatorio che includa HT (trattamento)

c) il monitoraggio della funzione cardiaca mediante eco 2D (vedi) può aiutare a salvare cuori adatti per la donazione.

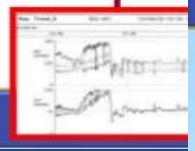
Casartelli, Bombardini, Procaccio, Cardiovascular Ultrasound, 2012

From Coma to Death

Life | **Death**

Autonomic "storm" → Brain Death → Spinal shock → CCA

- Hypertension
- Tachycardia
- Pulmonary edema
- Coagulopathy



Brainstem ischemic response
The Adrenergic "storm"

Organ damage

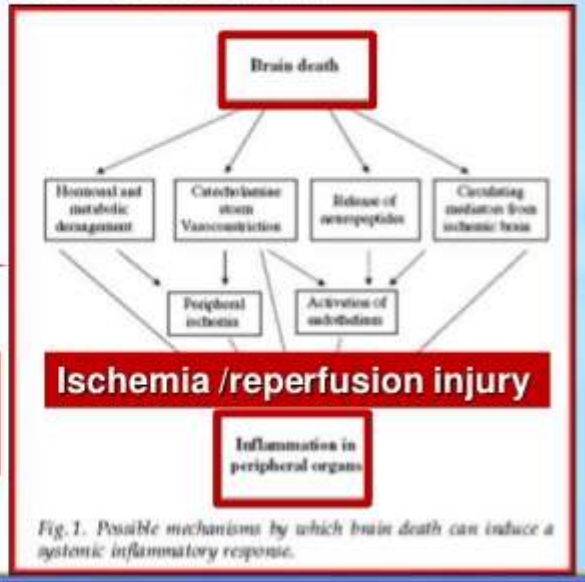


Fig. 1. Possible mechanisms by which brain death can induce a systemic inflammatory response.

Gli organi non perfusi soffrono ischemia

ischemia calda: *prima del prelievo*
ischemia fredda: *prima del trapianto*

Il danno da ischemia/riperfusione compromette il buon esito del trapianto

Gli organi non perfusi soffrono ischemia

ischemia calda: *prima del prelievo*
ischemia fredda: *prima del trapianto*

WIT: nel corpo del donatore «*in situ*»

CIT: fuori dal corpo del donatore «*ex situ*»

PERDITA DEL RESPIRO SPONTANEO
ALTERAZIONI CARDIOCIRCOLATORIE
SQUILIBRI IDROELETTROLITICI
ICU
ALTERAZIONI ORGANICHE E FUNZIONALI DELLA MORTE
PATOLOGIE IN VITA
ALTERAZIONI ORMONALI E METABOLICHE
PERDITA DELLA TERMOREGOLAZIONE
ALTERAZIONI DELLA COAGULAZIONE

Trattamento Sintomatico

Physiologic Changes During Brain Stem Death—Lessons for Management of the Organ Donor

Martin Smith, MBBS, FRCA

The widespread physiologic changes that follow brain stem death lead to a high incidence of complications in the donor and [illegible] the rapid physiologic decline seen after brain stem death can be stabilized by active donor [illegible] so that the functional integrity of potentially transplantable organs is maintained. Understanding the complex physiologic changes that occur after brain stem death is crucial to the development of effective donor management strategies. This article reviews the pathophysiologic changes that occur after brain stem death and discusses controversies in donor management. J Heart Lung Transplant 2004;23:S217–22.

Table 1. Incidence of Pathophysiologic Changes After Brain Stem Death

Hypotension	81%
Diabetes insipidus	65%
Disseminated intravascular coagulation	28%
Cardiac arrhythmias	25%
Pulmonary edema	18%
Metabolic acidosis	11%

Wait & Treat & See

NUOVO APPROCCIO ? A strategy based on:

a) longer interval of maintenance of the DBD potential donor (wait)

b) a circulatory targeted treatment including HT (treat)

c) cardiac function m (s

can help to rescue suit

Manuale

Corso Nazionale Coordinatori alla Donazione e al Prelievo di Organi e Tessuti

6.1 IL TRATTAMENTO DEL DONATORE D'ORGANI: CURE INTENSIVE ORIENTATE AL PROCUREMENT

C. Martini / M. Zanello / F. Lusenti / M. Vincenzi

ESPANSIONE DEL PROCUREMENT DI ORGANI: TRATTAMENTI INTENSIVI DI DOCUMENTATA EFFICACIA

Organ donor management in Canada: recommendations of the forum on Medical Management to Optimize Donor Organ Potential

CMAJ · MARCH 14, 2006 · 174(6) | S13

Casartelli, Bombardini, Procacc

Table 2. Suggested cardiovascular goals for the management of potential organ donors

Parameter	Target
Heart rate	60–120 beats min
Arterial pressure	Systolic pressure
	Mean pressure ≥ 70
Central venous pressure	8–10 mm Hg
Urine output	0.5–3 ml kg⁻¹ h⁻¹
Electrolytes	Serum sodium 130
	Normal potassium, magnesium, phosp
	Glucose 4–8 mmol
Blood gases	pH: 7.30–7.45
	Pa_{CO_2}: 4.7–6 kPa
	Pa_{O_2}: ≥ 10.7 kPa
	SO_2 saturation ≥
If pulmonary artery catheter inserted	
Pulmonary capillary wedge pressure	8–10 mm Hg
Cardiac index	2.4 litre min⁻¹ m⁻¹
Systemic vascular resistance	800–1200 dyn s cm

Critical Care Mo

Management of the
ICU: Society of Critic
College of Chest Phy
Procurement Organi

Robert M. Kotloff, MD; Sandralee Bl
Vivek N. Ahya, MD; Luis Angel, MD
Thomas E. Grissom, MD; Scott D. H
Debra L. Sudan, MD; Kenneth E. W
Elling E. Eidbo, MBA; Richard A. Fo
Cynthia Gries, MD; Richard Hasz, M
David Landsberg, MD; Daniel J. Lebovitz, MD; Deborah Jo Levine, MD; Mudit Mathur, MD;
Priyumvada Naik, MD; Claus U. Niemann, MD; David R. Nunley, MD; Kevin J. O'Connor, MS;
Shawn J. Pelletier, MD; Omar Rahman, MD; Dinesh Ranjan, MD; Ali Salim, MD;
Robert G. Sawyer, MD; Teresa Shafer, RN, MSN; David Sonneti, MD; Peter Spiro, MD

