The Annual General Pediatric Review & Self Assessment

Nicklaus Children's Hospital

Adolescent Medicine

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Miami, Florida

(Recorded at the 2023 GPRSA Course)

Nicklaus Children's Hospital

Disclosure of Relevant Relationship

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MAJOR EVENTS

- ADOLESCENCE (PSYCHOSOCIAL DEVELOPMENT)
- PUBERTY (PHYSICAL CHANGES)

GOALS OF ADOLESCENCE

- Seeks independence from family (peers back to family)
- Achieves some economic independence
- Develops a mature self-identity
- Develops a sexual identity and a relationship with a significant other

PSYCHOSOCIAL DEVELOPMENT

TASK	EARLY (10-13 y)	MIDDLE (14-16y)	LATE (17-21y)
Independence	Mood swings Disinterest in parental activities	Peak parental conflicts	Reacceptance of parental advice & values
Body Image	Preoccupation with pubertal changes	Acceptance of body Concern with making self more attractive	Comfort with pubertal changes
Peers	Same-sex relationships	Conformity with peer values Experimentation Sexual activity	Peer group less important Individual relationships more important
Identity	Concrete thinking Need for privacy Lack of impulse control	Risk taking behavior Invulnerability Still impulsive	Refinement of sexual moral and religious values Abstract reasoning

EMANCIPATION

- Emancipation is a legal process by which minors can attain legal adulthood before reaching the age at which they would normally be considered adults (“age of majority” i.e. 18 yrs)
- The rights granted might include the ability to sign legally binding contracts, own property, and keep one’s own earnings
- However, each state has different laws governing emancipation and some states simply have no law or legal process concerning emancipation
- Must be at least 16 years of age
- Must have a petition filed by the minor’s natural or legal guardian or, if there is none, by a guardian ad litem.

EMANCIPATION

Minor <18 years

- Marriage
- Economically emancipated
- Pregnancy-medical care
- Military service

- Teenagers can access services for some services without parental consent

CONFIDENTIALITY

- Family Planning: contraceptive care
- STI evaluation and treatment
- Substance Use services
- Mental Health Services

CONFIDENTIALITY

Clear exceptions to confidentiality:

- Suicidal
- Homicidal
- Abuse

FINAL HEIGHT

- Estrogen is the main hormone for growth in both males and females
- Pubertal events correlate better with bone age than chronological age for both boys and girls
- Genetic influence on the age of pubertal onset and menarche
  - Can track with either mother or father

Case

A 13 year old female, comes in with dad, concerned that she has not menstruated yet. Dad's sister did so at age 12 years

On exam, you note that she has breast tissue palpable just beyond the margins of the areola and a few pubic hairs with no axillary hair.

What would you say to her?

MENARCHE

- Average age 11-13 years
  - Age differs by ethnicity
    - 12.1 for African-Americans
    - 12.8 for Caucasians
  - Earlier in obese girls
  - Earlier in those who are blind/no light perception

- Menstruation (Late event in puberty)
  - 62% in SMR4
  - 26% in SMR 3
  - 11% in SMR 5
  - 1% SMR 2

- Bleeding often irregular in the first two years post-menarche

TIME INTERVALS

- Menses: interval from breast development is 2.3±0.1 years, (range: 0.5 to 5.75 years)
- 3.3 years after the onset of the growth spurt and 1.1 years after the peak height velocity is attained
- Growth rate slows- grow 4-8cms after menarche
- Early menarche may mean shorter height
- The percentage of body fat is critical; according to Frisch's theory, a minimum body fat value of 17% is required to initiate menses and a value of 22% is required to maintain regular cycles

ORDER OF CHANGES IN MALES

- *Testicular growth (>4mL or >2.5cm)*
- Pubic hair
- Penile and scrotal growth
- Axillary hair - SMR3
- First ejaculation
- *Growth spurt after achieving SMR IV*
- Facial hair
- Voice change - SMR4
- Genital T5
- Pubic hair T5

A 15 year old boy is referred to you for short stature and delayed sexual development. His parents are of average size. Ht and wt are at the 5% (or they may mention growth velocity). On examination there is no pubic hair and his testicular volume is 6 ml.
Rest of exam is non contributory

