

# Delirium in Children and Youth: Information for Primary Care



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**Summary:** Delirium is a disturbance of consciousness with reduced ability to focus, sustain or shift attention. It results in a decreased awareness of one's environment and confused thinking. Evidence from history/physical or laboratory investigations suggests that the disturbance is caused by a medical condition, substance intoxication or medication side effect. If delirium is seen in the office setting, prompt identification and referral for an emergency department evaluation is essential. Management includes addressing underlying causes, modifying risk factors, and symptomatic treatment for behavioural disturbance and agitation may include antipsychotic medication.

## Case

A 17 year old patient comes into your office with otitis and fever. You start him on amoxicillin. He has increased behavioural concerns and confusion so you stop the amoxicillin. The confusion subsided 2 weeks later, but the patients report that he has been more hyper than before. His parents notice some changes at home as well. They say that he has increased ranting/ruminating, follows directions poorly, some days he seems normal and other days he seems confused. School complains increased impulsivity, hitting another student, talking to himself. One day at school he has a hallucination that he is on fire. His parents are worried and bring him to see you.

## Epidemiology

- 10% of all inpatient referrals to child and adolescent consultation-liaison psychiatry services
- 17-66% of psychiatry referrals from pediatric intensive care units (PICU)
- 12.5%-29% mortality rate

## Etiology

### Predisposing factors

- Younger age
- Male gender

- Preexisting progressive cognitive impairment
- Mental retardation
- Preexisting emotional and behavioural problems
- Physical ill health
- Caregiver anxiety or absence
- Overall burden of physical illness
- Long duration of hospital stay

#### Precipitating Factors

- Infectious (33%)
- Drug-induced (19%)
- Serious trauma (9.5%)
- Autoimmune disorder (8%)
- Post-transplant (8%)
- Post-operative (7%)
- Various cancers (7%)
- Multiple organ, respiratory or cardiac failure (7%)

## Signs/Symptoms

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- Decreased attention span
- Difficulty maintaining or shifting attention
- Waxing and waning type of confusion
- Clouding of consciousness
- Disorientation
- Illusions
- Hallucinations
- Fluctuating levels of consciousness
- Dysphagia
- Dysarthria
- Tremors
- Asterixis in hepatic encephalopathy and uremia
- Motor abnormalities

## History

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- Obtaining a thorough history is essential, as the diagnosis of delirium is clinical, and there are no diagnostic laboratory tests for delirium
- As delirious patients are often confused and unable to provide accurate information, collateral history from family and caregivers is vital
- Asking about:
  - Constitutional symptoms
    - Fevers, chills, headaches...
  - Metabolic / Toxic
    - Drug use or setting suggestive thereof (ie. stimulants)
    - Drug toxicity (corticosteroids, neuroleptics, isoniazid)
  - Neurologic
    - History of head trauma
    - Neurological Deficits
    - Seizures/seizure-type activity

- Past history
  - History of systemic lupus erythematosus (SLE)
  - Prior episodes and any triggering factors (medications, stress, menstruation) or associated symptoms (e.g. vomiting, headaches)
- Family psychiatric history

## DSM-5 Criteria for Delirium

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Although not specific for pediatrics, DSM-5 does provide the following criteria for delirium:

- A. Disturbance in attention and awareness
  - a. Reduced ability to direct, focus, sustain and shift attention
  - b. Reduced orientation
- B. Disturbance develops over a short period of time
  - a. Represents a change from baseline attention and awareness
  - b. Fluctuates in severity
- C. Cognitive disturbance
  - a. Memory deficit, disorientation, language, visuospatial ability, perception
- D. Not better explained by neurocognitive disorder or arousal problems (i.e. coma)
- E. Evidence that there is a direct physiological consequence of another medical condition (can be from history, physical or labs)
  - a. Substance intoxic or withdrawal
  - b. Exposure to toxin
  - c. Multiple etiologies

## Differential Diagnosis (DDx)

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### I WATCH DEATH

- **I**nfection (encephalitis, meningitis, UTI, pneumonia)
- **W**ithdrawal (alcohol, barbiturates, benzodiazepines)
- **A**cute metabolic (electrolyte imbalance, hepatic or renal failure)
- **T**rauma (head injury, post-operative)
- **C**NS pathology (stroke, hemorrhage, tumour, seizure disorder)
- **H**ypoxia (anemia, cardiac failure, pulmonary embolus)
- **D**eficiencies (B12, folic acid, thiamine)
- **E**ndocrinopathies (thyroid, glucose, parathyroid, adrenal)
- **A**cute vascular (shock, vasculitis, hypertensive encephalopathy)
- **T**oxins/drugs/medications (alcohol, anesthetics, anticholinergics, narcotics)
- **H**heavy metals (arsenic, lead, mercury)

## Physical Exam

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First Check for:

