

## Practice Guidelines

# Acute Stroke Practice Guideline for Inpatient Management of Intracerebral Hemorrhage

## Policy statement:

OHSU Healthcare has adopted these practice guidelines in order to delineate a consistent, evidenced-based approach to treating the patient who presents with signs and symptoms consistent with acute stroke. Although these guidelines assist in guiding care, responsibility to determine appropriate care for each individual remains with the provider themselves.

Outcomes/goals	<ol style="list-style-type: none"> <li>1. Create a multi-disciplinary, evidence-based, approach to the management of acute stroke patients secondary to intracerebral hemorrhage (ICH).</li> <li>2. Patient plan of care to take into consideration the entire continuum of care from emergency department through rehabilitation.</li> </ol>
Physician	<p>Determine the appropriate unit for admission.</p> <ol style="list-style-type: none"> <li>a. Recommended Admission Criteria for patient with ICH to Neurosciences ICU:             <ol style="list-style-type: none"> <li>1. Acute symptom onset of &lt; 24 hours.</li> <li>2. Patients in whom impending mental status decline and loss of protective airway reflexes is of concern.</li> <li>3. Patients requiring IV blood pressure or heart rate control.</li> </ol> </li> <li>b. Recommended Criteria for Admission to 10K:             <ol style="list-style-type: none"> <li>1. S/p NSICU monitoring for at least 24 hours.</li> </ol> </li> </ol>
Physician	<p>Complete appropriate physician order set:</p> <ol style="list-style-type: none"> <li>a. NSG: NSICU Admission Orders.</li> <li>b. Admission orders include CBC, CMP (complete metabolic set), INR/PTT, urine toxicology, EKG. Activity and diet orders, code status, GI and VTE prophylaxis are addressed.</li> <li>c. Calculate ICH Score within 6 hours of arrival (prior to surgical intervention/invasive intracranial procedures) and document in H&amp;P.</li> </ol>
Pharmacy and RN	<p>Process physician orders according to OHSU policy.</p>
RN	<ol style="list-style-type: none"> <li>1. Complete admission database and initiate nursing plan of care according to the appropriate OHSU Adult Inpatient Standards of Care.             <ol style="list-style-type: none"> <li>a. <a href="#">NPEOC - Adult Critical Care Standard of Care</a></li> <li>b. <a href="#">NPEOC - Inpatient Adult Acute Care Adult</a></li> </ol> </li> </ol>