Each of the following would be consistent with the above findings except:

1. A bone age of 12.5 years
2. Adult height within normal range
3. Growth hormone deficiency
4. Acceleration of growth and sexual development within the next two years
5. A history of normal length and weight at birth

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EFFECTS OF PUBERTAL TIMING

- Variations can have significant psychological impact on adolescents whose development deviates from the mean
- The impact differs with sex
- Early-developing males tend to have greater self-confidence and a greater likelihood of academic, social,

  and athletic success than their peers, particularly when

  compared with late-developing males
- Conversely, early pubertal development in girls appears to be related to lower self-esteem and more concerns about body image

GYNECOMASTIA

- 75% of males
- Unilateral or bilateral and often tender - as in females
- Onset in SMR II-III
- ***Altered estrogen: testosterone ratio***
- Rarely last > 2 years
- Pseudo-gynecomastia: adipose tissue

A 13 year old boy with breast enlargement over the past 6 months.
He denies pain, galactorrhea, medication, street drug use
Physical examination reveals SMR (Tanner) stage 2 genitalia
Asymmetric breast buds beneath each areola, with the left measuring 1 cm and the right 3 cm.

Of the following, the most appropriate INITIAL management for this boy is:

1. Head CT with contrast
2. MRI of the brain
3. Serum beta-human chorionic gonadotropin level
4. Reassurance that this is a normal occurrence
5. Ultrasonography of the testes and breasts

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TREATMENT

- Physiologic-reassurance
- If large and persistent-endo/surgery
- Treat underlying condition

NON PHYSIOLOGIC CAUSES

- Klinefelter syndrome
- Tumors of the testicles and adrenals

- Breast mass- cancer, dermoid cyst, lipoma, hematoma, neurofibroma

DRUGS

- Illicit drugs-***marijuana***, amphetamines, methadone
- ***Anabolic steroids***
- Antibiotics- INH, ***ketaconazole***
- Psychotropics-tricyclics, phenothiazines
- Misc.-digoxin, phenytoin, cimetidine

Klinefelter Syndrome

47XXY-Physical manifestations are moderate and likely to be missed

- ***Gynecomastia***
- Tall slender with narrow shoulders, sparse hair
- ***Long lower legs and short torso***
- ***Small firm testicles –decreased libido and later infertility***
- Osteoporosis
- Speech and language difficulties
- Attention and learning disabilities
- Behavioral problems

SCROTAL MASSES

- Hydrocele (non-tender/ transilluminates)
- Spermatocele (transilluminates/ distinct from testes)

- Varicocele (bag of worms/left side)
  - if large and persistent causes reduced testicular size and infertility and requires surgery

- Testicular tumor (painless/solid)(95% germ cell-seminoma [which do not produce markers])
  - ά fetoprotein, hCG, LDH, ultrasound of the testes, CT scan of chest abdomen
  - Undescended testicles/cryptochordism

SCROTAL PAIN

- ***Testicular torsion***
  - Sudden, severe pain
  - Bell clapper deformity
  - Absent cremasteric reflex
  - Testicular US
  - ***Surgical emergency (within 6 hours)***
- Torsion of the appendix testes-blue dot sign
- Epididymitis - GC, Chlamydia, E. coli etc. rarely g+
- Orchitis - follows epididymitis and the testes is swollen and tender (mumps/viral)

