

Approved by Quality & Patient Care Committee  
20 December 2018

## **NICOLETONE (AEEG) BRAIN MONITOR**

*This Local Operating Procedure is developed to guide safe clinical practice in Newborn Care Centre (NCC) at The Royal Hospital for Women. Individual patient circumstances may mean that practice diverges from this Local Operating Procedure.*

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### **1. AIM**

- To apply the Viasys NicoletOne aEEG monitor to the newborn for brain monitoring

### **2. PATIENT**

- Newborns

### **3. STAFF**

- Medical and nursing staff

### **4. EQUIPMENT**

- NicoletOne machine and cables
- 6 EEG electrodes (gold)
- Packet of Gauze
- Sensor-positioning aid (Brainz brand) or tape measure
- NUPREP Abrasive Gel
- Conductive EEG paste (EC2)
- "Mefix" Tape / "Surgifix" Tubular stretch bandage
- Sucrose and 1mL syringe for dispensing
- Micropore
- Crepe Bandage
- Note: All the above stored in EEG Transport Box on the NicoletOne

#### **NOTE:**

The following babies may be considered for aEEG monitoring:

- Any baby who is receiving whole body hypothermia (cooling) as per the RHW NCC LOP – Cooling for Hypoxic-Ischaemic Encephalopathy in Infants  $\geq$  35 Weeks Gestation
- Any baby with abnormal movements or severe apnoeas that raise the suspicion of seizure activity
- Any baby with a suspected encephalopathy such as markedly abnormal tone or responsiveness
- A muscle-relaxed (paralysed) baby (eg. on pancuronium or rocuronium) who is at risk of HIE or neurologic abnormality
- Any baby with a probable significant hypoxic/ischaemic event around birth

### **5. CLINICAL PRACTICE**

#### **Procedure:**

1. Obtain verbal consent from parents.
2. Administer sucrose to the infant prior to commencement of the procedure.

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Starting the NicoletOne monitor

3. Plug electrical cord into mains power.
4. Check:
  - Connections on right edge of screen are secure before switching on
  - Amplifier Headbox is plugged into cable connected to screen
5. Switch machine on (switch is located at the bottom of screen next to power cord entry).
6. Click OK on Log On Box (no password is required).
7. Double-click on NicVue Icon (patient database should now be on the screen).
8. Click NEW (located at the upper left corner of screen).
9. Enter patient details for new patient:
  - For DOB ⇒ use DD/MM/YYYY
  - Click Nicolet icon (centre of screen display of montage selections)
  - Select "RHW aEEG protocol" (in protocol box (F3, F4, P3, P4) – Even is on Right; Odd is on Left
  - Impedance value is set at <math><10\text{K}\Omega</math> in threshold box and do not change

Preparing the Infant for aEEG Electrode Application

10. Clean the work surface with cleaning solution.
11. Open gauze pack. Lay out equipment. Mark location for electrode attachment on head with marker pen (See section on Identification of Location for aEEG Electrodes).
12. Remove any visible dried blood on hair. Gently pat dry with gauze without washing off the marked location points. DO NOT use alcohol to clean skin area.

Attaching EEG leads

13. Feed all 6 electrode cables through 10cm length of Surgifix tubular bandage.
14. Surface Electrode Application:
  - Part hair at sites that have been measured
  - Rub sites with Nuprep Abrasive gel using 3 cotton wool buds from the pack
  - Wipe edges of prepped area of excess cream
  - Put a blob of EC2 paste onto the electrode underside
  - Apply Mefix square on top of gold surface electrode and apply to cleaned/abraded surface
  - Plug electrode cables into Reference and Ground sockets on NicoletOne amplifier box
15. Apply the other 4 gold electrodes in the locations as set out above, with leads pointing up towards the vertex of the head.
16. Plug the 6 electrode cables into the sockets on NicoletOne amplifier box in the following locations:
  - LHS Frontal into F3
  - LHS Parietal into P3
  - RHS Frontal into F4
  - RHS Parietal into P4
  - Forehead into Ground
  - Occipital into Reference
17. Click on *Impedance* icon on Toolbar (top left of monitor screen). Check impedance is <math><10\text{k}\Omega</math> as you attach each electrode to patient (before checking impedance, Ground and Reference electrodes must be attached).
18. Apply bandage around head and chin

**NOTE:**

If impedance colour is red (impedance >10kΩ):

