ASET Position Statement

Skin Safety During EEG Procedures – A Guideline to Improving Outcome

The ASET Standards & Practice, Skin Safety Task Force was charged with developing best practices to protect the skin integrity of patients undergoing EEG procedures.

An extensive literature search was conducted (see attached bibliography), as well as a review of the American Clinical Neurophysiological Society (ACNS) and the International Federation of Clinical Neurophysiology (IFCN) guidelines, to determine recommendations for skin safety. A survey, posted on the ASET website, soliciting input on this subject with emphasis on patient population (adult/child), technique and products (including electrodes), and length of recording time was conducted.

The committee concludes that products and electrodes have less impact on skin safety than the technique in which they are used. One should review the manufacturers' "recommended use" of the products used for skin preparation and electrode application.

A better understanding of how skin responds related to hydration, air temperature, changing medical condition and external pressure will help guide technique and improve skin safety. Additional skin safety considerations should be employed for neonatal, pediatric, and geriatric populations due to the nature of their thin, delicate skin.

The following suggested techniques are for consideration:

1. **Skin Preparation:**
    - Start with a clean skin surface.
    - Use a cotton swab, preferably with a flexible stick, to apply the skin preparing product. Do not use the tip of the swab but the side of the cotton tip end to prepare the skin surface.
    - When using preparing solution with a cotton-tipped applicator, apply the solution using light, quick strokes in one direction only. Avoid rubbing the solution on the

skin back and forth in two directions, which can cause friction of the skin and an uncomfortable, burning sensation for the patient.

- Very thin, delicate skin may tolerate the preparation more safely by using clean gauze wrapped around the fore finger with the skin preparing agent and gently massaging the marked area.
- Wipe skin preparing solution off after preparation of the area. This will eliminate irritating material between the electrodes and the skin.

2. **Electrodes:**
    - Consideration of disposable electrodes should be evaluated for use on the critically ill patients.
    - If using reusable electrodes be sure that policies for cleaning are adhered to and infectious disease policies address the use of reusable electrodes on patients in isolation.
    - Scott NK. Infection prevention: 2013 review and update for neurodiagnostic technologists. *Neurodiagn J.* 2013 Dec;53(4):271–88.
    - A flat rimmed electrode exerts less pressure on the skin.
    - Thinner, less heavy electrode wire/cable choices will reduce pressure on the electrode and skin underneath.
    - Caution should be taken with electrode metal choice when setting up neonates who are under heat lamps as there have been reports of some metals heating up under heat lamp exposure. It has been noted that the temperature of gold-plated electrodes seems to remain constant in comparison to other metals. Further investigation is encouraged.

3. **Electrode Application:**
    - Fill the head of the electrode with a conductive medium. An ample amount of the conductive medium should be used.
    - Float the conductive filled electrode on the prepared area. Pressing the electrode metal firmly on the skin should be avoided.
    - Cushion the electrode hub and tail with soft cotton or gauze on all exposed skin surfaces (FP1/2, F7/8, A1/2 and any additional low/extra temporal skin surface electrodes).
    - Cover the electrode to secure. The medium for covering and securing the electrode should be assessed. Research has not demonstrated whether Collodion or other medical adhesives reduce or increase skin breakdown. The facility should determine which works better for their patient population.
    - If using collodion-applied electrodes with a thin conductive agent, caution should be taken when filling the electrode cup. A blunt needle tip can easily over-abrade the skin causing injury to the skin surface.

- If wrapping the head, stretchable, breathable, gauze should be considered. You should be able to place two fingers easily under the head wrap. When securing the wrap, do not tape the wrap over the electrode cup, electrode shaft, and tail. An open tubular retainer net dressing allows access to electrodes, visibility of the skin and air flow to aid in skin health. Tubular net dressing works best when a quarter size hole is cut on one side about 2 inches from the end. The net dressing should then be placed over the head prior to electrode application and pulled upwards to cover the head after the electrodes are applied.
- Patients who are unable or have minimal movement of their head and neck (ICU, neonates, and physically challenged patients) should have a cushion placed under the head/neck to relieve the pressure of the electrodes. Silicone/gel packs are helpful in relieving pressure. Nursing/wound care at your facility should be available for recommendation and facilitation of such an apparatus.

4. **Applied Electrode Impedance:**
    - In accordance with the recently revised ACNS guidelines, it is the recommendation that impedances be balanced and maintained up to 10 kilo ohm for extended EEG recordings to help maintain skin integrity.

5. **Skin Safety Checks:**
    - Laboratories should establish a tracking system to ensure skin safety. Consideration regarding impedance (initial and subsequent) values, frequency of electrode site examination, clear delineation of roles and responsibilities of each team member for daily skin integrity check(s) (nursing, wound care specialists, ND technologist) should be established.
    - Any evidence of skin change indicates the electrode site should be cleaned and the electrode moved away from the original site. Adjust homologous areas when necessary to maintain symmetry during recording and document per facility policy.

The Skin Safety Task Force collected data, which strongly discourages the following techniques:

- Non-breathable tape
- Tight head wraps
- Prolonged recordings, over 48 hours, with no skin integrity checks
- Blunt-tipped needles to reduce applied electrode impedance

The Skin Safety Task Force recommends the following:

- Offload the head with EEG leads in place – consider use of a pressure redistribution device.

- Develop a Protocol to include documentation for frequency of skin checks with electrodes, i.e., every 12 or 24 hours, minimal number of electrodes to be checked and designate head region.
- A Statement regarding collaborating with bedside nursing and wound care nurses should be included.
- For critical care LTM patients, consider MRI/CT conditional/compatible electrodes. This will avoid removing and reapplying frequency due to need for imaging purposes. Approval of your Radiology department should be obtained before investing in MRI/CT compatible electrodes.

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