AMENORRHEA
CLASSIFICATION

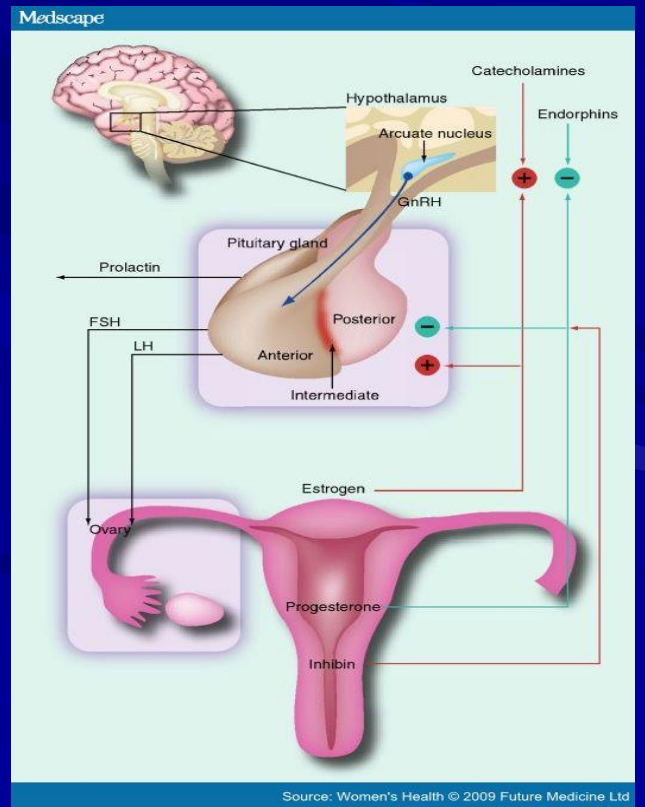
- **Primary amenorrhea**: failure to reach menarche by age 16 (15) years (5 years post puberty onset)
  - The lack of menses by age 14 with the absence of secondary sexual characteristics

- **Secondary amenorrhea**: Absence of menses for a period of at least 3 cycle lengths or for a period of 6 months after menarche

ETIOLOGY

- ***CAUTION: Pregnancy is always the first cause to consider for either primary or secondary amenorrhea***

- The three ‘compartments’ to consider :
  - Genital tract outlet
  - Ovaries
  - Central: hypothalamic pituitary axis



