 <p>CLINICAL PRACTICE GUIDELINE</p>	Practice Guideline: Obtaining Cerebral Perfusion Pressures with Arterial Line Leveling at the Tragus (Adult)	
	Approval Date: April 18, 2022	Pages: 1 of 2
	Approval By: Professional Advisory Committee Standards Committee	Supercedes: N/A

1. **PURPOSE AND INTENT:**

- 1.1. To ensure a standardized approach to the calculation of cerebral perfusion pressure (CPP) in neurosurgical patients with intracranial pressure (ICP) monitoring systems.
- 1.2. To guide nursing interventions to reduce secondary brain injury in neurosurgical patients with risk of cerebral hypoperfusion and/or elevated ICP.

2. **BACKGROUND:**


- 2.1. Cerebral perfusion pressure (CPP) measuring and monitoring is important in the management of patients with certain neurological conditions. Its measurement in clinical practice is calculated by the difference between mean arterial pressure (MAP) and intracranial pressure (ICP), $CPP = MAP - ICP$.
- 2.2. When calculating CPP in patients with neurological injuries, the MAP used in the calculation should be determined as the mean cerebral arterial pressure. The mean cerebral pressure is estimated to exist at the level of the middle cranial fossa which can be approximated by positioning (levelling) the arterial transducer at the tragus of the ear.

3. **GUIDELINE:**

- 3.1. If a goal CPP is ordered, the nurse levels the patient's arterial line transducer to the tragus of the patient's ear.
- 3.2. When the goal CPP is discontinued and/or the intracranial monitor is removed, the nurse levels the patient's arterial line transducer to the phlebostatic axis and obtains order for a goal MAP.
- 3.3. Confirm with the Attending Physician or delegate when there is a request to monitor the arterial pressure at the phlebostatic axis and goal CPP is ordered. Obtain a written order to level the arterial line at the phlebostatic axis before proceeding.

4. **COMPONENTS**

- 4.1. Single Pressure Transducer system with flush device
- 4.2. 500 mL N/S intravenous (IV) Solution
- 4.3. IV Pressure Bag
- 4.4. Bedside monitoring system
- 4.5. Pressure monitoring cable
- 4.6. ICP monitoring system

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5. **PROCEDURE:**

- 5.1. Perform hand hygiene before direct patient care and subsequently as clinically indicated.
- 5.2. Set up arterial line pressure transducer system. Refer to **Nursing Skills Online: Transducer System Setup and Zeroing** for:
 - 5.2.1. Pressure transducer system setup
 - 5.2.2. Monitor setup
 - 5.2.3. Zeroing the transducer
- 5.3. Attach the primed pressure transducer system to hub of the patient's arterial catheter. Observe arterial pressure waveform and perform a dynamic response test. Refer to **Nursing Skills Online: Arterial Catheter Insertion (Assisting), Care, and Removal**.
- 5.4. Level transducer to the tragus of the patient's ear as the reference point for CPP calculation prior to obtaining mean arterial pressure (MAP).
- 5.5. Calculation of CPP:
 - 5.5.1. Obtain ICP value from ICP monitoring system
 - 5.5.2. Obtain MAP from the arterial line pressure transducer system
 - 5.5.3. Calculate $CPP = MAP - ICP$
- 5.6. Ensure transducer is repositioned to remain levelled to the tragus following changes in body elevation or position.

6. **DOCUMENTATION:**

- 6.1. Document ICP, CPP, and MAP in the Intensive Care Flowsheet or Unit Specific Nursing Documentation Tool.
- 6.2. Document reference for the arterial line transducer on the Integrated Progress Note (IPN) or Unit Specific Nursing Documentation Tool.

7. **REFERENCES:**

- 7.1. Smith, M. (2015). Cerebral perfusion pressure, *BJA: British Journal of Anaesthesia*, 115(4), 488–490. <https://doi.org/10.1093/bja/aev230>.
- 7.2. Tse, B., Burbridge, M. A., Jaffe, R. A., & Brock-Utne, J. (2018). Inaccurate Blood Pressure Readings in the Intensive Care Unit: An Observational Study. *Cureus*, 10(12), e3716. <https://doi.org/10.7759/cureus.3716>.