## 1.04 ALTERED MENTAL STATUS

### Introduction

Altered mental status (AMS) is a descriptive term that encompasses a wide spectrum of signs and symptoms, ranging from vague complaints of atypical behavior and irritability, to more specific concerns related to both hyperactive states (such as agitation) and hypoactive states (such as lethargy, depressed levels of responsiveness, and loss of consciousness). AMS may be particularly difficult to recognize in very young children and children with medical complexity. Pediatric hospitalists frequently encounter children with AMS, either as a primary cause for admission or a secondary finding during hospitalization, and therefore they must be knowledgeable about the differential diagnosis and various organ system manifestations that may be involved. Pediatric hospitalists must be able to accurately recognize early signs of AMS, triage acuity, and provide prompt stabilization, which is critical to effective management of patients with this condition.

### Knowledge

Pediatric Hospitalists should be able to:

- Compare and contrast the different presentations of AMS, and describe the differential diagnosis associated with each for varying chronological or developmental ages.
- Identify the elements of the Glasgow Coma Scale and discuss the implications of the score or a change in score on management of a child with AMS.
- Discuss the features of the medical history and physical examination that prompt specific diagnostic evaluation, including signs and symptoms that warrant urgent management.
- Compare and contrast different features of toxidromes that may present with AMS.
- Discuss approaches to stabilization of a child with AMS, including evaluation of airway, breathing, circulation, disability, exposure, and intracranial perfusion.
- Define the indications to activate a rapid response, code blue, or other local emergency system for children with AMS.
- Explain indications for hospitalization of children with AMS.
- Summarize the initial approach to management of common conditions presenting with AMS, including but not limited to: seizures, increased intracranial pressure, intracranial hemorrhage, infectious or inflammatory encephalitis, sepsis, shock, hypoglycemia, diabetic ketoacidosis, renal or liver failure, neoplastic syndromes, suspected toxic ingestion, medication overdose, and adverse drug reaction.
- Discuss specific considerations for children with medical complexity presenting with AMS, including those with intellectual disability, impaired communication, epilepsy, dystonia, ventricular shunts, ventilator dependence, enteral feeding tubes, and multiple medications.
- Discuss the mechanisms of action of common medications used for delirium or agitation.
- Discuss the mechanisms of action of medications used for increased intracranial pressure (such as mannitol, 3% hypertonic saline, and others).
- List medications commonly used in the inpatient setting that may cause AMS as a side effect of use or withdrawal of use, such as seizure medications, opioids, benzodiazepines, anti-cholinergic medications, barbiturates, cannabinoids, and others.
- Explain the indications for chemical versus physical restraints, one-to-one supervision, and involvement of hospital security to ensure safety of the patient, family, and staff.
- Describe indications for urgent subspecialist consultation for children with AMS (such as toxicology, rheumatology, neurology, neurosurgery, and others).
- Discuss reasons for transfer to higher level of care, within the institution or elsewhere if pediatric-specific or psychiatric services are not available at the local facility.
- Describe the reasons for ancillary service involvement (such as physical, occupational, speech, feeding, behavioral therapies, and others) and durable medical equipment procurement for children with AMS.
- List criteria for inpatient rehabilitation.
- Discuss indications for involvement of social work, child protective services, or law enforcement for children with AMS.

### Skills

Pediatric Hospitalists should be able to:

- Elicit a thorough medical history, attending to a detailed care provider history, past medical history, exposures, medications, and medications in the home.
- Perform a physical exam to elicit signs of AMS, including evaluation of airway, breathing, circulation, psychiatric status, and the central and autonomic nervous system.
- Assign an accurate Glasgow Coma Scale score.
- Identify children with potentially reversible, life-threatening conditions, and promptly provide stabilizing measures, activating code or rapid response teams as indicated.
- Review medication list and note any potentially relevant interactions or adverse effects.
- Direct an appropriate, cost-effective evaluation to identify the cause of AMS and correctly interpret results, including performance of a lumbar puncture as indicated.
- Perform careful reassessments (such as serial neurological exams, Glasgow Coma Scale scoring, and others), identifying indications for adjustment to the plan of care, frequency of monitoring, and type of monitoring indicated.
- Identify and manage children who present with altered mental status secondary to common conditions, such as seizures, increased intracranial pressure, intracranial hemorrhage, infectious or inflammatory encephalitis, sepsis, shock, hypoglycemia, diabetic ketoacidosis, renal or liver failure, neoplastic syndromes, suspected toxic ingestion, medication overdose, and adverse drug reaction.
- Engage consultants, including neurologists, neurosurgeons, neuroradiologists, toxicologists, psychiatrists, and psychologists efficiently and appropriately.
- Coordinate care and communicate effectively with caregivers, primary care providers, and consultants about the mental status at the time of discharge and the transition plan, referring to ancillary or rehabilitation services as appropriate.

### Attitudes

Pediatric Hospitalists should be able to:

- Realize responsibility for reporting of iatrogenic etiologies as appropriate.
- Acknowledge the need for effective communication with subspecialty providers, primary care providers, and the patients and the family/caregivers to ensure ongoing support and coordinated care.
- Realize responsibility for effective and compassionate communication with patients/caregivers regarding findings, prognosis, and treatments, accounting for the stresses of hospitalization.
- Collaborate with social work, child protective services, and law enforcement when indicated.

### Systems Organization and Improvement

In order to improve efficiency and quality within their organizations, pediatric hospitalists should:

- Work with hospital administration and staff to develop, implement, and assess outcomes of intervention strategies for hospitalized patients with deterioration of mental status to prevent adverse outcomes (such as rapid response, code blue, stroke teams, and others).
- Coordinate educational programs for front-line providers to promote early recognition of AMS.
- Lead, coordinate, or participate in institutional efforts to report and reduce cases of AMS due to iatrogenic causes or adverse effects of medications.

## References

1. Lehman RK, Mink J. Altered mental status. *Clin Pediatr Emerg Med*. 2008; 9:68-75.
2. Avner JR. Altered states of consciousness. *Pediatr Rev*. 2006; 27:331-338. https://doi.org/10.1542/pir.27-9-331.
3. Malas N, Brahmbhatt K, McDermott C, Smith A. Ortiz-Aguayo R, Turkel S. Pediatric delirium: Evaluation, management, and special considerations. *Curr Psychiatry Rep*. 2017;19(9):65. https://doi.org/10.1007/s11920-017-0817-3.