COMPARTMENT 1
OUTLET PROBLEMS/ EUGONADISM

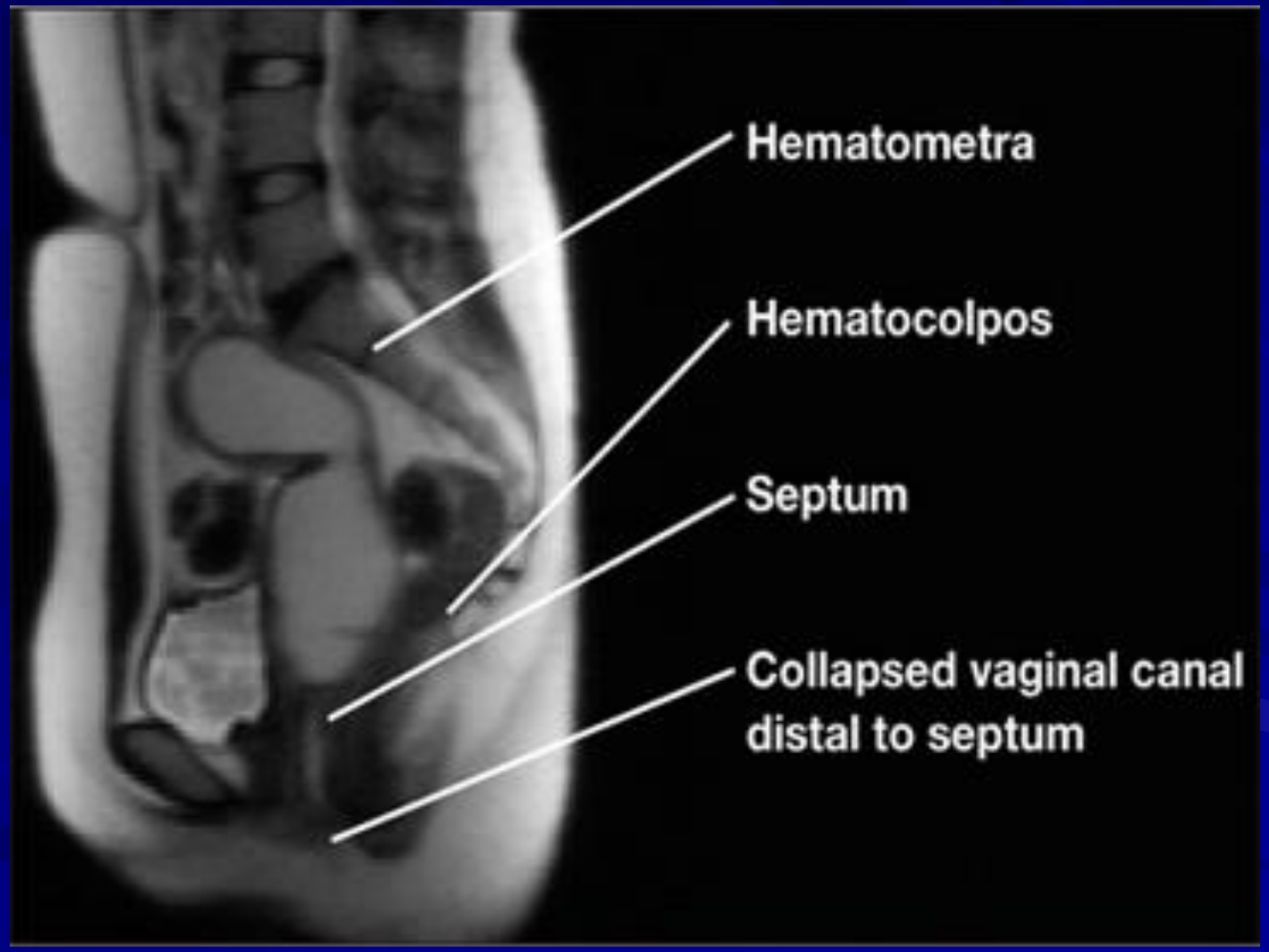
CONGENITAL

- Imperforate hymen
- Transverse vaginal septum
- Congenital uterine absence (*Rokitansky Meyer Hauser*)
- Androgen insensitivity syndrome (*testicular feminization syndrome*)

ACQUIRED

- Cervical stenosis
- Asherman's syndrome

Normal hormones, breast development, pubertal changes


Hematometra
Hematocolpos
Septum
Collapsed vaginal canal
distal to septum

COMPARTMENT 2-OVARIES
Hypergonadotropic Hypogonadism

CIOF

Turners syndrome

Privation of X chromosome

- Pure gonadal dysgenesis. (46XX)
- Mixed gonadal dysgenesis (45X/46XY)

CCOF

Autoimmune ovarian failure

Ovarian infiltration/infection

Neoplasia therapy

radiation, chemotherapy

Savage syndrome

Ovarian tumors

17 OH deficiency

A 16 year old girl who has primary amenorrhea is 147.3cm (58in.) tall. Physical examination of the extremities reveals cubitus valgus and short fourth metacarpal. Despite hearing loss, she is a “B” student in the 10th grade. Report from the nursery mentioned neonatal peripheral edema.

Of the following, the most likely diagnosis is:

a. Imperforate hymen
b. Normal variant short stature
c. Ovarian teratoma
d. Testicular feminization
e. Turner syndrome

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e. Turner syndrome

COMPARTMENT 3
HYPOTHALMIC-PITUITARY AXIS
Hypogonadotropic Hypogonadism

REVERSIBLE

- Physiologic Delay-pregnancy, lactation, maturational/constitutional delay
- Sudden weight loss or gain-eating disorders
- Stress
- Excessive exercise
- Drugs
- Chronic illness

16-year-old girl had her menarche at age 12 years, periods had become progressively more irregular, completely stopped 6 months ago

PMH: unremarkable -currently asymptomatic

SH: Denies being sexual active or having any body image issues. On the cross country team -planning on running a marathon in the next year.

- Vital signs are normal, BMI19.5 and SMR 5
- Pex. is unremarkable

- Pregnancy test is negative, CBC, electrolytes, TFTs, LH, FSH are normal.

begin combined oral contraception
increase her calcium and Vitamin D intake
increase her overall nutritional intake
stop exercising till her menses returns
switch to a non-endurance sport

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NORMAL MENSTRUAL VALUES

- 4-6 days with a range of 2 - 7 days
- Intervals of 28 days (range 21-44 days/3-6 weeks).
- A flow greater than 8 days with ≥ 8 pads or blood loss> 80ml is too much and should result in anemia
- For the boards remember more than 10 days

DEFINITION OF DUB

- Profuse **painless** bleeding of endometrial origin not associated with any other genital tract pathology or systemic illness
- Usually secondary to **physiologic** maturational delay with **anovulation**
- Usually used to indicate bleeding which is excessive in amount duration and frequency

A 14-year-old girl, irregular bleeding since menarche at age 11 years.

