The LICOX® System

Brain Tissue Oxygen Monitoring System

Product Presentation

NS1581-09/07
What is the LICOX® system?

- Measures interstitial brain tissue oxygenation ($P_{btO_2}$) in mmHg and brain temperature (°C)
- Probe inserted approximately 35mm below the dura into the white matter of the brain
- $P_{btO_2}$ used in conjunction with current ICP/CPP monitoring methods
Who needs the LICOX® system?

- Patients at risk for developing cerebral hypoxia or ischemia
- Head trauma patients
- Aneurysm patients
- Subarachnoid hemorrhage patients
- Stroke patients

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When is the LICOX® system placed?

- Within the first 24-48 hours of injury
  - The sooner cerebral hypoxia is detected, the better secondary injury can be prevented
- Generally, when an ICP catheter is required, a LICOX® probe should be considered
How is the LICOX® system placed?

- Can be either *bolted* or *tunneled*
- Can be placed independently or with an ICP catheter
- Requires minimal additional effort
- Does not need to be zeroed prior to placement, SMART card is included with each O₂ probe with all calibration data
- Monitor need not be present when placing in the OR
Where is the LICOX® system placed?

- Placement is up to clinical discretion

- The idea is to prevent SECONDARY injury by ensuring living tissue is receiving adequate oxygen

- LICOX® probe can be placed in either the injured side or non-injured side of brain

- Should not be placed directly into a lesion
What are the probe options?

• BOLTED
  - Double Lumen – Camino® ICP channel and LICOX® PMO catheter channel (IP2P)
• TUNNELED
  - Licox® PMO combined oxygen and temperature catheter (IT2)
• Probe kits come with required drill bits and other accessories
How accurate are the probes?

Oxygen Accuracy:

- \( P_{bt\ O_2} \) 0-20 mmHg accuracy is ± 2 mmHg
- \( P_{bt\ O_2} \) 21-50 mmHg accuracy is ± 10%
- \( P_{bt\ O_2} \) 51-150 mmHg accuracy is ± 13%

Temperature Accuracy: ± 0.2 °C
What about the nursing staff?

- Simple monitor set-up and use
- The monitor displays a digital oxygen and temperature reading
- Alarms are managed through a connection to the bedside monitor
What is a “normal” reading?

• Normal: 25-35 mmHg
• Risk of death increases
  – < 15 mmHg for 30 minutes
  – < 10 mmHg for 10 minutes
• $P_{bt}O_2 < 5$ mmHg
  – high mortality
• $P_{bt}O_2 \leq 2$mmHg - neuronal death\(^1\)

How is patient outcome affected?

- Its been found:
  - Head injured patients who undergo aggressive therapy to maintain ICP/CPP at normal levels still experience periods of severe brain hypoxia\(^1\)
  - Interventions previously thought to improve tissue oxygenation may improve ICP and CPP but actually decrease \(P_{bt}O_2\)\(^2\)

How is patient outcome affected?

• The $P_{bt}O_2$ number can provide:
  – Notification of hypoxic episodes
  – Independent predictors of unfavorable outcome and death

• Treatments to maintain $P_{bt}O_2$ correspond to more favorable patient outcomes

Is the LICOX® system cost-efficient?

• Added costs the Licox® system are justified by significantly improved outcomes

• Implementation of new protocols using P_{bt\text{O}_2}
  – Improve patient care\textsuperscript{1}
  – Better utilize resources\textsuperscript{1}
  – Probable reduction of
    • Ventilator days\textsuperscript{1,2}
    • ICU days\textsuperscript{1,2}
    • Overall hospital days\textsuperscript{1,2}

How is the LICOX® system different than a Jugular Venous Bulb?

- Jugular bulb oximetry, SjvO₂, measures oxygen saturation of venous blood
  - Measures global oxygen reduction
  - Cannot identify regional cerebral ischemia
  - May lead to secondary injury¹,²


How is LICOX® different than a Jugular Venous Bulb?

- SjvO₂ measurements are shown to be unreliable
  - Good quality data are only obtained about 50% of the placement time¹,²,³
  - SjvO₂ is difficult to use in children due to small vein size⁴

A few institutions that have published clinical studies with the LICOX® systems:

- Mission Hospital
  - Mission Viejo, CA
- Harborview
  - Seattle, WA
- Creighton University
  - Omaha, NE
- University of Pennsylvania Hospital
  - Philadelphia, PA
Thank you for your time!

Please contact us anytime should you have any further questions.
References


References (cont.)


