Clinical Problems in Childhood and Adolescence

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Normal Growth in Children

- Weight
  - Weight loss in first few days of life—5-10%
  - Regain birth weight by DOL #10
  - Double birth weight by 4-5 months
  - Triple birth weight by 1 year
  - Quadruple birth weight by 2 years
  - Daily weight gain
    - 10-30g for first 3 months
    - 15-20g for remainder of 1st year

Failure to Thrive

- Generally described as <3%tile for weight or decrease over 2 major percentiles
- Psychological, biological, environmental causes
  - Stress
  - Genetic syndrome/FAS
  - GI abnormality
  - Low intake
Puberty

Girls
  - African American (12.06 years)
  - Mexican American (12.09 years)
  - Caucasian (12.52 years) [J.Peds, 2005]
- Development of secondary sex characteristics prior to age 8 is considered precocious
- Causal factors suggested: increased BMI, increased animal fat intake, exposure to endocrine-disrupting chemicals (BPA, phthalates)

Boys
- African-American and Caucasian males mature at comparable ages
- Sexual development before age 9 is considered precocious

Developmental Problems – Speech and Language

Speech and language delay - most common
- Often constitutional but can indicate bigger issues such as autism

Language delay warnings
- 3 yo – not using short phrases
- 4 yo – no 3 word sentences
- 5 yo – not following 2 part commands

Screening
- Hearing screen at birth
- 9 months – screen via ASQ
- 24 months – M-CHAT (Modified Checklist for Autism in Toddlers)

Growth and Developmental Delay

Fetal Alcohol Syndrome
Fragile X
Failure to Thrive
Fetal Alcohol Syndrome

- Common reason for poor growth
- Cognitive delay
- Behavior problems
- No known safe level of alcohol consumption

Fragile X Syndrome

- 1/400 carry gene; Males > Females
- 1/2000 males affected 1/4000 females
- Low IQ, behavior problems

Childhood Deaths

- 46% decrease in accidental deaths in the past 20 years due to improved safety measures.
- Accidental death causes
  1. MVA
  2. Falls
  3. Poisoning
  4. Drowning
  5. Fires/burns

Childhood Deaths: Think ACCIDENTS!
Childhood Deaths—all causes

0-1 years:
- Developmental and genetic conditions present at birth
- Sudden Infant Death Syndrome (SIDS)
- All conditions associated with prematurity/low birth weight

1-4 years:
- Accidents
- Developmental and genetic conditions present at birth
- Cancer

5-14 years:
- Accidents
- Cancer
- Homicide

15-24 years:
- Accidents
- Homicide
- Suicide

Most deaths > age 5 are PREVENTABLE!

Sudden Infant Death Syndrome

- SIDS
  - Risk factors
  - Prone sleeping position
  - Smoke exposure
  - Soft bedding
  - Prematurity
  - Perinatal drug exposure
  - African/Native American

Sudden Infant Death Syndrome

- SIDS—prevention works!
  - Sleeping in same room with adults
  - Pacifiers when falling asleep
  - BACK TO SLEEP!!!
  - Back to Sleep Campaign introduced 1992-94

Death Rates (per 100,000)

<table>
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<th>Year</th>
<th>1995</th>
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<th>2001</th>
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Other Common Issues in Primary Care

Colic

**DEFINITION:**
Healthy, well fed infant with paroxysms of crying lasting >3 hours per day and occurring more than 3 times per week.

- Does not occur in the first days of life
- Most affected infants develop symptoms by 2 weeks of age
- Most episodes occur early in the evening
- Most infants are colic-free by 3 months of life

**Treatment**
- Rhythmic Rocking
- Encourage sucking
- Swaddle, bundle, cuddle
- DON'T medicate
- Be patient, and realize that it will go away
Iron Deficiency Anemia

- Common in US children ages 12-36 months (5.5% with Hgb <11.0)
- Dietary Iron
  - 8-10 mg iron must be consumed each day
  - 2-3 times more iron is absorbed from human milk than formula
  - breast milk or iron fortified formula is recommended for the first year of life
  - An additional source of iron should be provided at 4-6 months of age

Iron Deficiency Anemia

- Most common between 9-24 months of age
- Cows milk often the culprit
  - little bio-available iron
  - replaces food with higher iron content
  - inhibits iron absorption
  - can cause GI bleeding

Response to oral iron administration

- reticulocytosis- 48-72 hours
- increase in hemoglobin- 4-30 days (increase in hemoglobin by 1 gm/dl after 1 month of therapy)
- increase in iron stores- 1-3 months

Lead Poisoning

- Contributes to iron deficiency anemia
- Chelation very rare in areas without lead paint
  - East Coast higher
  - Currently less than 2% of kids have levels >10 mcg/dl
- Screen 9-72 months; more for high risk
- NO SAFE LEVEL
  - Evidence of decreased cognitive function
  - Recommendations for >10
  - Recheck in 3 months if elevated
Vitamin D Supplementation

