Big Kids or Little Adults?: Adolescents in the Emergency Department

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Objectives

• Discuss consent issues in adolescents
• Discuss confidentiality issues in adolescents
• Discuss reasons adolescents go to ED
• Discuss unique diagnoses in adolescents
• Discuss diagnoses you don’t want to miss

What is an adolescent?

• Merriam-Webster: a young person who is developing into an adult; one who is in the state of adolescence
• Dictionary.com:
  – Adjective:
    • 1. growing to manhood or womanhood; youthful.
    • 2. having the characteristics of adolescence or of an adolescent.
  – Noun:
    • an adolescent person.

What is adolescence?

• Dictionary.com:
  – 1. the transitional period between puberty and adulthood in human development, extending mainly over the teen years and terminating legally when the age of majority is reached; youth.
  – 2. the process or state of growing to maturity.
  – 3. a period or stage of development, as of a society, preceding maturity.
• WHO: WHO identifies adolescence as the period in human growth and development that occurs after childhood and before adulthood, from ages 10 to 19.

Adolescence

• Wikipedia:
  – In studying adolescent development, adolescence can be defined biologically, as the physical transition marked by the onset of puberty and the termination of physical growth; cognitively, as changes in the ability to think abstractly and multi-dimensionally; or socially, as a period of preparation for adult roles.
Not a big kid or a little adult...

- Vocabulary.com:
  - Adolescent is just a fancy word for teenager — someone who is no longer a child but is not yet an adult

Minor Consent to Medical Treatment Laws

- National District Attorney’s Association
- Updated January 2013 (most recent)
- This compilation includes state, District of Columbia, and territory statutes as of January 2013 regarding minor consent laws to medical treatment
  - Please note there may have been changes to this area of law since our last update. Please feel free to contact us at (703) 549-9222 for further discussion on updates to the information included in this document.
- 164 page document
- Available on ndaa.org

Virginia Minor Consent Laws

§ 54.1-2009: Authority to consent to surgical and medical treatment of certain minors

E. A minor shall be deemed an adult for the purpose of consenting to:
1. Medical or health services needed to determine the presence of or to treat venereal disease or any infectious or contagious disease that the State Board of Health requires to be reported.
2. Medical or health services required in case of birth control, pregnancy, or family planning except for the purposes of sexual sterilization;
3. Medical or health services needed in the case of outpatient care, treatment, or rehabilitation for substance abuse as defined in § 18.2-2500 for 4. Medical or health services needed in the case of outpatient care, treatment, or rehabilitation for mental illness or emotional disturbance.
A minor shall also be deemed an adult for the purpose of accessing or authorizing the disclosure of medical records related to subsection 1 through 4.

What about married or pregnant minors in Virginia?

F. Except for the purposes of sexual sterilization, any minor who is or has been married shall be deemed an adult for the purpose of giving consent to surgical and medical treatment.

G. A pregnant minor shall be deemed an adult for the sole purpose of giving consent for herself and her child to surgical and medical treatment relating to the delivery of her child when such surgical or medical treatment is provided during the delivery of the child or the duration of the hospital admission for such delivery; thereafter, the minor mother of such child shall also be deemed an adult for the purpose of giving consent to surgical and medical treatment for her child.

EXCEPT...

J. Nothing in subsection G shall be construed to permit a minor to consent to an abortion without complying with § 18.2-72.1.

K. Nothing in subsection E shall prevent a parent, legal guardian or person standing in loco parentis from obtaining
   (i) the results of a minor’s nondiagnostic drug test when the minor is not receiving care, treatment or rehabilitation for substance abuse as defined in § 18.2-2500 or
   (ii) a minor’s other health records, except when the minor’s treating physician or the minor’s treating clinical psychologist has determined, in the exercise of his professional judgment, that the disclosure of health records to the parent, legal guardian, or person standing in loco parentis would be reasonably likely to cause substantial harm to the minor or another person pursuant to subsection B of § 18.2-2500.
Which leads to confidentiality issues...