Physician	Evaluate for loss of airway protection and need for intubation.
Physician, RN, and RT	Maintain adequate oxygenation and ventilation. Avoid prophylactic or prolonged hyperventilation.
Neurosurgeon	<ol style="list-style-type: none"> <li>1. Consider ICP monitoring and/or EVD for patients based on poor neurological status: Glasgow Coma Scale (GCS) score &lt;8 or neurological deterioration with hydrocephalus or any concern for ICP elevation. If EVD placed, ICP goal &lt; 20 with cerebrospinal fluid (CSF) surveillance sampling per protocol by Neurosurgery.</li> <li>2. Primary surgical intervention (at Attending Neurosurgeon's discretion) in: <ol style="list-style-type: none"> <li>a. Cerebellar hemorrhage &gt; 3 cm with 4<sup>th</sup> ventricle effacement and/or hydrocephalus with neurological deterioration.</li> <li>b. Lobar ICH (&lt; 1 cm from surface) in younger patients (&lt; 45) with GCS 9-12 or expanding lobar ICH associated with progressively worsening GCS.</li> <li>c. Select patient with Medically Refractory Intracranial Hypertension.</li> <li>d. Select patient for Early Hemicraniectomy.</li> </ol> </li> </ol>
Physician and RN	<ol style="list-style-type: none"> <li>1. Keep Cerebral Perfusion Pressure (CPP) &gt; 60 or Mean Arterial Pressure (MAP) &gt; 70 in patients with no concern for elevated ICP. If concern for elevated ICP, prior to ICP monitor placement and estimation of CPP, consider MAP goal &gt; 80. Consider continuous arterial pressure monitoring for continuous titration of blood pressure.</li> <li>2. Measures to prevent increased ICP include: head of bed elevation &gt; 30 degrees, avoiding excessive hip flexion, keeping head in midline position as much as possible, avoiding pressure on neck from endotracheal tube tape and suctioning only as needed and using short acting sedative.</li> <li>3. Measures to treat elevated ICP include osmotherapy with mannitol and/or hypertonic, analgesia and sedation, controlled external ventricular drainage, and, in refractory cases, hemicraniectomy and/or clot evacuation as indicated by patient condition. Routine prophylactic hyperosmolar therapy NOT recommended. Mild hyperventilation (PaO<sub>2</sub> 28-35) can be used as bridging therapy to more definitive (surgical) intervention.</li> <li>4. Isotonic fluids recommended for volume resuscitation with goals of maintaining euvolemic state.</li> <li>5. Initiate vasopressors, if necessary, to achieve MAP and CPP goals. Continuous arterial pressure monitoring is recommended in patients requiring close titration of vasoactive medications including vasopressors and continuous IV infusions for BP titration. Central line recommended if patient receiving a vasoactive medication.</li> <li>6. Aggressively reverse coagulopathy. For anti-coagulation induced coagulopathy, see current OHSU protocol (LINK TO PROTOCOL).</li> <li>7. Consider seizure prophylaxis ONLY in high risk patients (Lobar hemorrhages). Consider continuous EEG x 24 hours in comatose patients (GCS &lt; 8) including patients with deep supratentorial hemorrhages. Keppra IV &gt;&gt; IV Fosphenytoin for prophylaxis. All patients presenting post seizure should be treated with anti-epileptic medications.</li> <li>8. Diagnostic Testing: If patient is a) &gt; 45 years of age, b) h/o HTN with c) SBP &gt; 160 on admission and d) ICH in basal ganglia or thalamus, CT and CT angiogram of head upon admission (latter if no history of or evidence of renal failure). If <b>any</b> of aforementioned criteria not met, <i>consider</i> conventional angiogram. MRI recommended if suspicion of underlying mass based on history (age, history of primary cancer), radiological appearance (multiple bleeds: r/o amyloid angiopathy, mets), or if etiology unclear.</li> </ol>
Physician and RN	<p><u>Recommended Guidelines for Treating Elevated BP</u></p> <ol style="list-style-type: none"> <li>a. SBP goal &lt; 140 mmHg in patients with no clinical suspicion of elevated ICP.</li> <li>b. In patients with long-standing uncontrolled hypertension and concern for end-organ damage by rapid control of BP, consider SBP goal &lt;160 mmHg.</li> <li>c. If clinical suspicion of elevated ICP exists, SBP goal &lt; 180 mmHg, with titration to SBP goal &lt; 160 mmHg once ICP monitor placed and ICP better controlled.</li> </ol>
Physician and RN	<p><u>IV medications that may be considered for control of elevated BP</u></p> <ol style="list-style-type: none"> <li>a. Labetalol, 5-15 mg IV bolus every 15 minutes.</li> <li>b. Nicardipine, 5-15 mg/hour IV continuous infusion.</li> <li>c. Hydralazine, 10-20 mg IV push every 30 minutes</li> </ol>

