

## NURS 821 Neurological Disorders

Margaret H. Birney PhD, RN

Lecture 11

Part 8 Special Pediatric Neurological Disorders

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### Plumbism-Lead Poisoning

- Definition: Permanent neurological damage due to lead ingestion
- Incidence: In U.S., most often found in children aged 1 – 3; Most frequent in summer months (unknown reason)
- Mandatory lead testing at 1 year to prevent MR
- Exposure: Unintentional ingestion of lead-containing paint, dust, water, soil, or foreign objects

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### Plumbism (Lead Poisoning)



- Most common sources for lead
  - Houses built before 1960
  - Window sills
  - Painted plaster walls
  - Children who engage in pica
- Unusual sources:
  - Folk medicines, flour, candy, pottery, metal urns/kettles, retained pellets after gunshot

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## Plumbism Clinical Manifestations

Within 3 weeks of chronic ingestion:

- anorectic
- Less playful, less alert, more irritable
- Intermittent vomiting
- Vague abdominal pain
- Clumsiness, ataxia

■ Within 1 week (or less if child younger):

- Acute encephalopathy
  - Vomiting, apathy, drowsiness, stupor, hyperirritability, seizure, papilledema, coma, death
  - CSF: ↑ pressure, ↑ lymphocytes, ↑ protein

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## Cerebral Palsy



■ Definition: umbrella term; describes a group of chronic disorders impairing control of movement.

- Usually appears in infancy to early childhood
- Not progressive

■ Etiology-

- Congenital-faulty embryonic development
- Acquired- damage to motor areas of brain
- Head injury, jaundice, Rh incompatibility, rubella (German measles)

(NINDS, 2000)

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## Cerebral Palsy Research

■ Research findings: Incorrect cell development early in pregnancy documented by missing enamel on certain teeth; possible relationship to bleeding in brain, seizures, breathing and circulation problems; neonatal stroke; low birth weight.



(NINDS, 2000)

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## Cerebral Palsy



- Effects: wide range; disrupts brain's control of movement and posture.
- Signs: infants-delayed developmental milestones e.g. roll over, sit, crawl, smile, walk.
  - Fine motor tasks, difficulty walking or balancing, involuntary movement (NINDS, 2000)

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## Attention Deficit Hyperactivity Disorder (ADHD)

*First described by Dr. Heinrich Hoffmann in 1844 in a poem "The story of Fidgety Philip"*



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## Attention Deficit Hyperactivity Disorder (ADHD)

- Other names: minimal brain dysfunction, hyperkinesis
- Incidence-One of most common mental disorders of children; 3-5% of all children; affects 2 million; boys 2-3X greater
- Characterized by varying degrees of Inattention, Hyperactivity, Impulsivity
- Misconception-can never attend or sit still; child can become totally engrossed in something that stimulates (NINDS, NIMH, 2000)

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## ADHD



- Often associated with learning disabilities, Tourettes Syndrome, Hyper-thyroidism, Plumbism, Oppositional Defiant Disorder-50%
  - Common triad of ADHD, obsessive compulsive disorder, and Tourette's Syndrome
- High incidence of depression, emotional problems, deviant behavior; family problems
- Etiology-High genetic component; prenatal exposure to drugs, smoking, alcohol; lead; anoxia at birth.
- (NIMH, NINDS, 2000)

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## Attention Deficit Hyperactivity Disorder (ADHD)

- 50% decline in prevalence with each 5 years of growth
- 1/3 to 2/3 of ADHD children continue to manifest some symptoms as adults, many "outgrow" it

Source: Victor & Ropper, 2001

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## ADHD Pathophysiology

- 5% smaller brain; smaller pre-frontal cortex, striatum, basal ganglia, and cerebellum on PET scans (NIMH, NINDS, 2000)
- Abnormality of dopamine & serotonin levels
- Right side of the brain is smaller in ADHD children including:
  - The caudate nucleus
  - The globus pallidus

Source: Victor & Ropper, 2001

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## Attention Deficit Hyperactivity Disorder (ADHD)

Most common clinical manifestations:

- Failure in school related to
  - Overactivity
  - Impulsivity
  - Inattentiveness
- Other symptoms:
  - Clumsiness
  - Boys- more hyperactive, inattentive, and have more difficulty reading and writing – dyslexia is common
  - Girls have more difficulty with numbers

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## Attention Deficit Hyperactivity Disorder (ADHD)

- Inattention: (need 6 or more)
  - Fails to give close attention to details
  - Has difficulty sustaining attention in activities
  - Does not listen when spoken to directly
  - Does not follow through on instructions
  - Has difficulty organizing tasks
- Avoids engaging in tasks that require sustained mental effort
- Loses things necessary for activities
- Is easily distracted by extraneous stimuli
- Is forgetful in daily activities



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## Attention Deficit Hyperactivity Disorder (ADHD)

- Hyperactivity and impulsivity: (need 6 or more)
  - Is fidgety
  - Leaves seat when expected to remain seated
  - Runs about in situations in which it is inappropriate
  - Has difficulty playing quietly
  - Acts as if “driven by a motor”
- Avoids engaging in tasks that require sustained mental effort
- Loses things necessary for activities
- Is easily distracted by extraneous stimuli
- Is forgetful in daily activities



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## Autism

- Definition-Developmental disorder of brain function
- Manifestations-wide ranging, including impaired social interaction, nonverbal and verbal communication problems, unusual or severely limited activities and interests
- Symptoms usually appear in first 3 years
- Affects 10-20/10,000 people
- Most serious-extremely repetitive, unusual, self-injurious, aggressive behavior; mild-learning disability (NIMH, 2000)

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## Autism



- Etiology:
  - No single cause
  - High genetic component-variations within families
  - Environmental influence-vaccine issues-MMR
- Pathology:
  - Abnormalities in cerebellum, amygdala, hippocampus, septum, mamillary bodies
  - Neurons appear smaller with stunted nerve fibers and signaling
  - May have serotonin abnormalities
  - Abnormalities probably occur early in fetal development (NINDS, 2000)

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