Psychotic Symptoms and Psychotic Disorders in Children and Adolescents

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Psychosis presenting in childhood and adolescence has been a controversial topic throughout the history of the field of child psychiatry because of the conundrum of diagnostic clarity (Courvoisie, Labellarte, & Riddle, 2001).
Questions

1. **Children and adolescents never have tactile hallucinations, only auditory or visual hallucinations.**
   a. T
   b. F

2. **Psychotic symptoms in children and adolescents are:**
   a. Always indicative of a psychotic disorder
   b. Are simply dreams that they tell us
   c. Can be seen in anxiety disorders
   d. None of the above
   e. All of the above

3. **Possible reasons children and adolescents have psychotic symptoms are:**
   a. An adverse response to a medication
   b. An underlying or undiagnosed medical condition
   c. One or more traumatic events in the child of adolescent's life
   d. An emerging psychotic disorder
   e. All of the above
Objectives

1. Examine the **epidemiology of psychotic symptoms** and **psychotic disorders** in children and adolescents.

2. Discuss **evidence regarding etiology** of psychotic symptoms and disorders in children and adolescents.

3. **Screen and recognize psychotic symptoms and disorders** in children and adolescents.

4. Appropriately **manage and determine next steps** for children and adolescent who **screen positive psychotic symptoms and/or psychotic disorder**.
Psychotic symptom, or symptom cluster-
(Courvoisie, Labellarte, Riddle, 2001)

• Associated with a specific disorder
• Defined by a certain number of symptoms occurring over a circumscribed duration of time with demonstrated impairment.
• Hallucinations
• Delusions
Hallucinations

- **Perceptions** in the absence of identifiable external stimuli (excludes imaginary friends)

**TYPES**
- **Visual** - shadows, people, events
- **Auditory** - voices, conversations
- **Olfactory** - burning, dead people; sz
- **Tactile** - on skin/body, can be drug induced; sz
- **Gustatory** - taste metal, poison; delusions of being poisoned RARE
- **Proprioreceptive** - sensation of floating, flying out of body experiences or other dissociative movements (sleep paralysis)

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Delusions

- **False personal belief** , not subject to reason or contradictory evidence
- **Not explained by a person's usual cultural and religious concepts** (so that, for example, it is not an article of faith);
- **Firmly maintained** in the face of incontrovertible evidence **that it is false**

**TYPES**
- Persecutory, grandeur, jealously erotomania, somatic

**CATAGORIES**
- **Bizarre** (alien invasion)
- **Non-Bizarre** (fear of being followed)
- **Mood congruent** delusions (depressed delusion of persecution) (manic delusions of grandeur)
- **Mood neutral** (not influenced by mood)
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### Prevalence of psychotic symptoms and in childhood and adolescence (Kelleher et al. 2012)

- **Median prevalence** of psychotic symptoms
  - among children aged 9 to 12 was 17%
  - among adolescents aged 13 to 18 was 7.5%

- **Higher in younger people**, particularly childhood
  - Developmental tendency towards fantasy

- **Adolescents** in a longitudinal birth cohort study who reported psychotic symptoms at age 11 were at a 5- to 16-fold increased risk for psychotic disorder at age 26

- **Self-reported auditory hallucinations at age 14** predicted increased rates of psychosis in adulthood. (Welham et al. (2009))
Prevalence of psychotic disorders in children and adolescents

- Psychosis RARE in children
- Childhood onset schizophrenia 0.1 to 0.4/10,000 (Am Academy of Child Adolescent Psychiatry, 1997)
- Schizophrenia in middle to late adolescence more common 1%
- Virtually half (46.4%) of all Americans have had a mental illness at sometimes in their lifetime prior to the age of 14 (Kessler et al., 2005)
- Lifetime prevalence of all psychotic disorders 3.06% (Perala et al., 2007)
- Lifetime prevalence: 0.87% for schizophrenia, 0.32% for schizoaffective disorder, 0.07% for schizophreniform disorder, 0.18% for delusional disorder (Perala et al., 2007)
Hallucinations associated with variety of childhood psychiatric syndromes