"THEY SAY YOU SHOULDN'T LIE TO YOUR DOCTOR. BUT ADMIT IT. IF THEY ASK IF YOU'VE EVER HAD SEX, AND YOUR MOM IS RIGHT THERE, YOU'RE GONNA SAY NO." - RISA SCHIZOPHRENIA

Exceptions to confidentiality

• Child abuse/neglect
  - Age of consensual sex
• Violent injuries (knife/gunshot)
• STI, other reportable disease
• SI/Hi—if patient/other at serious risk of harm
• Parental notification
  - Virginia: abortion requires both consent and notice
  - Some other states set minimum ages, or require marriage, pregnancy, or “mature minor” to consent for treatment for contraception, STI, prenatal care

Threats to confidentiality

• Medical records
  - Including patient/parent portals
• Billing
• Ancillary staff
• Pharmacists

Dealing with teens and their parents:

• Parent giving complete hx
• Teens may not be honest
• Not willing to engage
  - Headphones
  - Talking on cell phone
  - Social media
  - Video games
  - attitude
• Stress between parent and teen
• Parent may not be willing to allow you to talk to teen in private

Adolescent Visits to ED

• Difficult to get accurate, current info
  - National studies don’t group by adolescent age
  - Study published in 1998 did secondary analysis of national data from 1994
• Adolescents more likely to use ED, urgent care, or retail-based clinics than children
• Reason for using ED instead of pcp
  - Perception of severity/severity of illness
  - Pcp referral to ED
• Studies about subgroups Autism
  - Mental health
  - Drug use
  - Self-injurious behavior

A Week in the ED

• Data from 3/9-3/16
• Total 1328 patients, 263 age 11-19 yrs = 20%  
  - 11-12 yrs: 30% of adolescents
  - 13-17 yrs: 60% of adolescents
  - 18-19 yrs: 10% of adolescents
• Approx 60% female
A Week in the ED: How Sick Are They?

- **Triage level:**
  - 1, 2: 15%
  - 2: 29%
  - Psych: 11%
  - Testicular: 3%
  - Other: 37%
  - 4, 5: 20%
- **Admit/OR/Transfer:** 14%
  - Sickle cell
  - Psych/Ingestion
  - Respiratory
  - Injury
  - Abdominal pain
  - Infection
  - Other

Contributors to Unique Problems in Adolescents

- Rapid growth spurts
- Participation in high-intensity sports/physical activities
- Hormonal/pubertal changes
- Risk-taking behaviors
- Emotional/social stressors

Medical Problems Unique to Adolescents: Neurologic

- **Juvenile myoclonic epilepsy**
  - Most common epilepsy syndrome presenting in adolescence
  - Myoclonic seizures, typically on awakening
  - Generalized tonic-clonic seizures in 90%
  - Brief absence seizures in 60%
  - Ask about “twitches” and “jerks” and “blank periods”
  - Common presentations: generalized tonic-clonic seizures on awakening after late night or sleep deprivation, or while playing video game late at night in dark room
- **Juvenile absence epilepsy**
  - Usually occurs between ages 10-13 yrs
  - Tend to occur daily, but less frequently than in childhood absence epilepsy
  - Often last longer than those seen in childhood absence (30-40 sec, sometimes longer than a minute)
- **Other epilepsies**

Medical Problems Unique to Adolescents: Orthopedic

- Idiopathic scoliosis
- Spondylolisthesis
- SCFE (slipped capital femoral epiphysis)
- Apophysitis/apophyseal fractures
- Overuse injuries
  - Stress fractures
  - Osteochondritis Dissecans (OCD)

Spondylolysis/Spondylolisthesis

- **Spondylolysis:** fracture through the pars interarticularis, thin portion of vertebra that connects the upper and lower facet joints
  - Can occur at any age, but children/adolescents most susceptible due to developing spine
  - Most commonly due to repetitive stress on lower back
    - Gymnastics
    - Football
    - Weight-lifting
- **Spondylolisthesis:** the fractured pars interarticularis separates and slips forward on the vertebra below
  - Most commonly occurs during rapid growth spurts
  - High grade is >50% of width of vertebra
  - More likely to experience significant pain and nerve injury
Spondylolysis/Spondylolisthesis: Symptoms

• May be asymptomatic (incidental finding)
• When symptomatic, most common symptom is low back pain
  – May feel similar to muscle strain
  – May radiate to buttocks/back of thighs
  – May worsen with activity and improve with rest
• If high-grade spondylolysis, may have numbness/tingling/weakness in one or both legs

Spondylolysis/Spondylolisthesis: Diagnosis and Treatment

• Diagnosis:
  – PE:
  – Imaging: x-ray, CT, MRI
• Treatment:
  – Rest
  – NSAIDs
  – PT: improve flexibility, stretch tight hamstrings, strengthen muscles in back and abdomen
  – Bracing
  – Surgery

Spondylolisthesis

• X-ray taken from the side shows spondylolisthesis in the fifth lumbar vertebra. The white arrow shows the pars fracture. The black arrow shows the direction of the slippage.