She now presents with painless menstrual bleeding of 14 days' duration and is using 8 to 10 super-pads per day

She says she was told that her period could be irregular in the first few years, but she is feeling tired and is upset with the number of days of bleeding.

Can you reassure her?

DIFFERENTIAL-DUB

- LOCAL
  - trauma, foreign body, infection, pregnancy/ complications
- SYSTEMIC
  - -bleeding disorders
    - Congenital blood dyscrasias
    - Acquired: Liver/renal/malignancies
  - Thyroid disease

TREATMENT

- Identify and treat causative factors

- Reassurance
- Keep menstrual calendar
- Treat anemia with oral iron
- Oral contraceptive pills

- Follow up important

TREATMENT

SEVERE (Hgb < 8g/dL)

- Conjugated estrogen IV
- Concomitant OCP therapy
- Replace blood loss if necessary
- Identify and treat causative factors

- Continue daily OCPs as needed

TRANSFUSION CONSIDERATIONS

- Adolescents respond well to IV fluids and supplemental iron therapy
- If this developed over months or years it is better tolerated than that over hours or days
- Treatment of the underlying condition e.g. IUP, STIs, structural issues, bleeding disorder

POLYCYSTIC OVARIAN SYNDROME

2003 Rotterdam criteria requires the presence of two of the following three criteria:

1. Anovulation: oligo- or amenorrhea
2. Clinical /biochemical signs of hyperandrogenism (hirsutism/acne/clitoromegaly)
3. polycystic ovaries

Exclude other related conditions e.g.

- prolactinoma
- Cushing's syndrome
- congenital adrenal hyperplasia
- androgen-secreting tumors

- LH: FSH ratios (greater than 2- 2.5 to 1) are alluded to but not useful

POLYCYSTIC OVARIAN SYNDROME

Future risk for

- Type II diabetes
- Cardiovascular complications
- Infertility
- Endometrial cancer

DYSMENORRHEA

- Primary
  - pain in the absence of gross pathology
  - secondary to prostaglandin production
  - leading cause of school absenteeism

- Secondary
  - pain in presence of pathology
    - Salpingitis, ectopic pregnancy
    - endometriosis
    - Torsion of ovaries, ruptured cysts

DIFFERENTIAL DIAGNOSIS

- Primary
  - reports history of pain with menses
  - onset begins 6 to 12 months after menarche
  - pain begins several hours before onset of menses
  - pelvic exam usually normal
  - Try NSAIDs
  - Hormonal treatment
- Secondary
  - presents later in life
  - pain starts several days before menses
  - Different in intensity, duration and location from usual pain
  - pelvic exam is usually remarkable

Ovarian cysts

- Typically follicular or corpus luteum cyst
- Can be painful and vary in size
- Less than 5 cm – no repeat imaging
- Tx: pain management

- Ovarian torsion
  - Sudden, severe pain
  - Nausea and vomiting
  - Mimics appendicitis
  - US – enlarged ovary
    - May or may not have blood flow due to dual supply
  - Surgical emergency

TREATMENT FOR DYSMENORRHEA

These factors are usually not helpful:

- Resting in bed
- *Acetaminophen*
- Healthy diet
- Exercise?

What helps:

- NSAIDS

NONCONTRACEPTIVE OCP BENEFITS

- Treating dysmenorrhea /PMS
- Reducing blood loss and anemia
- Regulating cycles
- Treating acne (↑SHBG=↓ free testosterone)
- Reducing the risk of PID
- Reduces benign breast changes

CONTRACEPTIVE EFFECTIVENESS

Type Of Method	Perfect Use (%)	Typical Use %
Male sterilization	0.1	0.15
Female sterilization	0.5	0.5
IUD	0.2	0.2
Nexplanon	**0.05**	**0.05**
OCPs	0.3	8.0
DepoProvera	0.3	3.0
Condoms-male	2	15
Condoms-female	5	21