- Schizophrenia
- Reactive psychoses following stress and trauma
- Bereavement
- Dissociative disorders
- Depressive disorders
- As an acute and long-term outcome in temporal lobe epilepsy
- As "benign phobic hallucinosis"

- A self-limited, acute-onset episode of tactile and visual hallucinations in children under the age of 8
- In children suffering severe social and psychological deprivation or those reared in an environment of mystical belief
- In children with conduct and emotional disorders (in anxious, socially inept children)
- With adjustment reactions
Features Associated with Psychosis in Children

• Neurodevelopmental Delays –social, motor, sensory issues, language, learning issues
• Neurocognition- lower IQ
Hallucinations in non psychotic children

- The National Institute of Mental Health Epidemiological Catchment Area study, cited by Fennig et al. (1997), found that 2.8% of adults reported hallucinating before they were 21 years old.
- Furer et al. (1957) found that children were only mildly reluctant to talk about voices they heard, and in their study of a group of child psychiatric inpatients they reported that the children's long-term therapists rarely knew about the hallucinations!
Hallucinations in non psychotic children

• Nonpsychotic children who hallucinate differ from psychotic children in several ways:
  • They are not delusional
  • They do not exhibit disturbances in the production of language;
  • They do not evidence decreased motor activity or signs of incongruous mood;
  • They do not present with bizarre behavior or social withdrawal (Garralda, 1984a).
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Risk factors for psychosis in children and adolescents

• Neurodevelopmental disorders
• Speech and language disorders
• Trauma- early and ongoing abuse and neglect
• Genetic heritability
• Chronic substance abuse- Cannabis use
• Hypoxia associated obstetrical complications
Etiology of psychotic disorders

1. Genetics
   • Twin, family and adoption studies
   • Susceptibility gene for schizophrenia localized in region 8p22-8p21
   • Velocardiofacial syndrome (VCFS)-chromosomal region 22111.2 autosomal dom.
   • Smooth-pursuit eye-tracking movements
     • possible genetic marker for schizophrenia
     • association of eye-tracking pursuit abnormalities in adult-onset schizophrenia before and after treatment, in family members of schizophrenic probands, and in children of schizophrenic parents.
   • Heritability Estimates for Psychotic Disorders The Maudsley Twin Psychosis Series. Cardno et al. (1999) 224 twin probands (106 monozygotic, 118 dizygotic) with a same-sex co-twin and a lifetime history of psychosis
     • Schizophrenia heritability estimates from 41% to 87%.
     • Bipolar disorders heritability of 79%

2. Environmental (next page)
Etiology of psychotic disorders

2. Environmental influence to establish an association with the risk of schizophrenia.
   - Cannabis (strong)
   - Migration
   - Urbanicity
   - Obstetrical complications
   - Seasonality –

*Available proof insufficient*

- Childhood traumas
- Infectious agents
- Socio demographic. psychosocial factors

- May operate at different time in person’s life (fetal period, childhood, adolescence and early adulthood).
- Individual and population level
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Screening, assessment of psychosis in children and adolescents

- There is **no screen with normative data** for children with schizophrenia or other psychotic disorders.

**Semistructured diagnostic interviews** reliable and valid measures for diagnosing **MDD, BPAD, COS, and other psychiatric disorders** in childhood that present with psychosis.