Spondylolysis

• X-ray taken from the side shows a pars fracture in the fifth lumbar vertebra.

SCFE

• Most common hip disorder in adolescents
• The femoral head slips down and backwards off the neck of the bone at the growth plate
• Usually occurs during period of rapid growth
  – Usually age 10-14 yrs female
  – Usually age 12-16 yrs male
• More common in males
• Unknown etiology, but risk factors include:
  – Excessive weight/obesity
  – Most common for weight
  – Family hx of SCFE
  – Endocrinopathy (hyperthyroidism)
    • More likely in patients younger or older than typical age range
Slipped Capital Femoral Epiphysis (SCFE)

Normal anatomy of hip joint

SCFE

SCFE: Symptoms

- May develop acutely after minor fall/trauma
- More commonly develops gradually over weeks to months
- Pain in groin, hip, knee, or thigh
  - Usually worsens with activity
- May walk/run with limp
- Severe/unstable:
  - Sudden onset of severe pain after fall
  - Inability to bear weight/walk
  - External rotation
  - Leg length discrepancy

SCFE: Diagnosis

- PE:
  - Pain with ROM of hip
  - Decreased ROM of hip
    - Especially internal rotation
  - Involuntary muscle guarding/spasm
  - Limp/abnormal gait
- Imaging:
  - Line of Klein/Klein’s line: a line drawn along the superior edge of the femoral neck, should intersect at least a portion of the femoral epiphysis

SCFE: Treatment

- No weight-bearing
- Surgery to prevent further slippage
- Usually admit to hospital for bed rest and urgent surgery
- If untreated can cause arthritis

Apophysitis: Osgood-Schlatter

- Common cause of knee pain in adolescents
- Inflammation at the site of patellar tendon attachment to tibial tubercle
- Most common during growth spurts
- Repetitive contraction of quadriceps puts stress on tibial tubercle
  - Running, jumping, squatting
- PE: prominence of tibial tubercle, tenderness at tibial tubercle
- Treatment: rest, NSAIDs, stretching/strengthening

Apophysitis: Sever’s Disease

- One of most common causes of heel pain in children
  - Often seen during adolescent growth spurt
- Inflammation of growth plate of calcaneus caused by repetitive stress on growth plate as foot strikes ground
- X-ray may look normal or may show fragments
- Treatment:
  - Rest
  - NSAIDs
  - Heel pads
  - Stretching
Jumper’s Knee/Sinding-Larsen-Johansson

- Pain at site of patellar tendon attachment to patella
- Repetitive contraction of quadriceps
- Pain/swelling at inferior pole of patella
- If causes damage to growth plate called Sinding-Larsen-Johansson
- Treatment: rest, ice NSAIDs

Apophysitis/Apophyseal Fractures: Pelvis

- Apophysitis: localized pain, increased pain with activity and over time
- Apophyseal fracture: acute injury, often hear or feel a “pop”
- Repetitive activities: running, jumping, hurdling, kicking, splits
- Locations:
  - anterior superior iliac spine
  - anterior inferior iliac spine
  - ischial tuberosity
  - lesser trochanter
- Treatment: rest, ice, analgesics, rehab, rarely surgery

Other Apophyseal Injuries/Overuse Injuries

- Little Leaguer’s Elbow (medial epicondyle apophysitis): stress on growth plate of medial epicondyle due to repetitive overhead throwing
- Iselin’s disease: apophysitis of tuberosity at base of 5th metatarsal
- Stress fractures
- Osteochondritis Dissecans: small piece of bone begins to separate from surrounding region due to lack of blood supply; most often in kids/teens; most commonly in knee/ankle/elbow; unknown cause, but thought to be due to repetitive stress

Back to Little Adults or Big Kids?