CONTRAINDICATIONS TO ORAL CONTRACEPTIVE (OCP) USE

- Thromboembolic disorders or PMH of deep vein thrombosis
- Uncontrolled hypertension
- Headaches with focal aura
- Acute or chronic hepato-biliary disease
- Major surgery with prolonged immobilization

CONTRAINDICATIONS TO ORAL CONTRACEPTIVE (OCP) USE

RELATIVE

- Tobacco use-future concerns
- Seizures-reduces AED levels
- Antibiotics-reduce hormone levels
- Vasculitis/SCD/other chronic illness
  - increases risk of thrombosis-use 20µgrm pills

EMERGENCY CONTRACEPTION

Morning after pill-misnomer as it can be used up to 120 hours

A. Initially contained both estrogen and progesterone
B. Now PLAN B One-Step–progesterone only (95% reduction if within 24 hrs)
   - Consider giving all adolescents a prescription if ≤ 16 years
   - Not an abortifacient
C. ELLA a second generation antiprogestin, ulipristal acetate (30 mg in a single dose) available by prescription only, (next choice)

- Contraindications: pregnancy, unexplained bleeding, allergies to any of the ingredients

ADOLESCENT PREGNANCY

- Mortality associated with pregnancy and delivery exceeds that of any contraceptive method
- Prenatal care makes prognosis as good as with adult women
- Except with young adolescents
  - Many complications related to their maturity
- Concerns with educational, social, economic issues

HIV SCREENING

- At routine yearly visits for >13 year olds - opt out policy i.e. consent for care enough
- Antibody screening with EIA for HIV 1,2
- Rapid testing requires confirmatory tests, if positive
- Positive in 95% within 3 months of infection

Human Papilloma Virus-HPV

- Most common STI among adolescents
- More than 80 distinct types of HPV exist
  - low-risk, (types 6 &11 cause genital warts)
  - high risk types (16,18,31,35,45) sub-clinical cervical infection
  - Gardasil 9 adds protection against five additional HPV types—31, 33, 45, 52 and 58
- Persistent cervical infection: single most important risk factor for cervical cancer
- Pap smears: no longer recommended during adolescence
  - Screen after 21 years of age

URETHRITIS

- Dysuria and discharge
- Gonorrhea-profuse purulent discharge
- Chlamydia-clear scant discharge

- Ureaplasma Urealyticum
- Mycoplasma genitalium
- Trichomonas
- Herpes
- HPV

TESTING

- Culture: “gold standard” – legal cases/abuse
- Leukocyte esterase; urine dip in males
- Enzyme linked assay (EIA or ELISA)
- Direct Fluorescent Antibody (DFA) DNA probes
- Nucleic Acid Amplification Tests (NAATs)

C.TRACHOMATIS TREATMENT

- Azithromycin 1 gm. single dose by mouth

- Doxycycline 100 mg by mouth twice daily
  for 7 days

- PARTNER TREATMENT
- Reportable disease
- “Test of Cure” not needed
- Test of reinfection should be considered in >3 weeks
- http://www.cdc.gov/STD/treatment/2010/default.htm

17-year-old boy symptoms of burning on urination and occasional staining of his underwear. You note scant clear fluid at his urethral meatus but no other genital findings. 3 sexual partners in the past 6 months and uses condoms intermittently. You obtain a urine specimen to test for sexually transmitted infections. He has no allergies to any medications. You are concerned that he may not return for the test results

ampicillin and doxycycline each orally for 7 days
ampicillin as a single dose orally
benzathine penicillin intramuscularly
Ceftriaxone 250mg i.m. and azithromycin 1 gm. orally as a single dose
levofloxacin as a single dose orally

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N. GONORRHOEAE TREATMENT

- Azithromycin 1 gm. single dose by mouth
- OR Doxycycline 100 mg by mouth twice daily for 7 days
- AND Ceftriaxone 250 mg IM
- Need dual therapy for concerns of antibiotic resistance
- No fluoroquinolones/oral cephalosporins
- PARTNER TREATMENT
- Reportable disease
- “Test of Cure” not needed
- Test of reinfection should be considered in >3 weeks

DISSEMINATED GC

- Bacteremia- petechial and pustular rash, asymetric arthralgia, tenosynovitis, septic arthritis
- Knee is often the single septic joint
- Infrequently may have perihepatitis and rarely meningites, endocarditis