<b>Physician and RN</b>	<ol style="list-style-type: none"> <li>1. Monitor laboratory values as needed to monitor electrolytes, blood counts, coagulation status, and drug levels.</li> <li>2. Maintain glucose levels with sliding scale insulin titrated to blood glucose 140-180 mg/dL. Use Insulin infusion if blood glucose &gt; 180 mg/dL.</li> <li>3. Goal of normonatremia unless otherwise indicated. (If elevated ICP, or cerebral edema with worsening mass effect causing neurological deterioration: Administer hypertonic saline as needed.)</li> <li>4. Maintain normothermia. Treat fever by trying to identify source; tailor interventions to possible source(s); provide antibiotics, if indicated; and use of antipyretics. Attempt to achieve goals with acetaminophen, cooling blankets, ice packs etc; if failure to achieve goal of 36-37 degrees centigrade in 4 hours, consider transition to Arctic Sun and institute the Anti-shivering Protocol. as part of normothermia protocol measures (use NSICU NORMOTHERMIA ORDER SET).</li> </ol>
<b>RN</b>	<ol style="list-style-type: none"> <li>1. Perform focused neurological assessments based on patient condition and physician orders, every 1-2 hour while in the ICU and every 2-4 hours in acute care.</li> <li>2. Changes in patient condition to be reported immediately to the NSICU and Neurosurgery Team.</li> <li>3. Maintain VAP (Ventilator associated Pneumonia) precautions <i>per protocol</i>.</li> </ol>
<b>RN and Rehabilitation Services</b>	<ol style="list-style-type: none"> <li>1. Keep head of bed &gt; 30 degrees, if not contraindicated.</li> <li>2. Advance activity as tolerated to promote alertness, active exercise, strength training, and gait training when the interdisciplinary team assesses patient as clinically appropriate for early mobilization.</li> <li>3. RN to initiate interventions as needed to reduce risk of formation of contractures, subluxation, and minimize edema formation, using bracing/orthotic devices as needed.</li> <li>4. Consult Rehabilitation Services to provide aphasia treatment, cognitive rehabilitation, delirium management, communication devices, mobility/balance/gait training, spasticity treatment, functional adaptation for visual/perceptual deficits and neglect, and activities of daily living training.</li> <li>5. If patient has returned to prior level of function and does not need rehabilitation services during this hospitalization, this will be documented.</li> </ol>
<b>RN, Rehabilitation Services, and Nutrition Services</b>	<ol style="list-style-type: none"> <li>1. Dysphagia screening to be completed and documented prior to anything by mouth using the Bedside Nurse Swallow Screen. Initiate Speech Language Therapist consult for formal swallow evaluation, as needed, and when patient able to participate. Place dobbhoff tube (DHT) within 24 hours of admission if patient unable to swallow to optimize nutrition needs.</li> <li>2. Nutrition consult as needed to maximize nutritional support.</li> <li>3. Initiate dietary interventions to lower LDL's, if greater than 100mg/dL.</li> </ol>
<b>Physician and RN</b>	<ol style="list-style-type: none"> <li>1. Initiate VTE prophylaxis by hospital day 1 with intermittent pneumatic compression (SCD's) in all ICH patients. Initiate chemoprophylaxis with Lovenox 40 mg subcutaneous every day or Heparin 5000 subcutaneous every 8 hours following 48 hours with no evidence of hematoma expansion and at least 24 hours following insertion of extra-ventricular drain, per current NSICU protocol. Chemoprophylaxis will be continued throughout ICU stay regardless of patient's mobilization status. Primary Attending may choose to opt out of chemoprophylaxis for individual patients, and this decision must be documented in the medical record. Vascular ultrasound for patients with clinical symptoms of DVT or PE.</li> <li>2. Initiate peptic ulcer prophylaxis (PUD) as appropriate, per current NSICU protocol.</li> <li>3. Review FAST HUG in daily rounds.</li> </ol>
<b>RN, Social Worker (MSW), Case Manager, and Physician</b>	<ol style="list-style-type: none"> <li>1. Provide social and psychological support for the patient and their significant others as needed.</li> <li>2. Social work will perform a caregiver assessment and assist in creating a plan for respite, when applicable. If a patient is returning to an independent living situation, social work will provide independent living resources. They will screen patients for depression and provide additional evaluation as indicated, and provide patients/family with education and resources with regard to post stroke depression.</li> <li>3. Case management services to begin upon admission, providing ongoing utilization review. Works with multiple disciplines to determine patient's condition and needs/barriers for discharge. Coordinates discharge planning with patient and family (e.g., inpatient rehab, skilled nursing facility, home health, outpatient rehab, and durable medical equipment).</li> </ol>
<b>Multi-disciplinary team</b>	<ol style="list-style-type: none"> <li>1. Identify patient and family education needs and provide appropriate information and resources found in the stroke education packet. This should include: personal modifiable risk factors, such as tobacco cessation counseling if smoked anytime in past 12 months, alcohol intake, nutrition, exercise, and blood pressure regulation; warning signs for stroke; activation of EMS; need for follow-up after discharge, and medications prescribed.</li> <li>2. Document education provided in the Patient Education section of the electronic medical record and or LIP documentation in progress notes.</li> </ol>

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**Related Forms and Procedures:**

- [NPEOC - Adult Critical Care Standard of Care](#)
- [NPEOC – Inpatient Adult Acute Care Adult](#)
- [Bedside Swallow Screen Form](#)
- [Anti-Shivering Protocol Form](#)
- [NSG: NSICU Admission Orders.](#)
- [INR: ICU: Post Procedure Orders.](#)

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