- The things we need to think about more in adolescents vs younger kids:
  - Neuro: stroke, MS, myasthenia gravis
  - Cardiac: MI, HTN, hypercholesterolemia
  - PE/DVT
  - Type 2 diabetes
  - Cholelithiasis/cholelithiasis
  - STI/pregnancy
  - Intentional ingestion/injury
    - Suicide attempt
    - Recreational
  - IBS: estimated 6-14% of adolescents with IBS, more common in females

Strokes in Adolescents

- Diff dx: seizure, acute vestibular syndrome, migraine, brain tumor, infection, toxic-metabolic (esp hypoglycemia), hypertensive encephalopathy, gastroenteritis, conversion
- Risk factors: congenital heart defects, sickle cell, immune disorders, diseases of the arteries, abnormal blood clotting, head/neck trauma
- Symptoms: may be same as adult, but also consider severe headache, vomiting, sleepiness, dizziness, loss of balance/coordination

Multiple Sclerosis

- Up to 10% of patients develop sxs before age 18 yrs
- Symptoms:
  - Changes in vision
  - Numbness/tingling
  - Weakness
  - Loss of balance
  - Changes in bowel or bladder function
  - Fatigue
Myasthenia Gravis

• Juvenile MG: usually in female adolescents, esp Caucasian; about 10% of cases are juvenile-onset
• Symptoms may begin gradually over weeks to months, may be milder in morning and worsen during day
  – Excessively tired after very little activity
  – Problems chewing/swallowing
  – Dropping eyelids

PE

• Retrospective study 2003-2011 of patients <21 yrs seen in pediatric ED with ultimate dx of PE
• Most common risk factors:
  – BMI >/= 25
  – OCP use (36% of females with PE in this study)
  – Hx previous thrombus (NOT PE)
• Most common sx:
  – Chest pain: 52%
  – SOB: 44%
  – Cough: 32%
  – Hemoptysis RARE
• PERC was applied retrospectively, and 84% would NOT have been ruled out by PERC
• Scoring systems in adults (PERC, Wells, Geneva) but no validated scoring systems in pediatrics/adolescents

Cholecystitis/Cholelithiasis

• Both increasing in pediatric/adolescent populations
• Risk factors for cholelithiasis: hemolytic disease, hepatobiliary disease, obesity, prolonged parenteral nutrition, abdominal surgery, trauma, ileal resection, Crohn’s, sepsis, pregnancy
• Risk factors for cholecystitis: pregnancy, hemolytic disease, obesity, abdominal surgery, hepatobiliary disease, hyperalimentation, malabsorption, dehydration, OCP use, early menarche
• Cholecystitis in adolescents: 14:22:1 female:male
• Consider in any adolescent with RUQ abd pain and/or jaundice
  – Especially female, obese, hemolytic disease

STI

• About 20 million new cases of STI in US/yr, with about half in ages 15-24 yrs
• Number/rate of HIV diagnoses from 2010-2014 decreased for all age groups EXCEPT 20-24 (stable), and 25-29 (increased)
  – In 2015 highest rate for ages 25-29, followed by ages 20-24

Chlamydia — Rates of Reported Cases Among Women Aged 15–24 Years by State, United States and Outlying Areas, 2015

Ectopic pregnancy

• More common in adults vs. adolescents
• Different risk factors/presentation (ref)
  – Adults: more likely to have prior ectopic, prior pelvic surgery
  – Adolescents: more commonly present with pain, more commonly present with current GC and/or CT
Ectopic pregnancy presentation

- Acute rupture
  - May present with acute onset severe pelvic and shoulder (referred) pain
  - May present in shock
- Subacute presentation
  - Consider in any adolescent female with vaginal bleeding and/or abdominal pain