Fluids and nutrition	Administer maintenance fluids (can use enteral route), but avoid positive balance and hypernatraemia. Monitor urine output and maintain at 0.5–2.5 ml kg⁻¹ h⁻¹. If urine output is >4 ml kg⁻¹ h⁻¹, consider diagnosis of diabetes insipidus and treat with vasopressin infusion or DDAVP. Insulin infusion (1 unit h⁻¹ minimum). Maintain feeding or glucose source. Blood glucose target concentrations 4–8 mmol litre⁻¹. Correct electrolyte abnormalities to normal values
Blood and coagulation	Correct coagulation if evidence of active bleeding; consider need for coagulation support during retrieval. Consider need for transfusion*. Maintain thromboprophylaxis as there is a high incidence of pulmonary emboli found at retrieval
Systemic effects	Methylprednisolone 15 mg kg⁻¹ bolus immediately after brain death confirmed. Triiodothyronine*
Investigations	ECG, echocardiogram. Coronary angiogram may be indicated*. Bronchoscopy and lavage followed by lung recruitment manoeuvres. Chest X-ray after lung recruitment manoeuvres

*May be indicated or modified according to local policy or advice from retrieval team. DDAVP, 1-deamino-8-D-arginine-vasopressin.

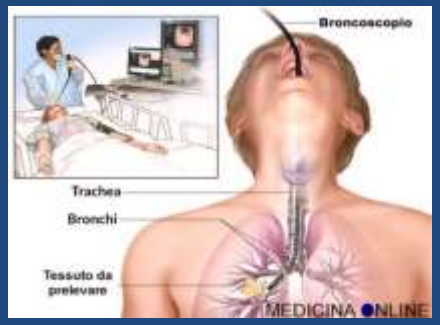
.....cosa facciamo???

MANTENIMENTO OMEOSTASI CLINICA

- Hb > 9 – 10 g/dl
- Ht > 30%
- FC 100 bpm
- PVC 8 – 10 mmHg
- PAS > 100 mmHg
- PAM > 60 – 70 mmHg
- Diuresi 1 – 1.5 ml/Kg/h

- PaO2 > 100 mmHg
- pH= 7.35 – 7.45
- SpO2 > 95%
- PaCO2 = 35 – 45 mmHg
- Temperatura centrale > 36° C
- Glicemia 80-130 mg/dl

MONITORAGGIO



EMODINAMICO : ECG, PAC, SpO2, PVC, PICCO, ECO

DIURESI ORARIA e BILANCIO IDRICO

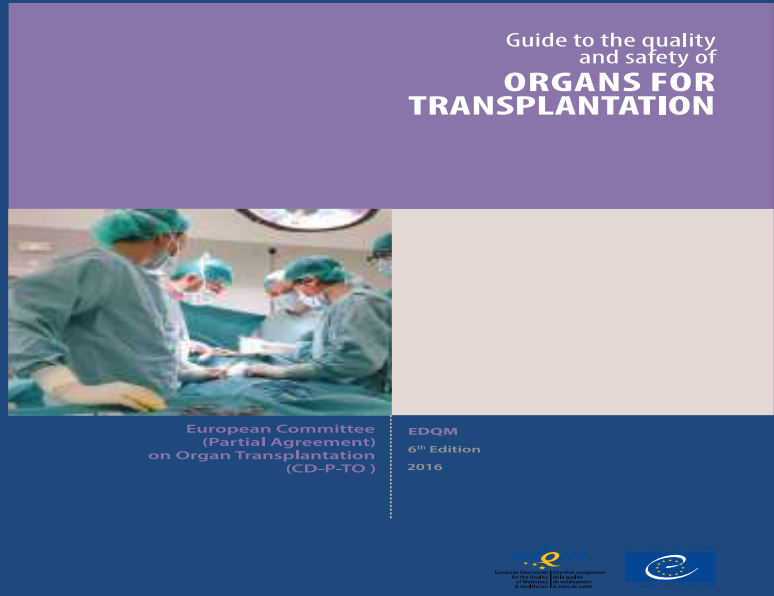
TEMPERATURA CENTRALE

PULSOSSIMETRIA, CAPNOMETRIA (EtCO2)

EMATOCHIMICO : ELETTROLITI, GLICEMIA, OSMOLARITA', COAGULAZIONE, EQUILIBRIO ACIDO-BASE

STRUMENTALE : RX TORACE, ECOGRAFIA, TAC, FBS

Ipotensione arteriosa



Se: MAP <60-70 mmHg

- ***Noradrenalina 0,05-0,1 (0,2) µg/Kg/min***

- ***Dopamina <10-12 µg/Kg/min***

- **Dobutamina <15 µg/Kg/min**
- **Adrenalina 0,05-0,1(0,2) µg/Kg/min**
- **Vasopressina 1 U bolo 0,5 – 4 (2,4) U/h**

Guide to the quality and safety of

ORGANS FOR TRANSPLANTATION

European Committee (Partial Agreement) on Organ Transplantation (CD-P-TO)

EDQM

6th Edition

2016

edqm European Directorate for the Quality of Medicines & HealthCare | Direction européenne de la qualité du médicament & soins de santé

COUNCIL OF EUROPE

CONSEIL DE L'EUROPE

b. Myocardial dysfunction can be easily assessed and quantified by Doppler echocardiography. In such cases, administration of an inotropic drug, such as dobutamine in association with norepinephrine, is recommended.

c. Vasopressin (1 U as bolus, 0.5-4 U/h, as a recommended dose) is still under evaluation for its use in DBD donors as a way to gradually reduce vasopressor administration, while maintaining target parameters after appropriate correction of all other issues to decrease vasopressor dosages. Given vasopressin's lack of cardiotoxicity, [illegible] result of normalisation of systemic vascular resistance, cardiac function can be improved. As a result, in a study, the number of transplantable hearts (most of which had initially been evaluated as unsuitable for transplantation) rose by 35 % [illegible, 23].

d. The pre-treatment of donors with low doses of dopamine (< 4 µg/kg/min) has been shown to reduce the need for dialysis after kidney transplantation without a significant clinical impact on graft or patient survival as well as to mitigate cold preservation injury to cardiomyocytes in heart grafts [24, 25, 26]. Since dopamine directly interacts with the cellular membrane and is capable of protecting endothelial cells from oxidative stress during cold storage, the application of low-dose dopamine is intended to protect kidney grafts from damage related to prolonged ischaemia time exclusively (and not as vasopressor). This was confirmed by the randomised trial of Schnülle *et al.*, in the sub-cohort of grafts exposed to long ischaemia times, by reducing the rate of delayed graft function [27]. On the contrary, high doses of dopamine (> 10 µg/kg/min) must be avoided because, due to its action on α-adrenergic receptors, it can induce a progressive renal and systemic vasoconstriction, the depletion of endogenous norepinephrine and of ATP reserves in the organs, and affect their function after transplantation, especially in the case of the heart.

