ASET Position Statement Invasive Electrode Techniques for Neurodiagnostic Procedures

Neurodiagnostic professionals (i.e., technologists, specialists, surgical neurophysiologists, etc.) who perform IONM are trained to apply recording and stimulating electrodes using a variety of techniques. Most electrodes used for EEG recording are metal discs applied to the skin surface with adhesive materials such as paste, tapes, gels, sticky pads, or collodion. The American Clinical Neurophysiology Society has recommended that needle electrodes not be used for recording routine EEGs (Guideline One, Section 2.2; 2016). However, there are some situations in clinical as well as surgical settings that make needle (subdermal) electrodes a desirable and reasonable option. In these situations, with proper training and diligence with regard to electrical safety and infection control, Neurodiagnostic professionals can become proficient in safe subdermal electrode insertion and subsequent recording.

Because they do penetrate the skin, subdermal electrodes can be considered invasive by strict definition (Bonner & Davidson, 2020). Subdermal electrodes are simply placed under and parallel to the skin and are not inserted into nerves, bone, or vessels. The placement of subcutaneous electrodes is considered an accepted practice for experienced Neurodiagnostic professionals.

Electromyography (EMG) is the use of needle electrodes to record muscle activity, however, and is a medical diagnostic procedure that involves insertion of needle electrodes into muscle mass with exploration of the muscle as it contracts and relaxes and is considered an invasive procedure. The EMG testing session is conducted by an electrodiagnostic medical consultant who interprets the study as he/she performs the procedure. Neurodiagnostic professionals may assist this physician but, in keeping with the practice standards of the American Association of Neuromuscular and Electrodiagnostic Medicine (AANEM), they would not be involved in the needle insertions or interpretation.

Neurodiagnostic professionals do record electrical activity of muscles as components of some surgical monitoring, but this recording is different than an EMG as described above. When subdermal EEG electrodes are used to record muscle activity, the needle may be close to or may even penetrate muscle mass because of the close proximity of the muscle to the skin surface. The Neurodiagnostic professionals can be trained to locate muscles and to insert these electrodes. In instances when the needle is purposefully inserted into
muscle for monitoring purposes, the supervising neurophysiologist is responsible for overseeing the training of the Neurodiagnostic professional who performs IONM procedures and ascertaining his/her technical competency.

Some surgical procedures require the placement of recording or stimulating electrodes within the incision site. These electrodes include cortical strips, grids or wicks, electrodes placed in the epidural space beneath the lamina, in interspinous ligaments or posterior spinous processes. Placement of these electrodes is the responsibility of a physician, not the Neurodiagnostic Technologist. The technologist is responsible for ascertaining that the electrodes are sterile, in proper working condition and suitable for the intended use.

The neurodiagnostic professional is responsible for connecting the electrodes to the recording instrument, for delivering correct and safe levels of current to stimulating devices, for monitoring the recording, and for documenting and reporting procedures in keeping with ASET’s endorsed positions and guidelines.

Reference:

-- Adopted by ASET, August 1997

-- Updated and approved by the ASET Board of Trustees, November 1, 2022

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