- Old recommendation: Breastfed infants should start on vitamin D supplementation at 400 IU per day (AAP 2003)
- New recommendations: 400 IU vitamin D supplementation for ALL infants and children beginning in the first few days of life
- Supplementation can be stopped if
  - taking >1000ML formula daily
  - >1 year and taking Vit-D fortified milk at >32oz/day

Vitamin Supplementation

- Summary:
  - Vitamin D supplementation at 400 IU daily starting at birth (goal about 800 total)
  - Change to Vitamin D plus iron supplementation at 4-6 months
  - Continue both until 5 years
  - Consider ongoing Vitamin D supplementation (along with Calcium) for older children and adolescents at 400-800 IU/day
**Breath Holding Spells**

- Common phenomenon in healthy children
- Usually occurs between 6-18 months of age
- Family history in 23-30%
- Onset before the age of 5 years old
- Breath is held on exhalation

**Sequence of events in Breath Holding Spell**
- precipitating event
- child cries or becomes upset
- noiselessness, exhalation, cessation of breathing
- color change, hypotonia
- in severe cases, seizure activity
- limpness, return of consciousness

**Types of Breath Holding spells**
- cyanotic
- pallid

**Frequency**
- once a year to several a day
- peaks at age 2 years

**Differential Diagnosis**
- Seizures
- Syncope
- Prolonged QT

**Prognosis**
- Excellent if no underlying process
Enuresis

- Incidence
  - 5 year olds: 15-20%
  - 10 year olds: 5%
  - 15 year olds: 1-2%
- Annual spontaneous cure rate is 15%
- Nocturnal enuresis common in males
- Diurnal enuresis more common in females

Enuresis

- Etiology
  1. Family history
  2. Bladder Capacity
  3. Developmental lag
  4. Sleep level
  5. Psychological factors
  6. Inadequate ADH secretion

Enuresis

- Uncomplicated
  - Nocturnal symptoms
  - Normal physical examination
  - Negative UA and urine culture
- Complicated
  - History of voiding dysfunction
  - Abnormal neurologic or abdominal exam
  - History of UTI
  - Positive UA

Enuresis Interventions

- Should be age appropriate
- Initiated only after full work-up reveals no abnormalities
- 3 years:
  - Self awakening hints
  - Good bedtime habits
  - Empty bladder
  - Limit fluids
  - Praise for dry mornings
### Enuresis– Interventions

- **6 years:**
  - Self awakening tips
  - Motivational techniques

- **8 years:**
  - Enuresis alarm
  - Drugs intermittently for special events

- **12 years:**
  - Enuresis alarm
  - Drugs continuously for 2-6 months

### Non-Infectious Abdominal Complaints

- **Acute Scrotum**
- **Acute Abdomen**
- **Intussusception**

### Acute Scrotum

- **History**
  - Age, onset of symptoms, prior trauma, associated findings (rash, fever, etc.)

- **Physical Exam**
  - Cremasteric reflex
  - Appearance of scrotum
  - Palpation

- **Differential diagnosis of painful, enlarged testis**
  - Testicular torsion
  - Torsion of the appendix testis
  - Trauma
  - Epididymitis
  - Tumor
Testicular Torsion

Anatomic deformity
Typical history
- Acute onset, with nausea and vomiting
- While active, at rest, or after trauma
- Often history of similar events, although less severe

Physical findings
- Scrotal edema, erythema, high riding testicle
- Entire testicle is tender (as opposed to “blue dot” and focal tenderness of appendix torsion)
- Spermatic cord “knot”
- Absent cremasteric reflex

Radiologic studies
- Decreased blood flow on nuclear scan

Treatment
- Surgical emergency
- Detorse the affected testicle and anchor both sides
### Intussusception

- Invagination/telescoping of proximal intestine into the adjacent bowel
- Often a “lead point” in Peyer’s Patch
- Most common cause of intestinal obstruction between 3 months and 6 years of age
- Etiology unknown in 95%

### Intussusception - Definition

- Presentation: crying with severe, colicky (due to peristaltic rushes) abdominal pain, flexion of the knees and hips
- The initial pain subsides with infant quite comfortable between episodes
- Over time: increasing frequency of pallor, diaphoresis, and increasing pain may occur

### Currant Jelly Stool

Mass (M) and dilated Bowel loops
Intussusception: Barium Enema

“Coiled Spring”

Intussusception: Management

- Resuscitation
- Enema Reduction
  - Barium/Air
  - Surgery

Intussusception: Prognosis

- Untreated intussusception in infants is almost always fatal
- Recurrence is rare at >24 hours post reduction
- Mortality rate rises rapidly after 24 hours, especially after the 2nd day
- Spontaneous reduction during preparation for operation is not uncommon
- Long term complications are few

Rotavirus Vaccine & Intussusception

- ACIP & AAP in 1998 recommended RRV-TV for routine childhood immunization of US children
- From Sept 1, 1998 - July 7, 1999: 15 cases of intussusception among infants who had received RRV-TV
- Several studies also noted higher incidence rate within the 1st week after RRV-TV
- CDC recommended suspending routine vaccination
- 2006 new formulation approved; currently in use with no increase in intussusception noted
- Now 2 formulations RotaTeq and Rotarix
Non-Infectious Rashes