5.4.4. Hypokalaemia/hypernatraemia

Hypokalaemia can be corrected by replacing potassium. Normalisation of elevated serum sodium levels may be difficult. When hypernatraemia exists in combination with volume deficiency (CVP < 7 mmHg), a 5 % glucose solution may be administered as an infusion (always together with insulin). Blood glucose and potassium levels should also be monitored. As there is a sharp decline in the metabolic rate of donors, administration of large volumes of 5 % glucose solution may lead to severe hyperglycaemia, with consequent osmotic diuresis, if not properly monitored. In the case of hypernatraemia with adequate blood volume or hypervolaemia (CVP > 10 mmHg), administration of electrolyte-free solutions alone will cause over-hydration. In such cases, Furosemide should be administered and the volume of urine excreted hourly should be replaced with 5 % glucose solution.

5.4.5. Hypothermia and dysregulation of body temperature

A minimum body temperature of 35 °C should be maintained in DBD donors. This can be achieved by:

a. reducing passive heat loss by covering the donor with, for example, metal foil;

b. using electric blankets and hot-air blowers;

c. heat infusion solutions in water baths or special infusion heaters.

Untreated and/or uncontrolled hypothermia (< 35 °C) causes numerous complications that impair the transplant success of organs, such as:

a. In general, metabolic activity, energy and oxygen consumption of the organs fall at lower body temperatures. This causes adaptive impairment of organ function (heart, liver and/or kidneys), which may have a negative impact on organ-related functional diagnoses. At the same time, hyperglycaemia may increase as insulin production and insulin efficacy are reduced and the rate of glucose metabolism decreases.

b. Cardiac contractility declines and the risk of arrhythmia increases, both resulting in under-perfusion of the organs.

Erythrocyte flexibility declines, causing disruption to micro-circulation in the organs and reducing oxygen release into the tissues.

d. Hypothermia enhances coagulation disorders.

In some cases, hyperthermia (> 38 °C) may occur because of failure of central temperature regulation and SIRS without infection, or because of SIRS combined with a relevant infection (in which case the cause should be sought and proper treatment should be initiated).

Mantenimento della VOLEMIA

DIABETE INSIPIDO

Poliuria >4 ml/kg/h
Osmolarità plasmatica >300 mOsm/kg
Osmolarità Urinaria < 300
Peso specifico urine < 1005
Perdita di elettroliti

Disidratazione
Ipernatriemia
Iperosmolarità

→ **DANNO D'ORGANO**

EQUILIBRIO IDRICO

- ✓ diuresi adulti → 0,5 – 3 ml/Kg/h
- ✓ diuresi bambini → 2ml/Kg/h

DIAGNOSI

POLIURIA

OLIGURIA
<0,5-1 ml/Kg/h

PVC <8 cmH2O
PAS <100 mmHg
PAM <60-70 mmHg

→ RIEMPIMENTO VASCOLARE

PVC >12 cmH2O
PAS >100 mmHg
PAM>70 mmHg

→ DIURETICI
Furosemide 20-40 mg ev
Mannitolo 0,5 g/Kg (18%)

POLIURIA
> 4 ml//Kg/h

- ➢ TERAPIA EZIOLOGICA
- ➢ RIEMPIMENTO VASCOLARE

→ DIURESI ORARIA

Terapia Infusionale

- Cristalloidi
- Colloidi (destrani, gelatine, HEA ecc.)
- Cristalloidi/Colloidi 2/1 (starter)
- Albumina 5% (se < 3g/100)
- Soluzioni Glucosate
- Soluzioni Ipotoniche / Ipertoniche
- Plasma
- Sangue (GR, piastrine ecc)
- Fattori coagulazione

} Coagulopatia, Anemia

1 – desamino 8 D arginina vasopressina

- ✓ ADH di sintesi
- ✓ agonista selettivo recettori V_2
- ✓ > effetto antidiuretico (rispetto pitressina)
- ✓ durata > 3-5 volte
- ✓ somministrazione ev: 0,125 – 0,250 → 1 ml
  (1 fiala = 4 μg = 1 ml)
  bolo ev 8 ng/Kg → 4 ng/Kg/ora
  bolo ev 1-4 μg → 1-2 μg in 6 ore

Chapter 5. Management of the potential donor after brain death

M. Doitchinova, E. Miñambres, F. Procaccio, J. Charpentier, M. Thuong

Monitoring:
- Electrocardiogram
- Pulse oxymetry
- Arterial line
- Central venous access
- Temperature monitoring
- Bladder catheter

Extended monitoring:
Monitoring +
- Repeated Echography
- Right heart catheter
- Or Oesophagal doppler
- Or Picco™ ...

MAP < 65 mmHg → NO → Compensable polyuria

YES → **Hypovolemia?**

- YES → Fluid loading → Norepinephrine 0.25 - 0.5 µg/kg/min
- NO → Norepinephrine 0.25 - 0.5 µg/kg/min

MAP < 65 mmHg → **Cardiovascular exploration**

- Hypovolemia → Fluid loading, Treatment of diabetes insipidus
- Myocardial dysfunction → Hypothermia? Hypocalcemia? → Dobutamine, Epinephrine
- Vasoplegia → Norepinephrine + Fluid loading

J Charpentier - Expert Confère

Polyuria > 2 mL/kg/h

Exclude secondary polyuria
- Osmotic (Mannitol, hyperglycemia)
- Induce (Diuretic)
- Adapted (Fluid overload)

→ Medical history, Urinary and Blood sample

Confirm diabetes insipidus
- Urine specific gravity below 1.005
- Trend to hypernatremia - hyperosmolarity

