Guide to *CACNA1A*-related Severe Hemiplegic Migraine (CSHM)

for clinicians

Dear Clinician,

Some patients with certain *CACNA1A* variants are at risk for CSHM, which is a severe neurological emergency requiring immediate medical intervention to prevent permanent damage, or even death. These events are more severe than classic hemiplegic migraines. We created these materials to guide providers in supporting their patients and preparing for emergencies. Below is a quick reference guide that can be utilized in an emergency department setting. A more comprehensive guide and corresponding materials on our website can be utilized in discussions with caregivers in a clinic setting. When properly managed, damage from CSHM can be prevented.

The CACNA1A Foundation
www.cacna1a.org
www.cacna1a.org/hemiplegic-migraine

Clinic Appointment Checklist

If your patient has a variant on our identified list, please use this checklist during clinic appointments. Identified variant list and comprehensive information about CSHM can be found on our website.

- ☐ Create a written CSHM emergency plan with your signature so caregivers may present the plan to ED staff during an event. See examples of plans on our website.
- ☐ Educate families on how to recognize a potential CSHM event. See videos of HM events on our website.
- ☐ Provide our CSHM Guide for Families
- ☐ Discuss prophylactic options
- ☐ For patients who experience respiratory distress during CSHM events, consider at home use of a pulse oximeter, Ambu bag, and oxygen concentrator

CACNA1A FOUNDATION

Quick Reference Emergency Guide

CSHM is a medical emergency that requires immediate treatment to prevent permanent damage, or even death. It should be treated with the same sense of urgency as a seizure.

Recognizing CSHM

If a patient has a *CACNA1A* genetic variant and is presenting with symptoms on the following list, immediate treatment is required. ● One-sided weakness and/or paralysis is the most distinguishable symptom ● Eye deviation ● Increased nystagmus (more than the patient's baseline nystagmus) ● Decreased responsiveness and/or altered consciousness ● Vomiting ● Development of a fever ● Seizures	Triggers* may include: ● Minor head trauma ● Seizures ● Emotional or physical stress ● Exertion ● Viral infections ● Lack of sleep ● Menstrual period ● Catheter angiography *Can also occur without identified trigger

Note on minor head trauma: Typically, within an hour of the injury a child might develop a headache, vomiting or a fever.
Note on CSHM with seizures: The weakness on one side of the body becomes evident after seizures are controlled. If a patient requires sedation to control seizures, a CSHM may not be detectable and should be treated if at all suspected. For those whose CSHM is triggered by seizures, it can be difficult to differentiate when seizure has stopped and CSHM begins due to some similarities in presentation (eye deviation).

Treatment in ED

Rapid administration of treatment medications should be administered prior to obtaining imaging.

First line treatment options for CSHM: ● Verapamil: 0.1-0.3 mg/kg/dose with max 5 mg dose ● Acetazolamide: 10 mg/kg ● Ketamine: intranasal 0.1 to 0.2 mg/kg/dose up to five doses For cerebral edema: ● Steroids: Methylprednisolone 20-30 mg/kg/day (max 1g) ● Hypertonic saline & Mannitol: both 5 ml/kg stat followed by 2 ml/kg in every 6 h Pain management and nausea: ● Motrin: 10 mg/kg ● Ketorolac: 0.5 mg/kg I.V. ● Zofran: 0.15 mg/kg I.V.	Medications to avoid: ● Standard migraine medications, which can reduce blood flow like ergotamine and dihydroergotamine ● Triptans, which can worsen the constriction of brain vessels -Newer migraine rescue medications (CGRP antagonists and ditans) do not have as much concern for changing blood flow and may be considered in the future for those with hemiplegic migraine, but they are too new to offer any information at this time.

Imaging

A CSHM can lead to cerebral edema. Similar symptoms can be seen in other conditions like stroke, seizure, infection, and brain tumors. It is important to make sure these conditions are evaluated for. Head imaging should be obtained. MRI is the preferred test, but it is not always immediately available. In order to ensure timely identification of stroke, CT may be performed first. A MRI is recommended after having a CT, even if the CT is normal.

Examine MRI for acute cerebral edema or diffusion restriction or hemispheric hyperperfusion and dilation of cerebral blood vessels which can be seen with an attack of hemiplegic migraine.

Continued Treatment Once Admitted

It is recommended that observation be considered at least overnight in the hospital because even prior history of mild attacks cannot fully predict severity of current attack. It can be difficult to know when the event has fully resolved, so patients should receive a 3-5 day round of treatment. Cerebral edema can be delayed so repeat imaging may be performed.