- Check electrode fixation on the electrode indicated by the montage
- If still >10 repeat procedure reapply the electrode

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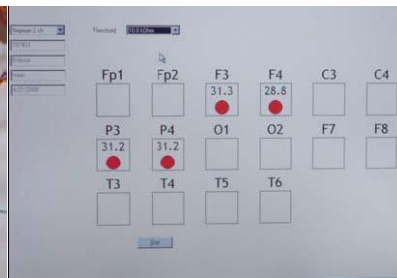
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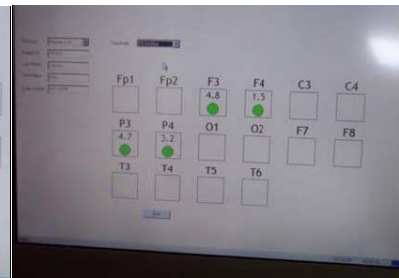
19. Slide Surgifix over infant's head to support electrode fixation (Picture 1).
20. To re-Check the contact impedance:
  - Each of the 6 lights indicates one of the 6 electrodes in the scalp
  - All 6 lights should be green
  - If impedance colour is Red (impedance >10kΩ)
    - Repeat procedure and reapply the electrodes
    - If all lights are red check Reference and neutral fixation (See Picture 2)
    - If all lights are green commence monitoring (See Picture 3)



Picture 1



Picture 2



Picture 3

To Commence Monitoring

21. Click Start button on screen below connection layout.
22. Select "Notch" in Toolbar on top of screen (this will filter unwanted noise from signal).

**NOTE:**

Event boxes (RHS of lower EEG trace) can be selected to add event markers to recording.

To Ensure Accurate Recording

23. If electrodes disconnect or impedance becomes >10kΩ:
  - A Bad Electrode Event Alert Box will appear on the monitor impedance screen
  - Click OK and then select Impedance box on top of Toolbar of screen to check electrode indicators
  - Follow instructions (see above) to improve contact if impedance for any lead is >10kΩ
  - Click START box to recommence recording
  - Decrease electrical interference if possible
  - Turn off non-essential equipment (such as radios and mobile phones) where possible.

To Shut Down

- Select "File" on top left of Acquisition Screen and click on "Exit".
- Select "OK" to "Do you want to close the ongoing test".
- Select "File" on top left of Database Screen and click on "Exit".
- Select "Start" at bottom left of screen then select "Shutdown" in menu box.

**NOTE:**

DO NOT remove power until Windows message on screen says it is safe to do so.

Removal of electrodes

- Remove Mefix tapes.
- Wipe electrode sites with gauze and warm water.
- Remove electrodes.
- Do not discard electrodes.

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Documentation

- Document observation chart the time aEEG is commenced on the infant.
- Record all seizure activity on Seizure Chart.
- Mark all events on the patient recording using menu buttons on bottom right of screen (e.g. possible seizure, administration of anti-convulsant drugs, IV procedure, suctioning etc.)
- Notify medical staff of any abnormal rhythmic activity that is recorded on the monitor.

**6. DOCUMENTATION**

- eMR
- Daily Care Plan
- Neonatal Observation Chart
- NICUS database

**7. RELATED POLICIES/PROCEDURES/CLINICAL PRACTICE LOP**

- Cooling for Hypoxic-Ischaemic Encephalopathy in Infants  $\geq 35$  weeks Gestation

**8. RISK RATING**

- Low

**9. NATIONAL STANDARD**

- Standard 1 Governance for Safety and quality in Health Service Organisation
- Standard 8 Preventing and Managing Pressure Injuries
- Standard 9 Recognising and Responding to Clinical Deterioration in Acute Health Care

**10. ABBREVIATIONS AND DEFINITIONS OF TERMS**

aEEG	Amplitude-Integrated Electroencephalogram	RHW	Royal Hospital for Women
NCC	Newborn Care Centre		

**11. REFERENCES**

- RHW NCC Moderate Whole Body Hypothermia Protocol for Neonatal Hypoxic-Ischaemic Encephalopathy (HIE) in infants  $\geq 35$  weeks gestation, November 2007.
- The BRAINZ BRM2 Monitor: Its Application and Use in an Infant Patient, 2005.

**12. AUTHOR**

Primary	18/8/2011	J Smyth (Staff Specialist)
Revised	29/8/2018	J Smyth (Staff Specialist)

**REVISION & APPROVAL HISTORY**

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