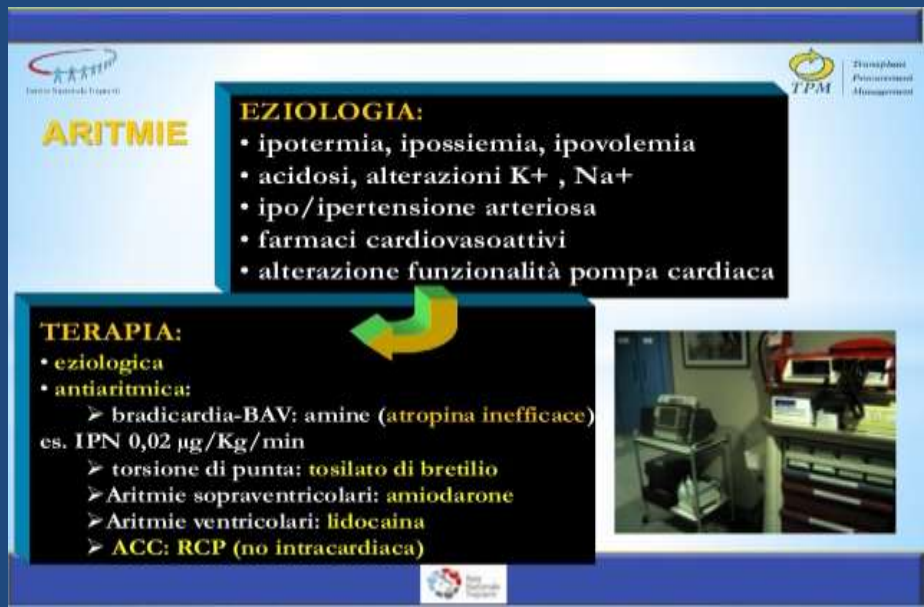
Treatment

- **Symptomatic**
  Compensate polyuria
  Dextrose 2,5% + electrolyte
  Glycemic control
- **Lab Monitoring**
- **Specific**
  desmopressin
  0,5 – 1 µg IV /6 to 12h
  Goal: diuresis 1 – 1,5 mL/kg/h

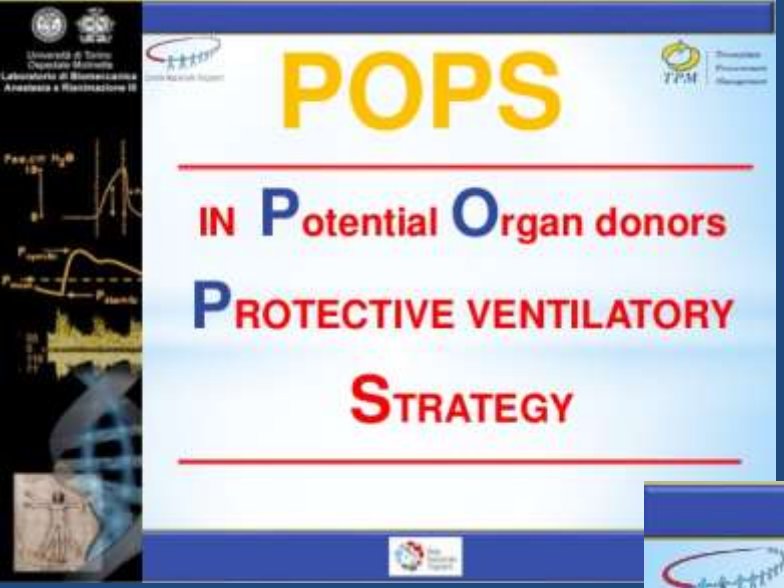
IPERTENSIONE ARTERIOSA

- Eliminare la noxa eziologica
- Esmololo (100-500 µg/Kg bolo) ˇ100-300 µg/Kg/min
- Vasodilatatori: nitroglicerina, nitroprussiato

(0,5-5 µg/Kg/min)



OMEOSTASI POLMONARE



Modello ventilatorio protettivo del polmone (POPS)

TV 6-8 ml/kg

Fr ➡ $PaCO_2$ 35-45 mm Hg

PEEP 8 – 15 cm H_2O

P picco < 30 cm H_20

CPAP (durante la prova di apnea)

FiO_2 < possibile ➡ Param. resp. OK

Test di diffusione O_2

FiO_2 = 1 (10 min.) (PEEP 5 cm H_2O)

PaO_2/FiO_2 = > 300 mm Hg

Reclutamento alveolare

Prevenzione dereclutamento

Nursing respiratorio

Equilibrio endocrino

EQUILIBRIO ENDOCRINO-METABOLICO

Alterazioni dell'asse ipotalamo-adenoipofisi:

Nella morte encefalica si ha:

- ✓ < T3 – T4, TSH < o =
- ✓ cortisolo <
- ✓ insulina <

UTILITA' TERAPIA T3, CORTISOLO, INSULINA PER FAVORIRE LA STABILITA' EMODINAMICA E L'ESTRAZIONE PERIFERICA DI O_2 ??

CLINICAL AND TRANSLATIONAL RESEARCH

ANNI 2000 - 2009
PROC. ORG > 5,02% - 9,23%

Thyroid Hormone Therapy in the Management of 63,593 Brain-Dead Organ Donors: A Retrospective Analysis

Dimitri Novitzky,[1] Zhihao Mi,[2] Qing Sun,[2] Joseph F. Collins,[3] and David K.C.

Circulating renistin levels are early and significantly increased in deceased brain dead organ donors, correlate with inflammatory cytokine response and remain unaffected by steroid treatment

11 TRIALS
14 LAV. OSS.

REVIEW ARTICLES

Corticosteroids in the management of brain-dead potential organ donors: a systematic review

S. Dupuis[1,2,3*], J.-A. Amiel[1,2], M. Desgroseilliers[1,3], D. R. Williamson[1,3], Z. Thiboutot[4], K. Semi[4,7], M. M. Perreault[1,2], P. Marsolais[4,7] and A. J. Frenette[1,3]

TERAPIA ORMONALE SOSTITUTIVA INDICAZIONI

EMODINAMICA "INSTABILE"
"STUNNED HEARTS"

Scarsa o difficoltosa responsività a riempimento volemico

Necessità di elevato e/o prolungato apporto di amine cardiovasoattive

Deficit di pompa cardiaca (Ecocardiografia: FEVS < 40-45% - alterazione cinesi/volumi cav. cuore ecc- alterazione parametri emodinamici
Oligoanuria – Aritmie – Troponina > ecc.)