- Schedule for Affective Disorders and Schizophrenia for School-Aged Children—Present and Lifetime Version (K-SADS-PL) **GOLD STANDARD**

- Diagnostic Interview for Children and Adolescents (DICA), 59

- Diagnostic Interview Schedule for Children (DISC) 60
Evidence-Based Algorithm for Psychosis in Children and Adolescents (Fohrman & Stein, 2005)

• Complete History

• Address six causes of psychotic symptoms (listed in order of decreasing probability):
  1. Substance Abuse
  2. Medication Reactions
  3. General medical conditions
  4. Unexplained somatic symptoms (such as from toxic environmental exposures)
  5. Developmental and learning disabilities
  6. Atypical presentations

• Do not stop if you find one possible cause of psychotic symptoms... continue to end of algorithm

• More factors identified, greater chance of finding treatable cause that may reduce or ameliorate their symptoms
Substance abuse as cause for psychosis

- Common among adolescents and adults
- Commonly present in intoxication and withdrawal
- Diagnosis directly associated between temporal use and symptoms
- Drug induced states—delusions, hallucinations, paranoia, disorganized behavior
- Drug use > Development of chronic psychotic symptoms? Limited evidence
- **Case reports** link these drugs to chronic schizophrenia-like symptoms
  - Methylenedioxymethamphetamine ("Ecstasy")
  - Lysergic acid diethylamide (LSD)
  - Marijuana
- The strongest evidence links **long-term methamphetamine and cocaine use to chronic psychotic symptoms.**
Medications reported to cause psychosis

<table>
<thead>
<tr>
<th>Drug Class</th>
<th>Bizarre behavior/delusions</th>
<th>Auditory of visual hallucinations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amphetamine-like drugs</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Anabolic steroids</td>
<td>X</td>
<td></td>
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<tr>
<td>Angiotensin-converting enzyme (ACE) inhibitors</td>
<td></td>
<td>X</td>
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<tr>
<td>Anticholinergics and atropine</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Antidepressants, tricyclic</td>
<td></td>
<td>X</td>
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<tr>
<td>Antiepileptics</td>
<td>X</td>
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<tr>
<td>Barbiturates</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Benzodiazepines</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Beta-adrenergic blockers</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Calcium channel blockers</td>
<td>X</td>
<td></td>
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<tr>
<td>Cephalosporins</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Drug Class</td>
<td>Bizarre behavior/delusions</td>
<td>Auditory of visual hallucinations</td>
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<tr>
<td>Corticosteroids</td>
<td>X (dosages&gt;40mg/day markedly elevated risk for transient psychotic symptoms)</td>
<td></td>
</tr>
<tr>
<td>Dopamine receptor agonists</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Fluoroquinolone antibiotics</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Histamine H1 receptor blockers</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Histamine H2 receptor blockers</td>
<td>X</td>
<td></td>
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<tr>
<td>HMG-CoA reductase inhibitors</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Nonsteroidal anti-inflammatory</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>drugs</td>
<td></td>
<td></td>
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<tr>
<td>Opioids</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Procaine derivatives (procainamide, procaine penicillin G)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Salicylates</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Selective serotonin reuptake</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>inhibitors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sulfonamides</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>
### General Medical Conditions that may cause psychosis in children and adolescents