• Idiopathic Thrombocytopenic Purpura
• Henoch Schonlein Purpura

Idiopathic Thrombocytopenic Purpura (ITP)

• Common acquired bleeding disorder in children < 10 years old
• Manifestations:
  - platelet count < 150,000
  - normal bone marrow
  - purpuric rash
  - absence of other causes of thrombocytopenia

ITP

• Clinical signs and symptoms
  - Petechiae, purpura, epistaxis, hematuria
  - Preceding viral illness
  - Absence of hepatosplenomegaly

ITP

• Laboratory studies
  - Thrombocytopenia
  - Mild anemia sometimes
  - Platelets may be large
  - Normal bone marrow
  - Normal peripheral blood smear
**ITP**

- **Natural history of ITP**
  - Most cases of ITP in children are acute
  - 75% spontaneously remit within 6 months
  - Mortality is less than 1% (CNS bleeds)

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**Management**

- **Steroids**
  - Concern for use if malignancy not ruled out
  - Cause a rapid rise in platelet count
- **IVIG**
  - Similar rise in platelet count as compared to steroids
  - No need for bone marrow
- **Anti-D (winrho)**
  - Coats normal red cells and helps block spleen's destruction of platelets

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**Henoch Schonlein Purpura (HSP)**

- IgA mediated small vessel vasculitis
- Generally in children between 2-12 years of age
- 75% with preceding URI
- Boys 1.5/Girls 1.0

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**Clinical Manifestations**

- Purpuric rash (100%)
- Abdominal pain (50%)
- Scrotal edema in boys
- Other edema: periorbital, distal extremities
- Arthritis (knees, ankles, hands)
- Hematuria (up to 80%)
- Nephritis (20-30%)
HSP

- Treatment:
  - NSAIDS
  - Supportive
  - Occasional cytoxan for severe kidney disease
    - Although very rare, renal failure is the most common serious complication
  - Steroids
    - soft tissue swelling
    - scrotal swelling
    - abdominal pain

Altered Mental Status

- Seizures (febrile and nonfebrile)
  - ALTE
  - DKA
  - Ingestions
  - Shaken Baby Syndrome

Febrile Seizures

- Typical Febrile Seizure
  - Generalized, tonic-clonic
  - <15 minutes duration
  - Child 6 months-5 years old
    - (peak 15-18 months)
  - One seizure in 24 hour period

Febrile Seizures

- Atypical/Complex Febrile Seizure:
  - Prolonged >15 minutes
  - >1 seizure in 24 hours
  - Focal
  - Todd's Paralysis after the seizure qualifies it as complex
Febrile Seizures: Facts and Stats

- Occur in 3-4% of all children
- 25-30% of kids with febrile seizures will have a second and 50% of those with a second will have a 3rd
- FS do NOT cause MR, CP, learning disorders
- FS do not cause epilepsy or afebrile seizures
- However....

Febrile Seizures: Facts and Stats (cont.)

- Family history of epilepsy, preexisting neurologic disease, and the history of a complex febrile seizure correlate with increased incidence of epilepsy later in life
- If all 3 of the above exist, increased risk of seizure disorder to 10-15%, up from baseline of 0.4% in population

Febrile Seizure: Work-up

- STOP! Work up the FEVER
  - 73% of the time it's OM, URI, pharyngitis, viral exanthems
  - If the child returns to baseline status, no seizure work-up needed
  - Blood Studies (lytes, Ca, Mg, Phos, glucose) are NOT routinely recommended
  - EEG NOT routinely recommended
  - LP NOT routinely recommended
  - Consider in child <12 months and in anyone with meningeal symptoms

Febrile Seizure: Treatment

- Treat the cause or the fever
- Consider RTC acetaminophen or ibuprofen early on in the infection
- In children with multiple recurrences, consider rectal diazepam
Childhood Asthma

- Childhood asthma is (still!) on the rise
- #1 cause of school absences
- #1 admitting diagnosis
- 7-13% of kids have asthma (10% prevalence in CA, 2004)
- Higher in inner city, low income kids
- Majority diagnoses < age 5
- Often associated with allergies

Management of exacerbations
- Albuterol – nebulized and MDI have same efficacy
- Ipratropium Bromide – adjunctive to albuterol in acute management but not in daily maintenance
- Magnesium Sulfate – helpful in patients not responding to albuterol treatments
- Systemic steroids – should be initiated when not responsive after initial albuterol treatments or when admission is being considered
  - Oral dexamethasone well tolerated

Asthma

- Inhaled corticosteroids are safe and effective for children!
- New guidelines focus on functional status as well as baseline diagnosis
- Rule of 2’s
  - Daytime symptoms >2x weekly
  - Nighttime symptoms >2x monthly
  - Exacerbations >2x yearly
  → If yes to any of the above, need ICS for 1-3 months and then reassess!

Questions?