Equilibrio idroelettrolitico

Target

- Natriemia Na 130-150 mEq/L (trattata se > 150 mEq/L)
- Kaliemia K 3-5 mEq/L
- Calcemia 4.4-5.2mEq/L
- Cl - Mg++ Ca++ P++

Effetti collaterali

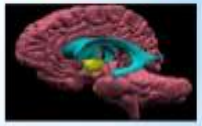
- Aritmie
- Alterazioni emodinamiche
- Alterazione funzionalità organi

Omeostasi Termica e Glucidica

MANTENIMENTO DELLA TEMPERATURA CORPOREA: IPOTERMIA

MECCANISMO

Distruzione ipotalamo → assenza termogenesi e assenza riflessi antitermodispersione → POICHILOTERMIA



CONSEGUENZE

- depressione miocardica
- aritmie (QT lungo, inv. T, FA, FV)
- acidosi
- alterazione della coagulazione/microtrombi
- squilibri elettrolitici/enzimatici
- ridotta liberazione di O_2 tessuti
- iperglicemia
- < metabolismo farmaci (amine)

SONDA ESOFAGEA

36 °C

ALTERAZIONI DEL METABOLISMO DEL GLUCOSIO

IPERGLICEMIA

CAUSE

- < insulina
- infusione di catecolamine
- infusione di glucosate pregresso trattamento con corticosteroidi
- ipotermia

CONSEGUENZE

- chetoacidosi
- Glicosuria. Poliuria osmotica
- disidratazione e ipovolemia

TRATTAMENTO

- insulina pronta ev → normalizzazione della glicemia (80-130 mg/dl)

1 U/h o bolo 10-20 U

MANTENIMENTO DELLA FUNZIONE EMOSTATICA

Anomalie della coagulazione

CAUSE:

- stati di fibrinolisi
- DIC
- trasfusioni massive di sangue citratato
- ipotermia

CONSEGUENZE:

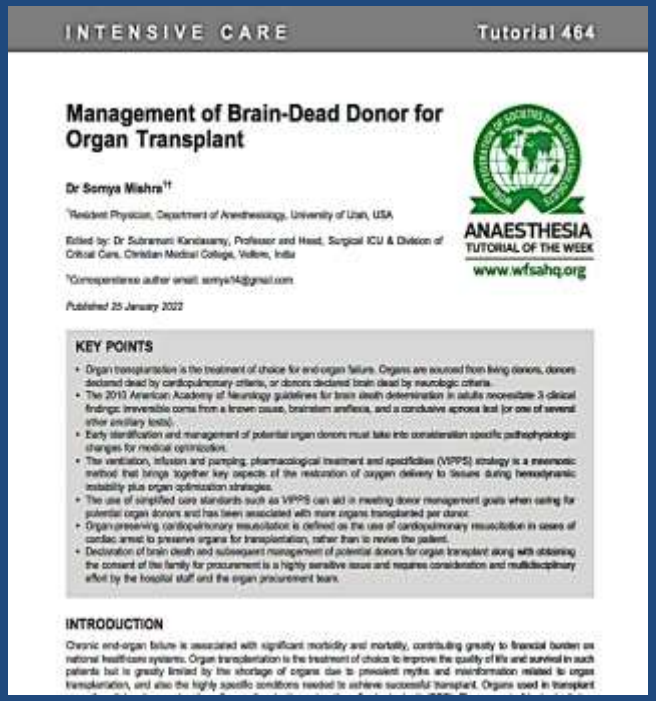
- consumo piastrinico e di fattori della coagulazione
- emorragie
- formazione microtrombi

TRATTAMENTO

Trasfusioni di emazie concentrate, plasma fresco, piastrine conc., fattori della coagulazione, Ca^{++} → Normalizzazione dei parametri della coagulazione

Profilassi Antibiotica

- Cefalosporine di III –IV
- Carbapenemico/tazobactam
- Glicopeptide/antifungino



INTENSIVE CARE Tutorial 464

Management of Brain-Dead Donor for Organ Transplant

Dr Somya Mishra[1*]

[1]Resident Physician, Department of Anesthesiology, University of Utah, USA

Edited by: Dr Subramani Kandasamy, Professor and Head, Surgical ICU & Division of Critical Care, Christian Medical College, Vellore, India

[1]Correspondence author email: somya14@gmail.com

Published 25 January 2022

ANAESTHESIA TUTORIAL OF THE WEEK
www.wfsahq.org

KEY POINTS

- Organ transplantation is the treatment of choice for end-organ failure. Organs are sourced from living donors, donors declared dead by cardiopulmonary criteria, or donors declared brain dead by neurologic criteria.
- The 2010 American Academy of Neurology guidelines for brain death determination in adults necessitate 3 clinical findings: irreversible coma from a known cause, brainstem areflexia, and a conclusive apnoea test (or one of several other ancillary tests).
- Early identification and management of potential organ donors must take into consideration specific pathophysiologic changes for medical optimization.
- The ventilation, infusion and pumping, pharmacological treatment and specificities (VIPPS) strategy is a mnemonic method that brings together key aspects of the restoration of oxygen delivery to tissues during hemodynamic instability plus organ optimization strategies.
- The use of simplified care standards such as VIPPS can aid in meeting donor management goals when caring for potential organ donors and has been associated with more organs transplanted per donor.
- Organ-preserving cardiopulmonary resuscitation is defined as the use of cardiopulmonary resuscitation in cases of cardiac arrest to preserve organs for transplantation, rather than to revive the patient.
- Declaration of brain death and subsequent management of potential donors for organ transplant along with obtaining the consent of the family for procurement is a highly sensitive issue and requires consideration and multidisciplinary effort by the hospital staff and the organ procurement team.

INTRODUCTION

Chronic end-organ failure is associated with significant morbidity and mortality, contributing greatly to financial burden on national healthcare systems. Organ transplantation is the treatment of choice to improve the quality of life and survival in such patients but is greatly limited by the shortage of organs due to prevalent myths and misinformation related to organ transplantation, and also the highly specific conditions needed to achieve successful transplant. Organs used in transplant

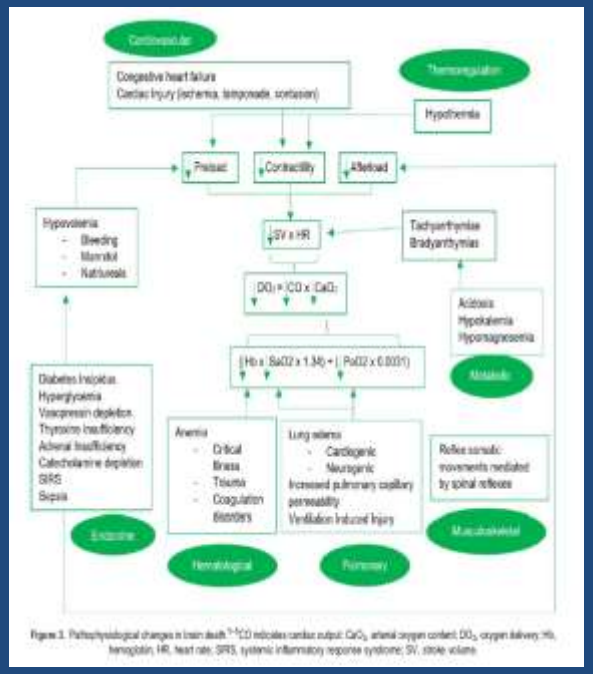


Figure 3. Pathophysiological changes in brain death. [1-12] CO indicates cardiac output; CaO_2, arterial oxygen content; DO_2, oxygen delivery; Hb, hemoglobin; HR, heart rate; SIRS, systemic inflammatory response syndrome; SV, stroke volume.

