November 1, 2016

The Canadian Association of Electroneurophysiology Technologists, Inc
L'Association Canadienne des Technologues en Electroneurophysiologie, Inc

STANDARD THREE:
MINIMAL TECHNICAL STANDARDS
CLINICAL ELECTROENCEPHALOGRAPHY:
NEONATAL

INTRODUCTION:

Recording the neonatal EEG poses unique challenges. The technologist is required to modify routine set-up procedures and recording practices.

The following recommendations represent the minimum standards for routine clinical recording of the neonatal EEG and are consistent with the Entry-to-Practice Competencies for the Profession of Electroencephalography Technology

The special requirements for neonatal recording follow and are to be used in conjunction with Standard One, "Minimal Technical Standards Clinical Electroencephalography: Routine Adult".

The recommendation numbers in this document correspond with those in the routine adult standards.

A) EQUIPMENT

2.0 ELECTRODES:

2.1 Subdermal electrodes should not be used in routine recordings of neonates.

B) TEST PREPARATION

1.0 DOCUMENTATION/PATIENT PREPARATION:

1.1 Neonates should be comfortable and, if feasible, fed prior to or during recording in order to encourage sleep.

1.2 In addition to patient identification and clinical history, the following must be documented:

- Gestational age
- Conceptional age (gestational age plus chronological age)
- APGAR (if available)
- Maternal history
- Medications and drug levels
- Cephalic asymmetries; and
- Current clinical status

2.0 ELECTRODES PLACEMENT APPLICATION/REMOVAL:

2.1 A reduced array of electrodes is required when the neonate's head circumference is less than 36 centimeters (cm). Either of two systems of head measurement is acceptable:

2.1.1 The International 10-20 System of Electrode Placement using the Following sites: F1, F2, C3, C4, T3, T4, O1, O2, Fz, Cz, Pz, A1 and A2 (or mastoids, M1/M2) Ground, and reference.

2.1.2 The 12.5 – 25 System of Electrode Placement as proposed by the International Federation of Societies for Electroencephalography and Clinical Neurophysiology (IFSECN), which maps 12 equally distributed electrode positions over the scalp.

2.2 Handling of the neonate should be as minimal as possible.

2.3 Ether-based products such as collodion should not routinely be used for electrode application. Accumulation of fumes in isolettes/incubators due to poor ventilation is noxious.

2.4 Wrapping the neonate's head with gauze or a conforming bandage to further secure the electrodes is recommended.

2.5 Compliance with institutional/laboratory entanglement policy is essential.

3.0 IMPEDANCES:

3.1 Electrode impedances of less than 5Kohms can be obtained regularly, although higher impedances may be allowed in order to avoid excessive manipulation or excessive abrasion of tender skin. It is most important that marked differences in impedances among electrodes be avoided.

C) RECORDING PROCEDURE

1.0 MONTAGES:

1.1 A single, standardized montage should be used throughout the neonatal recording. When necessary, additional montages should be used to enhance localization and signal appreciation.

1.2 Montages selected will utilize "double distance derivations."

2.0 ANNOTATIONS:

2.1 Frequent annotation of patient and environmental changes is crucial for the accurate interpretation of neonatal EEGs. Head, eye and limb movement, lip-smacking and smiling should be clearly indicated as well as changes in state.

3.0 SENSITIVITY SETTINGS:

3.1 Sensitivities of 10 uV/mm and 15 uV/mm are commonly required in neonatal recordings.

4.0 FILTER SETTINGS:

4.1 Low frequency (high-pass) filter settings should be 0.3 Hz or 0.5 Hz to accurately display low frequency signals.

5.0 TIME BASE:

5.1 A time base/sweep speed of 15 mm/sec is recommended.

6.0 LENGTH OF RECORDING:

6.1 A minimum of 60 minutes of artefact-free, neonatal recording is recommended. Obtaining both active and quiet sleep cycles is preferred which may lengthen the recording time. Minimally, capturing an entire episode of quiet sleep and active sleep is recommended.

7.0 RESPONSE TESTING:

7.1 Response testing in stuporous or comatose neonates or those with an invariate EEG pattern should be performed toward the end of the recording and clearly documented on the recording.

8.0 EXTRA-CEREBRAL MONITORING:

8.1 In addition to the adult standard requiring recording of the electrocardiogram (EKG) and electrooculogram (EOG), the following should be monitored:

- Muscle: submental electromyogram (EMG) or movement transducer
- Respirations can be recorded by any of the following means:
    - Abdominal and/or thoracic strain gauges
    - Airway thermistors/thermocouples

D) ACTIVATION

2.0 PHOTIC STIMULATION:

2.1 In neonatal recording, photic stimulation is clinically useful only in the instance of myoclonic seizures, otherwise, it is not recommended.

5.0 SEDATION:

5.1 Spontaneous sleep is preferred for neonatal assessments. The use of sedation is NOT indicated and is NOT recommended.

H) TECHNOLOGIST QUALIFICATIONS:

1.0 SPECIAL REQUIREMENTS:

1.1 Neonatal EEGs should be recorded by or acquired under the direct supervision of a Registered Electroencephalograph Technologist (RET) who has expertise in these specialized studies.

**For references see CAET Standard One.*