- Hypoglycemia findings: Altered mental status, diaphoresis, tachycardia, hypotension
- Hypoxia findings: Cyanosis, pallor, shock, respiratory distress

Second Check for:

- Toxidromes

Look for other etiologies. Attention to vital signs, mental status, eye findings and neurological exam provide the

greatest help in narrowing the differential diagnosis

- Fever (infection, anticholinergic or sympathomimetic intoxication, withdrawal syndrome)
- Tachycardia (infection, drug exposure, withdrawal syndrome)
- Eye findings
  - Dilated pupils (anticholinergic or sympathomimetic symptoms)
  - Nystagmus (dissociative agent – ketamine, dextromethorphan, PCP)
  - Ocular clonus (Serotonin syndrome)
  - Conjunctival injection (THC use)
  - Kayser-Fleischer rings (Wilson's disease)
- Ears (Rule out Otitis)
- Mouth and Mucous Membranes
  - Dry (nonspecific, may indicate anticholinergic toxicity)
  - Salivating (may suggest ketamine use)
  - Bruxism (serotonergic agents – MDMA)
  - Abdomen and GU
    - Absent bowel sounds and urinary retention (anticholinergic)
    - Positive bowel sounds (sympathomimetic)
    - Skin
- Diaphoresis (very non specific)
- Anhydrosis (anticholinergic toxicity)
- Malar rash (SLE)
- Neurological Exam (looks for focal/lateralizing findings – CNS mass lesion, CNS hemorrhage, severe traumatic brain injury, stroke)

## Investigations

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First do:

- Rapid Blood Glucose (hypoglycemia, diabetic ketoacidosis, and hyperosmolar nonketotic states)
- Pulse oximetry or blood gasses (hypoxia)

Other investigations based on presentation:

- CBC with differential (infection, anemia)
- Electrolytes (low or high levels)
- Renal and liver function tests (liver and renal failure)
- Thyroid function test (hypothyroidism)
- Urine analysis (UTI)
- Urine and blood drug screen (toxicological causes)
- Thiamine levels (thiamine deficiencies)
- B12 levels (B12 deficiencies)
- HIV test
- EKG (ischemia and arrhythmias)
- Calcium-Binding protein S-100 B levels (could be a serum marker of delirium)
- Lumbar puncture (CNS infection)
- Inflammatory markers
- Heavy metal levels

Imaging that can be ordered:

- CT of the head
- MRI of the head (stroke, hemorrhage, structural lesions)

- EEG
- Chest X-ray (pneumonia, CHF)

## Management

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### Primary care approach:

- Generally, if a patient presents to a primary care office setting with delirium, send the patient to an Emergency Department for further evaluation

### Emergency Department and Inpatient Management:

- The number one management is to find and treat the underlying cause, for example:
  - If infection, consider antibiotics
  - If hypoglycemia, consider glucose
  - Etc...
- Non-pharmacological Strategies
  - Frequent reassurance and reorientation (preferably by a familiar person)
  - Lighting schedule (bright light during day, dim at night)
  - Minimize noises
  - Develop/maintain a regular routine
  - Minimize exposure to intervention (limit blood draws...etc)
  - Purpose of these strategies are to decrease fear and confusion, and facilitate a connection for the child to the environment
- Pharmacotherapy (antipsychotics)

## Pharmacotherapy

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Antipsychotic medication can be used for symptom control:

- Haloperidol (Haldol)
  - Start at 0.05-0.1 mg/kg
  - Can dose Q2-4H PRN
  - Max 0.15mg/kg/day
- Risperidone
  - Start at 0.125-0.5mg
  - Can dose Q4-6H PRN
  - Max 2mg/day
- Olanzapine
  - Start at 1.25-2.5mg
  - Can dose Q4-6H PRN
  - Max 20mg/day
- Quetiapine
  - Start at 6.25-25mg
  - Can dose Q4-6H PRN
  - Max 400mg/day

Side Effects of antipsychotics

- Sedation

- Hypotension
- Neurological effects
- Extrapyrarnidal effects
- Tardive dyskinesia
- Neuroleptic malignant syndrome
- Lengthening of QT interval
- Polymorphic ventricular tachycardia (torsades des pointes)
- Lowering of seizure threshold
- Galactorrhea
- Elevation of liver enzyme levels
- Inhibition of leukopoiesis

For sleep disturbances:

- Melatonin

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## About this Document

Reviewed by members of the Department of Psychiatry and Family Medicine at the University of Ottawa. Reviewed by members of the Family Medicine Program at the University of Ottawa, including Dr's Farad Motamedi; Mireille St-Jean; Eric Woollorton (2014). Special acknowledgements to Dr's Prakesh Babani, Psychiatry Resident (uOttawa, Class of 2017) and Christopher Clarkstone, Medical Student (uOttawa, Class of 2017).

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