System and Variable	Target Range	Management
Cardiovascular		
MAP	60-110 mm Hg	Initial volume expansion:
Central venous pressure	4-12 mm Hg	If MAP < 65 mm Hg or diuresis < 1 mL/kg/h, infuse 20-30 mL/kg of crystalloid.
Heart rate	60-120 beats/min	Fluid responsiveness evaluation after
Ejection fraction	≥ 50%	initial volume expansion:
No. of low-dose vasopressors	≤ 1	Infuse more fluid only if clinical assessment suggests hypovolemia (eg, ΔPp ≥ 13%, inferior vena cava collapse on echo, etc.).
		If MAP < 65 mm Hg despite the initial infusion of 20-30 mL of crystalloid:
		Norepinephrine or dopamine plus vasopressin 1 U + 0.5-2.4 U/h.
		Dobutamine only when there is evidence of ventricular dysfunction.
Respiratory		
Pa_{O_2}/Fi_{O_2} ratio	≥ 300	Lung-protective ventilatory strategy: TV 6-8 mL/kg of predicted body weight, PEEP 5 cm H_2O and increased as necessary.
		Recruitment maneuvers
Renal		
Urine output	≥ 1 mL/kg/h over last 4 hours	Judicious use of fluids to maintain MAP and normovolemia
Metabolic		
Arterial blood gas pH	7.3-7.5	Adequate volume resuscitation
Sodium	≤ 155 mEq/dL	If S_{Na^+} > 155 mEq/dL, infusion of a hypotonic solution 0.45% NaCl (77 mEq/dL) or 5% dextrose as a maintenance fluid at a rate of 0.5-1.0 mEq/dL/h to avoid cerebral edema and its sequelae.
Endocrine		
Glucose	≤ 180 mg/dL	Insulin infusion to maintain serum glucose ≤ 180 mg/dL.
Temperature	≥ 35°C	Consider hormone replacement therapy

Table 1. Donor management goals.[1-12] MAP indicates mean arterial pressure; Pa_{O_2}, partial pressure of arterial oxygen; Fi_{O_2}, fraction of inspired oxygen; ΔPp, pulse pressure variation; TV, tidal volume; PEEP, positive end-expiratory pressure.

Questa edizione rivista, include un nuovo capitolo sulla **"donazione pediatrica"**, **"Comunicazione del rischio e processo decisionale condiviso"** affronta il consenso per il trapianto di organi e la donazione di esseri viventi e fornisce una guida per la gestione delle crisi e la comunicazione quando si affrontano reazioni o eventi avversi gravi.

Caso clinico

Pz: uomo 45 aa SRI LANKA ricoverato 14 luglio 2022
Anamnesi remota: varici arti inf.

Diagnosi di ricovero: *Coma post-ROSC*

presso il proprio domicilio si verifica ACC, rianimato dalla famiglia e poi dai sanitari del 118, ripreso il ritmo veniva trasferito presso struttura ospedaliera, diversa dalla nostra, e vi giungeva:

-incosciente non analgosedato
-midriatico, pupille areagenti, assenti riflessi del tronco encefalico
-emodinamica instabile PA 50/30
-acidosi metabolica

Viene sottoposto

-ECG: RS a fc 65 bpm

-Ecocardio: apice acinetico, ipocinesia del setto medio distale, cavità destre nella norma, assente versamento pericardico

Trattamento:

- Solf. Mg
- Dobutamina 4 mcg/kg/min
- Noradrenalina 0,28 mcg/kg/min
- Ringer A 100 ml7h

Sodio bicarbonato 1,4%, 100 ml7h

Ci viene trasferito presso il nostro reparto nella stessa giornata

nel nostro reparto

Esegue AngioTAC encefalo e valutazione NCH:
emorragia subaracnoidea diffusa e scarsa differenziazione bianca-grigia come da edema cerebrale diffuso. No int chirurgico

Ecocardio: **Ventricolo sinistro lievemente ipertrofico (FE 56%)** *Sezioni destre nei limiti lievemente ipocinetico Apparati valvolari senza alterazioni morfologiche di rilievo. E/A < 1. PAPs non campionabile. Vena cava mal visualizzabile.*

→

STOP Dobutamina

↓

Noradrenalina 0,4 mcg/kg/min

Ringer A 100 ml7h
NPT 60 ml/h
Antibiotico terapia

↓

PA 90/50 FC 45 bpm diuresi 100ml/h

EGA: Ph 7,31, pCO2 44,pO2 104, HCO3 22, K 4,02, latt 1,8 mmol/l, hgt 139

←

START Adrenalina 0,04 mcg/kg/min

↓ Noradrenalina 0,2 mcg/kg/min

A 24 h dall'ACC si convoca la CAM per l'accertamento della morte encefalica consenso alla donazione da parte della famiglia

MANTENIMENTO DEL DONATORE CARATTERIZZATO DA: →

-instabilità emodinamica
-ipokaliemia
-acidosi metabolica con:
↑lattati ↓ HCO3 ↑HGT BE -10,6
-poliuria

TRATTAMENTO:

-Noradrenalina 0,2 mcg/kg/min
-Adrenalina 0,07 mcg/kg/min
-Riempimento volemico con cristalloidi 300 ml/h
-Desmopressina per la poliuria
-Insulina in IC sec HGT
-Soluzione bicarbonato 1,4 % 150 ml/h
-Correzione dell'ipokaliemia valore all'EGA k 1,75 mmol/l molto resistente alla correzione

Report di misura

15.07.22 13:29

cobas b 123 POC system

Numero serie	40244
Nome dispositivo	COBAS B123
Nome ospedale	P.O GARIBALD RIANIMAZION
ID campione	7103
Modo campione	Normale

ID paziente	3
Tipo campione	Sangue
Tipo sangue	Arteriosc
Temperatura	37.0 °C
FIO_2	0.50

FO_2Hb	0.946		
tHb	12.9 g/dL	[	11.5
pH	7.253	[	7.350
PCO_2	44.7 mmHg	[	32.0
PO_2	72.6 mmHg	[	83.0
Hct	31.7 %	[	36.0
Na^+	153.6 mmol/L	[	136.0
K^+	1.75 mmol/L	[	3.50
Ca^{2+}	1.511 mmol/L	[	1.150
Cl^-	124.8 mmol/L	[	98.0
Glu	238 mg/dL	[	74
Lac	5.7 mmol/L	[	1.0
SO_2	96.4 %	[	94.0
MetHb	0.7 %	[	0.0
HHb	3.5 %	[	0.0
$cHCO_3^-$	19.3 mmol/L		
BE_{ecf}	-7.87 mmol/L		
Indice PF	145.25 mmHg		
PAO_2	306.1 mmHg		
BE	-7.65 mmol/L		

