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PROCEDURE	Manual: Department	Section: ICU	Code No.: ICU P001	Old Code No.: P4-PRO
Title: Peripheral Nerve Stimulator (PNS)			Original Effective Date: Sep 01, 2000	
			Review/Revised Effective Date: Jan 27, 2020	
			Next Review Date: Feb 01, 2023	
Cross Index:	Authoring Committee/Program/Dept: ICU		Approved By: SLT	

Purpose:

- To measure the neuromuscular transmission in patients receiving neuromuscular blocking agents (NMBAs). The use of the Peripheral Nerve Stimulator (PNS) will assist the health care team in determining the appropriate dosing for the individual patients.

Responsibility:

- RNs in ICU/CICU/CVICU

Equipment:

- Peripheral Nerve Stimulator with leads
- 9 Volt battery
- 2 ECG electrodes
- NMBA agent to be used

Method:

This procedure requires a physician's order specifying the agent to be used, dosage, and frequency of dosing.

Perform Test procedure on nerve stimulator BEFORE using on patient:

- Connect the two alligator clamps to each other.
- Turn the PNS on by pushing the on/off button.
- Increase the current to about 40mA and test the demand button.
- If no error is indicated then the unit is delivering the current requested.

Establish baseline mA:

- Stimulator should be OFF during connection to patient.
- Clip any excess hair, cleanse area with alcohol and allow to dry.
- For Ulnar Nerve testing; extend the arm, palm up in a relaxed position. Place both electrodes along the ulnar nerve of the forearm; placing one about 2-3cms above the wrist crease and the other about 10cms above the wrist crease. Connect the negative (black) alligator clamp to the distal electrode and the positive (red) alligator clamp to the proximal electrode.
- For facial nerve testing; place electrode on face at outer canthers of the eye and second electrode approximately 2cm below, parallel with the tragus of the ear.
- Turn the PNS unit on.
- Using the current arrow, select 10mA and depress the TOF button, assess the reaction.
- Observe only for movement of the thumb.
- Observe for a single twitch. Increase to 20 mA and observe. If the reaction is greater, then increase to 30 mA and so on until there is no change in the response between two settings. End reaction is to obtain 4 twitches observed- record that as baseline MA.
- Once NMBA has been initiated one will often need to increase mA by at least 10%.

Train of Four (TOF) Testing:

- Administer the NMBA as ordered.
- Perform the TOF testing 15 minutes after drug administration by depressing the TOF button.
- Observe for the number of twitches that occur. Goal is to achieve 1 twitch (90-95% block) to 2 twitches (80-90% block) out of 4 for appropriate neuromuscular blocking effect.
- Continue to administer NMBA as ordered and test response Q 15 minutes until desired effect is achieved.
- If no twitch is observed (0/4 twitches), troubleshoot for potential error:
 - Make sure all connections are secure.
 - Check battery power.
 - Try strategies to improve conduction:- new electrodes or prepping the skin.
 - Assess for presence/absence of cough.
 - Increase the mA, if necessary. Wait at least 10 seconds before retesting the nerve.
 - Consider use of other nerve site (e.g. facial nerve), however the ulnar nerve is the preferred site.
 - If system appears to be working correctly, notify the physician as the patient may be 100% blocked.
- **With intermittent boluses or continuous infusions of NMBA, once desired effect is achieved, monitoring of TOF occurs Q 2 hours and PRN.**
- Testing of TOF shall occur with any electrode changes.
- Turn PNS off between testing.

Documentation:

- Record the initial and subsequent baseline mA in the patient's electronic chart.
- Document the response-level of blockade.

Special Considerations:

- NMBA do not alter the level of consciousness of the patient. Therefore, while in a paralyzed state, the patient must receive sedation according to Southlake's [Analgesia and Sedation in the ICU and CCU policy](#).
- NMBA should be reversed daily to assess neurological status.

References:

- Fisher & Paykel Healthcare Division. (2004) *NS242 PERIPHERAL NERVE STIMULATOR Operating Manual*
- Henderson C. BSN, CCRN. Using the Peripheral Nerve Stimulator to Guide Neuromuscular Blocking Agent Doses. *American Association of Critical Care Nurses Newsletter*, 1999 Vol. 6
- Howard, W.Nathan. Peripheral Nerve Stimulators. In: Elsevier eds. *AACN Procedure Manual for High Acuity, Progressive, and Critical Care 7th ed.*(2017)Missouri: P. 268-276



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