

1 **A Multidisciplinary Approach to Rapid Diagnosis and Management**
2 **of CHANTER Syndrome in an Adolescent Male, Case Report**

3
4 **Cruz, Emmanuel¹; Bawmann, Oliver¹; Mundy, Erin³; Pazniokas, Julia²; Grassia, Fabio²;**
5 **Alfano, Matthew^{1,5}; Broman, Alia^{1,4†}**

6 ¹University of Colorado School of Medicine, Department of Medicine, 13001 E 17th Pl, Aurora, Colorado, 80045

7 ² University of Colorado School of Medicine, Department of Neurosurgery, 13001 E 17th Pl, Aurora, Colorado,
8 80045

9 ³Childrens Hospital Colorado, Department of Physical Medicine and Rehabilitation 3123 E 16th Ave, Aurora, CO
10 80045

11 ⁴Denver Health, Department of Pediatrics, Division of Critical Care, 777 Bannock St, Denver, Colorado, 80219

12 ⁵Denver Health, Department of Radiology, 777 Bannock St, Denver, Colorado, 80219

13 **Abstract**

14 **Objectives:** Opioid toxicity is becoming increasingly prevalent in the pediatric population and
15 naloxone resistant syndromes must be recognized rapidly and treated accordingly. A broad
16 differential is paramount when treating unstable patients who may have been exposed to opioids.

17 **Methods:** A case study of a 14-year-old male with a past medical history of bipolar disorder,
18 attention-deficit-hyperactivity disorder (ADHD), and substance use disorder was reviewed and
19 analyzed. A multidisciplinary team of critical care physicians, radiologists, physical medicine
20 and rehabilitation (PM&R) specialists, and neurosurgeons were consulted for the approach to
21 this case.

22 **Results:** The patient presented to the emergency department (ED) hemodynamically unstable
23 with a Glasgow coma scale (GCS) of 3, fentanyl and tetrahydrocannabinol (THC) positive on

24 urine drug screen (UDS), without improvement on naloxone administration. Initial computed
25 tomography (CT) brain imaging showed parenchymal abnormalities necessitating magnetic
26 resonance imaging (MRI). On the subsequent MRI, the patient was found to have cerebellar,
27 hippocampal, and basal nuclei edema with restricted diffusion.

28 **Discussion:** The MRI pattern suggests a recently emerging opioid related hypoxic anoxic brain
29 injury. After a prolonged hospital course including intensive inpatient care, multiple
30 neurosurgical operations, radiologic discussions, familial care conferences, and extensive
31 physical rehabilitation, the patient made a remarkable recovery. Rapid identification of this
32 syndrome is critical for appropriate care. Potential complications arising from this condition
33 include elevated intracranial pressures (ICPs) and hydrocephalus, as occurred in this case, which
34 may require surgical intervention. The recent 2023 brain death guideline changes accurately
35 capture this patient's isolated infratentorial injury, highlighting adherence to the new guidelines
36 and the potential for recovery with a multi-disciplinary approach to care, including physical
37 medicine and rehabilitation interventions.

38 **Keywords:** CHANTER, Hypoxic-brain-injury, rehabilitation, Opioid-overdose, Case Report.