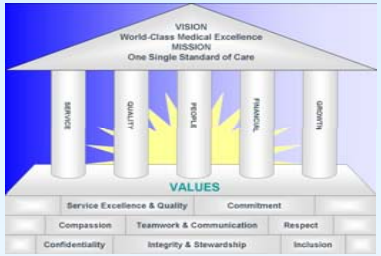
Implementing Microdialysis and the Implications for the ICU Nurse

Lee FongHong RN, MBA, MSN, CCRN; Jillian Miller, RN, BSN
Jackson Health System, Miami, Florida

Microdialysis Aligns with JHS Pillar of Quality

Provision of care and treatment of services



Neuroscience Intensive Care Unit

24 bed ICU
Treatment modalities
- Continuous Electroencephalography (EEG)
  - Records electrical activity of the brain
- Microdialysis
- Licox
  - Measures brain tissue oxygenation and temperature
- Intracranial Pressure (ICP) monitoring
  - Measures pressure inside the head
- Induced hypothermia

Microdialysis Equipment

Microdialysis catheter

CMA 106 Microdialysis Pump

CMA 600 Analyzer

www.microdialysis.com

Definition: Microdialysis

Process of monitoring brain chemistry after injury such as a traumatic event to determine the extent of the injury.
The process monitors the levels of glucose and other important solutes in brain tissue.

Brain Tissue Chemistry

Substances monitored includes:
- Glucose
- Lactate
- Pyruvate
- Lactate/pyruvate ratio.

Other substances monitored
- Glutamate
- Glycerol

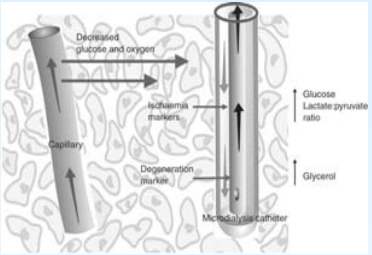
Markers of Cell Damage

Glucose and pyruvate concentrations
- Metabolism involves oxygen use
- Less when there is ischemia

Lactate concentration
- Rises during conditions where there is no oxygen (ischemia)

During ischemia/hypoxia
- Lactate/pyruvate ratios increase

The Concept of Microdialysis



www.microdialysis.com

The probe or catheter mimics a blood capillary. The probe is introduced into tissue and is permeated with a solution at a constant rate. Solutes (analytes) are small enough to cross the probe membrane per diffusion

Patients that had Microdialysis

All have been involved in some traumatic event
All had surgical removal of part of the skull i.e. craniectomy
All had Intracranial Pressure (ICP) monitoring
Other therapies: selected patients with brain oxygenation monitoring (Licox), induced hyperthermia and continuous EEG, chemical paralysis

55 yr old male - Fall
21 yr old female - Shot in head
69 yr old male - Motor Vehicle Crash
57 yr old male - Assaulted
60 yr old male – Pedestrian hit by car
22 yr old male – Motor Cycle Crash
20 yr old male - Motor Vehicle Crash
32 yr old male - Assaulted
17 yr old male – Motor Vehicle Crash
40 yr old female - Fall

Requirements for Implementing Unit Microdialysis

Staff training
Point of Care Testing
- -Laboratory requirements for diagnostic testing at the bedside

Nursing Protocol
Documentation
- -Order set
- -Flow sheet

Role of the ICU Nurse in Microdialysis

Communication: ICU nurse is made aware patient has microdialysis catheter
Two (2) hours before patient arrives to ICU
- -Start up CMA 600 machine
- -Mix reagents and calibrates machine
- -Run quality control samples
- -At bedside, prepare CMA 106 microdialysis pump with perfusion fluid

Once patient arrives in ICU
- -CMA 106 microdialysis pump is attached to catheter.
- -ICU nurse runs samples
- -ICU nurse records data
- -ICU nurse analyzes chemical trends

Resources

Nurse Manager Violet Kramer, RN, MSN - vkramer@jhsmiami.org
Nurse Educator Lee FongHong, RN, MBA, MSN, CCRN - lfonghong@jhsmiami.org
Microdialysis champions
- -Jillian Miller, RN - jmiller1@jhsmiami.org
- -Margie Francis, ARNP, CCRN - mfrancis2@jhsmiami.org

Product representative John Fournier 1-800-440-4980 x126
POC coordinator
- -Virginia Pontigas – virginia.pontigas@jhsmiami.edu

Physician Ross Bullock, M.D., PhD. – rbulluck@med.miami.edu

Center for Nursing Excellence
Jackson Health System