<table>
<thead>
<tr>
<th>Category</th>
<th>Conditions</th>
<th>Common symptoms/comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rheumatologic</td>
<td>Lupus erythematosus</td>
<td>Joint pain, fever, facial butterfly rash, prolonged fatigue</td>
</tr>
<tr>
<td>Infectious</td>
<td>Viral encephalitis</td>
<td>Fever, headache, and mental status change, may occur in perinatal period</td>
</tr>
<tr>
<td>Neurologic</td>
<td>Multiple sclerosis</td>
<td>Varied neurologic deficits, especially ophthalmologic changes and weakness</td>
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<td></td>
<td>Neurosyphilis</td>
<td>Personality change, ataxia, stroke, ophthalmic symptoms</td>
</tr>
<tr>
<td></td>
<td>Seizure(temporal lobe epilepsy, interictal psychosis)</td>
<td>Paroxysmal periods of sudden change in mood, behavior, or motor activity with or without loss of consciousness</td>
</tr>
<tr>
<td>Toxicologic</td>
<td>Carbon monoxide poisoning</td>
<td>Shortness of breath, mild nausea, headache, it's dizziness</td>
</tr>
<tr>
<td>Category/condition</td>
<td>Symptoms/comments</td>
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<tr>
<td><strong>Endocrine</strong></td>
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<tr>
<td>Hyperthyroidism</td>
<td>Tachycardia, weight-loss, excessive sweating, tiredness, inability to sleep, diarrhea, shakiness, muscle weakness</td>
<td></td>
</tr>
<tr>
<td>Thymoma/myasthenia gravis</td>
<td>Shortness of breath, swelling of face, muscle weakness (especially around eyes)</td>
<td></td>
</tr>
<tr>
<td><strong>Hematologic</strong></td>
<td></td>
<td></td>
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<tr>
<td>Porphyria (Acute intermittent porphyria, porphyria verigate)</td>
<td>Intermittent abdominal pain (severe) accompanied by dark urine</td>
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<tr>
<td><strong>Genetic</strong></td>
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<tr>
<td>Fábry's disease</td>
<td>Burning sensations in hands and feet that worsen with exercise and hot weather</td>
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<tr>
<td>Nieman-Pick disease, type C</td>
<td>Vertical gaze palsy, hepatosplenomegaly, jaundice, ataxia</td>
<td></td>
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<tr>
<td>Prader-Willi syndrome</td>
<td>Obesity, hyperphagia, mild to moderate mental retardation, hypogonadism, tantrums, obsessive-compulsive disorder</td>
<td></td>
</tr>
<tr>
<td><strong>Infectious</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Epstein-Barr virus</td>
<td>Fever, sore throat, adenopathy, fatigue, poor concentration</td>
<td></td>
</tr>
<tr>
<td>Lyme disease</td>
<td>Target lesion, fever; high-risk geographic area</td>
<td></td>
</tr>
<tr>
<td>Malaria/typhoid fever</td>
<td>Fever, mental status change; endemic area</td>
<td></td>
</tr>
<tr>
<td>Rare:</td>
<td>Category/condition</td>
<td>Symptoms/comments</td>
</tr>
<tr>
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</tr>
<tr>
<td>Metabolic</td>
<td>Citrullinemia</td>
<td>Mental status change, high plasma citrulline and ammonia</td>
</tr>
<tr>
<td>Metabolic</td>
<td>Tay-Sachs disease</td>
<td>Unsteadiness of gait and progressive neurologic deterioration</td>
</tr>
<tr>
<td>Metabolic</td>
<td>Homocystinuria</td>
<td>Dislocated lenses, blood clots, tall stature, some mental retardation</td>
</tr>
<tr>
<td>Metabolic</td>
<td>Juvenile metachromatic leukodystrophy</td>
<td>Cognitive decline, ataxia, pyramidal signs, peripheral neuropathy, dystonia; 60% of cases present before age 3</td>
</tr>
<tr>
<td>Neurologic</td>
<td>Central pontine myelinolysis</td>
<td>Suspect in patient with pathogenic polydipsia</td>
</tr>
<tr>
<td>Neurologic</td>
<td>Huntington’s disease</td>
<td>Chorea, myoclonic seizures, poor coordination, emotional lability</td>
</tr>
<tr>
<td>Neurologic</td>
<td>Moyamoya disease</td>
<td>Paresis, syncopal episodes</td>
</tr>
<tr>
<td>Neurologic</td>
<td>Narcolepsy</td>
<td>Excessive daytime sleepiness, cataplexy</td>
</tr>
<tr>
<td>Neurologic</td>
<td>Subacute sclerosing panencephalitis</td>
<td>Visual hallucinations, loss of developmental milestones</td>
</tr>
<tr>
<td>Neurologic</td>
<td>Traumatic brain injury</td>
<td>Occurring 4 to 5 years after a loss of consciousness &gt;30 minutes</td>
</tr>
<tr>
<td>Neurologic</td>
<td>Wilson’s disease</td>
<td>Tremors, muscle spasticity, possible liver inflammation</td>
</tr>
<tr>
<td>Nutritional</td>
<td>Pellagra (vitamin B₆ deficiency)</td>
<td>Redness, swelling of mouth and tongue, diarrhea, rash, abnormal mental functioning; seen with isoniazid treatment for tuberculosis</td>
</tr>
<tr>
<td>Oncologic</td>
<td>Cancers (pancreatic, CNS papilloma, germinoma)</td>
<td>Postural headache, neurologic signs, increased intracranial pressure, early morning nausea, vomiting</td>
</tr>
<tr>
<td>Toxicologic</td>
<td>Lead intoxication</td>
<td>Headache, fatigue, mental status change</td>
</tr>
<tr>
<td>Toxicologic</td>
<td>Mercury poisoning</td>
<td>Abdominal pain, bleeding gums, metallic taste; history of exposure</td>
</tr>
</tbody>
</table>
Hypnagogic hallucinations occur while you are falling asleep.