Pregnancy: Ectopic

<table>
<thead>
<tr>
<th>Gestational Age</th>
<th>HCG Quant Range (mIU/mL)</th>
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<tbody>
<tr>
<td>0-1 week</td>
<td>5-50</td>
</tr>
<tr>
<td>&gt;1-2 weeks</td>
<td>500-500</td>
</tr>
<tr>
<td>&gt;2-3 weeks</td>
<td>100-10,000</td>
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<tr>
<td>&gt;3-4 weeks</td>
<td>1000-30,000</td>
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<tr>
<td>&gt;4-5 weeks</td>
<td>3000-115,000</td>
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<tr>
<td>&gt;5-8 weeks</td>
<td>12,000-270,000</td>
</tr>
<tr>
<td>&gt;8-12 weeks</td>
<td>15,000-320,000</td>
</tr>
<tr>
<td>2nd Trimester</td>
<td>10,000-50,000</td>
</tr>
<tr>
<td>3rd Trimester</td>
<td>10,000-50,000</td>
</tr>
</tbody>
</table>

- Quantitative HCG should double every 48 hours in early pregnancy
- If no IUP seen on transvaginal US with quant HCG 1500-2000 then suspect ectopic.

Ectopic pregnancy: testing

- Beta-quantitative HCG
- CBC
  - Evaluate for anemia/significant blood loss
  - Methotrexate contraindicated if Hgb <8
- Type and screen
  - If Rh negative give RhoGham
- Transvaginal US
  - If beta-quant >1500-2000 should see IUP

Ectopic pregnancy: treatment

- Stabilize
  - If hemodynamically unstable treat with ivf, may need blood
- Expectant
  - If early and appears to be spontaneously aborting on own
- Medical (methotrexate)
  - More successful if HCG <5000
  - Several contraindications
    - Requires long-term, frequent f/u
- Surgical
  - Hemodynamically unstable
  - Contraindications to methotrexate
  - Failed medical therapy
  - Need for another surgical procedure

Mental health

- Suicide is 2nd leading cause of death among 15-19 year-olds
- Rate of attempted suicide to completed suicide is 50:1 to 100:1
- Completed suicide 3 times higher in males
- Suicide attempt twice as high in females
- Sexual minority youth have more than twice the rate of SI
- The 2013 Youth Risk Behavior Survey
  - students in grades 9 through 12 in the United States
  - during the 12 months before the survey:
    - 29.1% of girls and 20.6% of boys felt sad or hopeless every day for at least 3 weeks in a row
    - 16.9% of girls and 10.3% of boys had planned a suicide attempt
    - 10.8% of girls and 5.4% of boys had attempted suicide
    - 3.6% of girls and 1.8% of boys had made a suicide attempt that required medical attention.

Mental health cont.

- Many risk factors for suicide
- No risk factors is NOT protective
- More than 90% of adolescent suicide victims met criteria for a psychiatric disorder before their death
- Important risk factors to consider:
  - Mood disorder
  - Psychosis
  - Bullying
Intentional Ingestion

- Retrospective observational study using the American Association of Poison Control Center’s National Poison Data System
  - patients aged 13–19 years old at the time of their substance ingestion
  - between the years 2004 and 2013
  - coded as reason for ingestion of “intentional-supected suicide.”
  - 390,000 poison center calls for intentional suspected suicide in the United States between 2004 and 2013
    - accounting for 80.3% of all “intentional” ingestion calls in the adolescent population.
  - most common substance ingested:
    1. acetaminophen (10.9%)
    2. ibuprofen (9%)
    3. selective serotonin reuptake inhibitors (7.7%)
    4. atypical antipsychotic (6%)
    5. antihistamines (5%)
  - most common medications coded as resulting in major clinical effects or death were antidepressants and atypical antipsychotics

Mental health in the ED

- Consider in adolescents that present frequently or with vague complaints
- Consider in agitated/irritable teens
- Know how to get help
- Hospitalize if necessary to keep safe

Recreational Substance Use/Abuse

- See graph (from drugabuse.gov)
- Younger adolescents more likely to use inhalants (household cleaners, glue, pens)
- Older adolescents more likely to use synthetic marijuana and prescription drugs
- Others:
  - Heroin (<1% lifetime use in 8th/10th/12th graders)
  - Bath salts (<1% lifetime use in 8th/10th/12th graders)
  - Cocaine/crack cocaine (0.1-3.4% lifetime use in 8th/10th/12th graders)

- But highest number of deaths due to overdose are due to heroin or other illicit opioids

- Bath salts (<1% lifetime use in 8th/10th/12th graders)
- Cocaine/crack cocaine (0.1-3.4% lifetime use in 8th/10th/12th graders)