HYGEIA GROUP

HYGEIA HOSPITAL TIRANA

Post – resuscitation care

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No conflict of interest

What do we know so far …

- In-hospital mortality rates:
  - 50% for 672 adult & children whose "*heart beat restarted*"

    Stephenson et al , 1953
  - 67 & 55% for 19,819 adults & children who regain ROSC

    Nadkami et al, 2006
- Only 7,9% of treated CA survive to hospital discharge

  Nichol et al, 2008

Destiny after ROSC …

Survival is dependant by **quality** of in-hospital treatment after ROSC

Engdahl et al, 2000

Laghelle et al, 2003

Herlitz et al, 2006

Carr et al, 2009

Chain of survival

- Preserving function
- Restoring quality of life

ERC GUIDELINES 2005 EDITION

Pathophysiologic mechanisms

- Post-Cardiac Arrest Syndrome
  - ❖ Brain injury
  - ❖ Myocardial dysfunction
  - ❖ Systematic ischemia / reperfusion response
  - ❖ Persistent precipitating pathology

Binks A, Nolan JP, 2010; Nolan et al. ILCOR CONSENSUS STATEMENT. 2008

Post-Cardiac Arrest Syndrome

- Brain injury
  - 2/3 of deaths in patients following OHCA
  - Persistent coma; myoclonic status or brainstem death
  - Several complex mechanisms
    - free radical formation
    - disordered Calcium homeostasis
    - activation of cell death signaling pathways
    - pathological protease cascades and
    - excitotoxicity

Post-Cardiac Arrest Syndrome

- Brain injury
- Myocardial dysfunction
  - Very common
  - Myocardial stunning & to ACS
  - Reversible & amenable to treatment

Post-Cardiac Arrest Syndrome

- Brain injury
- Myocardial dysfunction
- Systematic ischemia / reperfusion response
  - Activation of immunological & coagulation pathways
  - Multiple organ failure
  - Increased risk of infection
  - “sepsis - like” syndrome

Post-Cardiac Arrest Syndrome

- Brain injury
- Myocardial dysfunction
- Systematic ischemia/reperfusion response
- Persistent precipitating pathology
  - AMI, Pulmonary emboli

Therapeutic strategies:
ABCDE approach

Arterial blood gases

- To ensure adequacy of ventilation and oxygenation
- To ensure correction of acid/base imbalance

Echocardiography

- To identify contributing causes to cardiac arrest.
- To assess size/function of cardiac structures (chambers, valves), presence of pericardial effusion Cranial Computed tomography
- If the immediate cause of cardiorespiratory arrest is not obvious
- To identify causes to cardiac arrest (subarachnoid/ subdural haemorrhage, intracerebral bleeding, tumour)
- To identify cardiac arrest associated changes (e.g. oedema)

Full blood count

- To exclude anaemia as contributor to myocardial ischaemia and provide baseline values

Biochemistry

- To assess renal function
- To assess electrolyte concentrations (K^+, Mg^{2+}, and Ca^{2+})*
- To ensure normoglycaemia
- To commence serial cardiac troponin measurements
- To provide baseline values

12-lead ECG

- To record cardiac rhythm**
- To look for evidence of acute coronary syndrome
- To look for evidence of old myocardial infarction
- To detect and monitor abnormalities (e.g. QT prolongation)
- To provide a baseline record

Chest radiograph

- To establish the position of a tracheal tube, a gastric tube, and/or a central venous catheter
- To check for evidence of pulmonary oedema
- To check for evidence of pulmonary aspiration
- To exclude pneumothorax
- To detect unintended CPR sequelae (e.g. sternal, rib fracture)
- To assess cardiac contour (accurate assessment of heart size requires standard PA erect radiograph – not always practicable in the post-resuscitation situation)

ERC ADVANCED LIFE SUPPORT. ERC GUIDELINES 2010 EDITION

What is the optimal treatment after ROSC?

Airway & **B**reathing

- ✓ Intubation & ventilation???
- ✓ Delivering O_2 : SpO2: 94-98%
- ✓ Waveform capnography & ABGs

What is the optimal treatment after ROSC?

Circulation

- ✓ Early PCI, fibrinolysis
- ✓ Early ECHO
- ✓ Fluids, inotropes, vasopressors, IABP
- ✓ MAP 65-100 mmHg (*urine output:1ml* kg^{-1} h^{-1})
- ✓ K^+ : 4.0 - 4.5mmoll^{-1}

What is the optimal treatment after ROSC?

Disability-optimizing neurological recovery

- ✓ Seizure control
- ✓ Glucose control: ≤ 180 mg/dl
- ✓ Control of temperature
  - Treatment of hyperpyrexia
  - Therapeutic hypothermia

Prognostication

- Complex
- Predictors of poor long-term outcome
  - Absence @ 72 h post-ROSC of papillary light & Corneal reflexes
  - Myoclonic Status Epilepticus???
  - SSEPs-N20, Biochemical markers, EEG, C/T, MRI

Conclusion

- Return of spontaneous resusitation is **JUST** the 1st step in a continuum of resuscitation
- Coordinated – goal directed approach
  - ✓ PCI
  - ✓ If adequate awake, *keep the pt awake*
  - ✓ If comatose
    - Keep the pt sedate and cold (TH)
    - Early optimization of hemodynamic & O_2
    - Focus on optimal vital organ perfusion
    - Prognostication not earlier than 72 h post normothermia in comatose pts

THE NEW YORKER, JANUARY 17, 2000