Hypnopompic hallucinations occur while you are waking up.
Prevalence of imaginary companions in a normal child population (Pearson et al. 2001)

- Approximately 1800 children between the ages of 5 and 12 years were randomly selected and asked whether they had present or past experiences of imaginary companions.
- 829 (46.2%) children reported experiences of imaginary companions.
- Findings were unexpected as previous studies had suggested that imaginary companions are generally experienced by fewer, much younger children.
- Imaginary companions were reported by more girls than boys, and were not restricted to very young children.
- Children with imaginary companions were predicted to have better narrative skills than children without imaginary companions (Trionfi, G, & Reese, 2009).
Imaginary friends... (Gleason, Sebanc, Hartup (2000))

- Developmental significance of preschool children’s imaginary friends
- Mothers of 78 children interviewed about their child’s social environment and imaginary companions (if their children’ had them)
- **Differences** in terms of pretend friends’ stability and ubiquity, identity and relationship with the child
  - *Invisible companions* - sociable and friendly; fulfilling need for relationship
  - *Personified objects* (stuffed animals or dolls) – occurred as a result of acquiring a toy
- Children with imaginary companions **did not differ from the children without imaginary companions in having friends and positive reactions to preschool**
- Children with imaginary companions **more likely to be first born and only children**
- **Social experiences within family have greater influence on imaginary companion creation** than do social experiences outside the family.
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Identify child or adolescent with possible psychosis

- **Identify child or adolescent** in office, classroom by behaviors, symptoms
  - New child/adolescent to provider/in classroom or
  - Child/adolescent may be known to provider/teacher/counselor

- **Notable behaviors**
  - Any change in behavior that interferes intellectually, socially, in the home
  - Isolate, won’t eat with others in cafeteria or play with others
  - Misinterpret others’ intentions as being harmful
  - Odd social interactions
  - Talking to themselves
  - Increased irritability and anger regarding simple issues
  - Paranoia
  - Communication seems “off” – don’t answer a question logically
  - Looking at something as if they are relating to it but you cannot see
  - Bizarre behavior (drinking mop water)
Manage and Next Steps

• Stay calm, curious about symptoms and reassuring of safety
• If they are psychotic, most often are not dangerous to self or others
• Often frightened and disorganized, confused
• UNLESS they are having **COMMAND hallucinations** to harm self and others
  • Urgent issue, contact family, share concern, get to psychiatric medical provider ASAP... all the while being calm and reassuring of safety
• Good to discuss with school/office to determine plan for this type of situation so you can have **your ducks in a row in advance**
• Good to have list of referrals
• Stay open and reassuring to child and/or adolescent and family
Summary

- Psychotic disorders in children and adolescents are RARE
- Imaginary friends common in younger children
- Hallucinations in non-psychotic children/youth occur
- Thorough assessment is best to r/o substance use, medications, medical causes, of psychosis
- Be calm and get your ducks in a row regarding identification of child/adolescent with possible psychotic disorder
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