Report di misura

Roche

15.07.22 19:33

cobas b 123 POC system

Numero serie	40244
Nome dispositivo	COBAS B123
Nome ospedale	P.O GARIBALDI CENTRO RIANIMAZIONE
ID campione	7113
Modo campione	Normale

ID paziente	3
Tipo campione	Sangue
Tipo sangue	Arterioso
Temperatura	37.0 °C
FIO_2	0.99

FO_2Hb	0.976				
tHb	13.2 g/dL	[	11.5 -	17.8]	
pH	7.374	[	7.350 -	7.450]	
PCO_2	37.2 mmHg	[	32.0 -	48.0]	
PO_2	122.4 mmHg	[	83.0 -	108.0]	↑
Hct	31.4 %	[	36.0 -	53.0]	↓
Na^+	159.7 mmol/L	[	136.0 -	145.0]	↑
K^+	1.81 mmol/L	[	3.50 -	5.10]	↓
Ca^{2+}	1.585 mmol/L	[	1.150 -	1.330]	↑
Cl^-	128.0 mmol/L	[	98.0 -	107.0]	↑
Glu	217 mg/dL	[	74 -	101]	↑
Lac	4.0 mmol/L	[	1.0 -	1.8]	↑
SO_2	99.5 %	[	94.0 -	98.0]	↑
MetHb	0.8 %	[	0.0 -	1.5]	
HHb	0.5 %	[	0.0 -	2.9]	
$cHCO_3^-$	21.2 mmol/L				
BE_{ecf}	-4.01 mmol/L				
Indice PF	123.65 mmHg				
PAO_2	665.2 mmHg				
BE	-3.49 mmol/L				

Report di misura

16.07.22 00:00

cobas b 123 POC system

Numero serie	40244
Nome dispositivo	COBAS B123
Nome ospedale	P.O GARIBALDI CENT RIANIMAZIONE
ID campione	7117
Modo campione	Normale

ID paziente	3
Tipo campione	Sangue
Tipo sangue	Arterioso
Temperatura	37.0 °C
FIO_2	1.00

FO_2Hb	0.981			
tHb	13.5 g/dL	[	11.5 -	1
pH	7.462	[	7.350 -	7.
PCO_2	29.7 mmHg	[	32.0 -	4
PO_2	264.9 mmHg	[	83.0 -	10
Hct	30.9 %	[	36.0 -	5
Na^+	160.6 mmol/L	[	136.0 -	14
K^+	3.25 mmol/L	[	3.50 -	5
Ca^{2+}	1.403 mmol/L	[	1.150 -	1.
Cl^-	129.9 mmol/L	[	98.0 -	10
Glu	152 mg/dL	[	74 -	
Lac	3.7 mmol/L	[	1.0 -	
SO_2	100.0 %	[	94.0 -	9
MetHb	0.7 %	[	0.0 -	
HHb	0.0 %	[	0.0 -	
$cHCO_3^-$	20.8 mmol/L			
BE_{ecf}	-3.01 mmol/L			
Indice PF	264.94 mmHg			
PAO_2	680.6 mmHg			
BE	-1.89 mmol/L			

Il CRT allocava:

-Fegato in regione

-Reni fuori regione

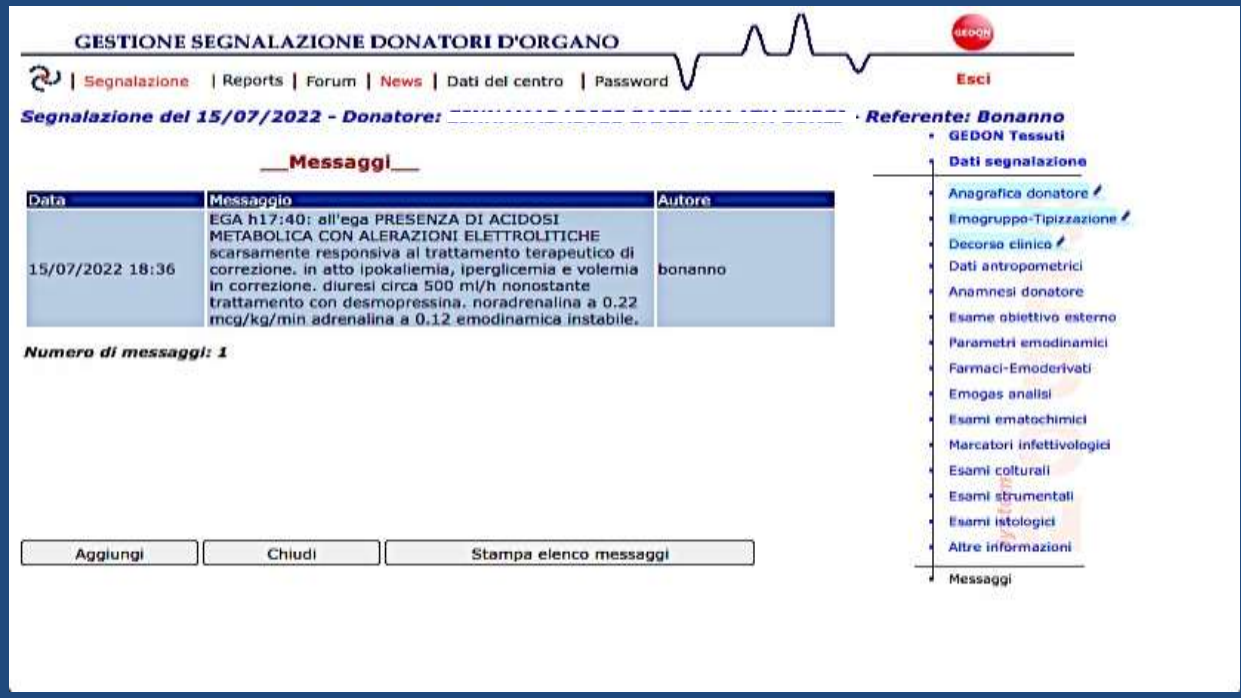
-Cuore fuori regione

per urgenza nazionale

Rischio non standard accettabile

seconda opinion infettivologica

Per PCT 7,8 GB16,7



GESTIONE SEGNALAZIONE DONATORI D'ORGANO

| Segnalazione | Reports | Forum | News | Dati del centro | Password

Esci

Segnalazione del 15/07/2022 - Donatore: [illegible] · Referente: Bonanno

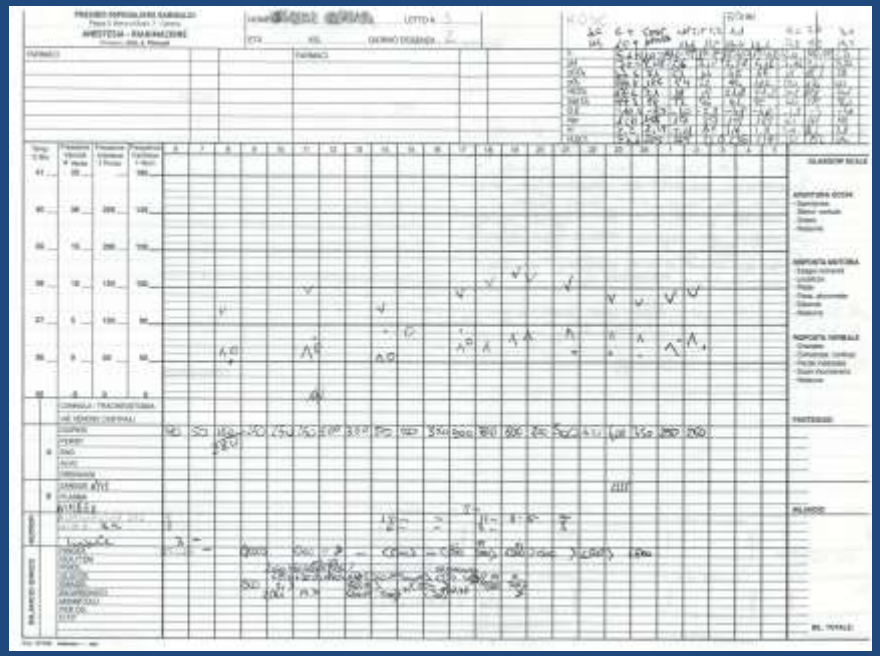
__Messaggi__

Data	Messaggio	Autore
15/07/2022 18:36	EGA h17:40: all'ega PRESENZA DI ACIDOSI METABOLICA CON ALERAZIONI ELETTROLITICHE scarsamente responsiva al trattamento terapeutico di correzione. in atto ipokaliemia, iperglicemia e volemia in correzione. diuresi circa 500 ml/h nonostante trattamento con desmopressina. noradrenalina a 0.22 mcg/kg/min adrenalina a 0.12 emodinamica instabile.	bonanno

Numero di messaggi: 1

Aggiungi | Chiudi | Stampa elenco messaggi

- GEDON Tessuti
- Dati segnalazione
- Anagrafica donatore
- Emogruppo-Tipizzazione
- Decorso clinico
- Dati antropometrici
- Anamnesi donatore
- Esame obiettivo esterno
- Parametri emodinamici
- Farmaci-Emoderivati
- Emogas analisi
- Esami ematochimici
- Marcatori infettivologici
- Esami colturali
- Esami strumentali
- Esami istologici
- Altre informazioni
- Messaggi



Alle ore 02:00 il pz viene trasferito in S.O.

-PA 140/80, FC 78, T 36,6

-adrenalina 0,04 mcg/kg/min

-noradrenalina 0,18 mcg/kg7min

-diuresi 200 ml/h

-Hb 14,3 dopo trasf 1 EC

-EGA: ph 7,50, pO2 101, pCO2 28,HCO3 24,5, BE -1,6, K 3,8, Latt 3,4 HGT 141

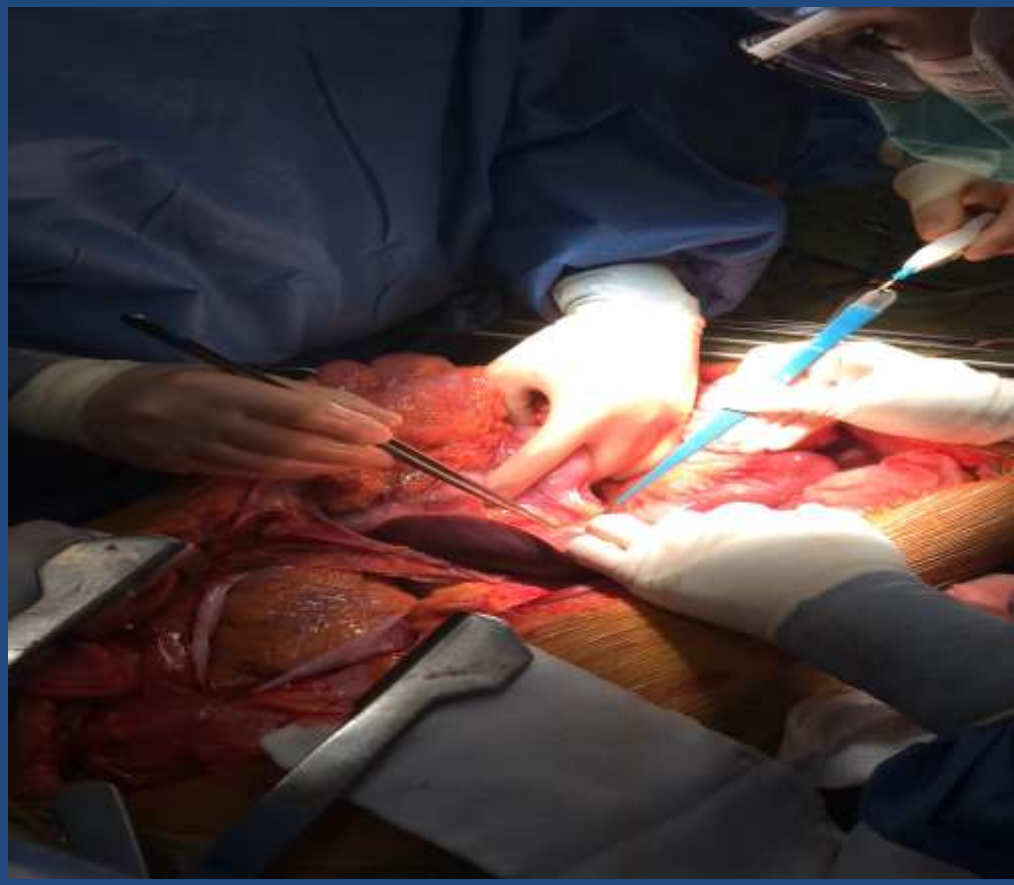
Sono stati prelevati e trapiantati con successo:

-Fegato

-Reni

-Cornee

-Cuore non idoneo al tavolo operatorio



Ricomposizione accurata della salma

grazie