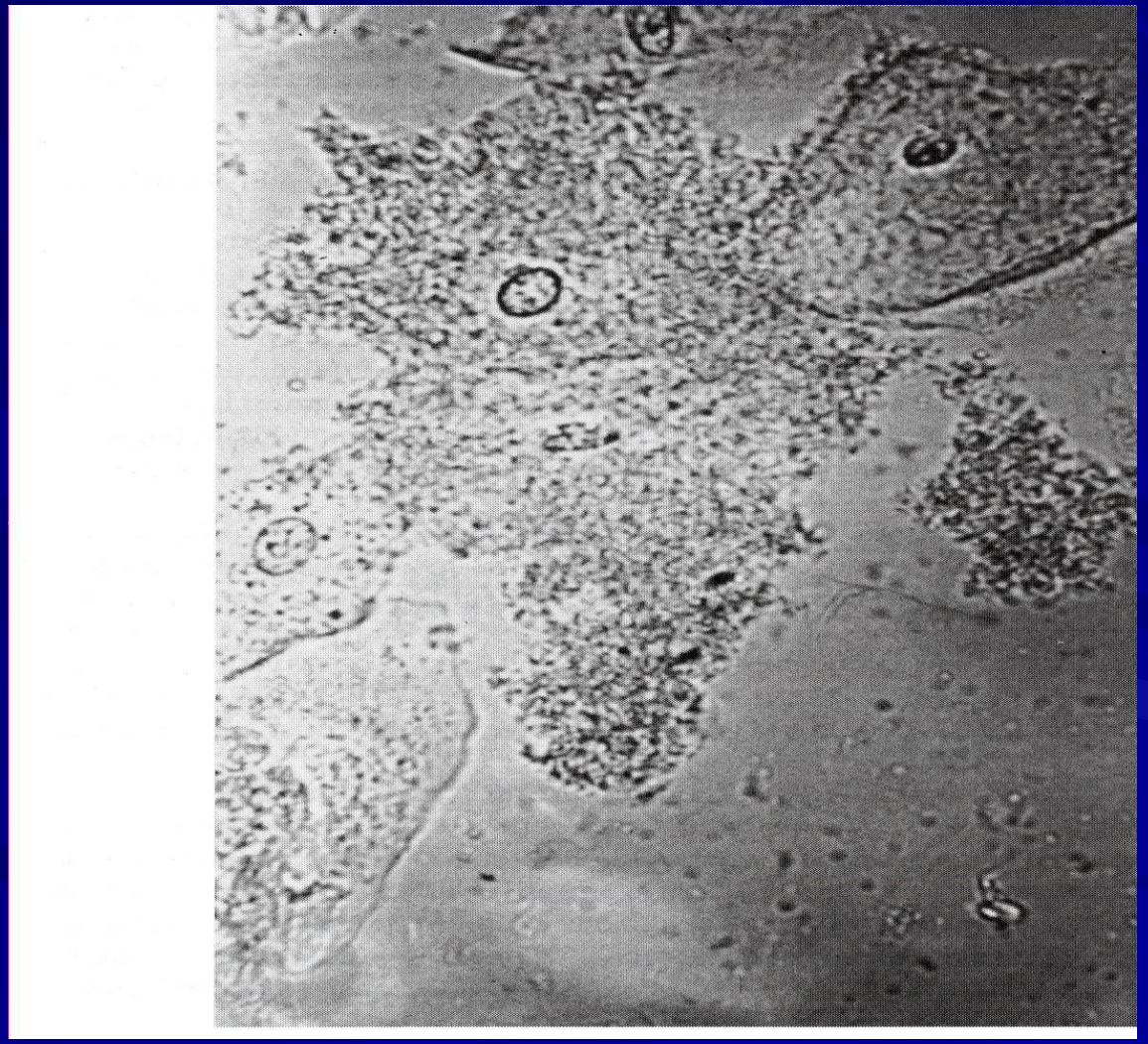
GENITAL ULCERS

- Herpes-most genital are *Type 2*, multiple, ***painful***
- Syphilis- *T pallidum*, single ***painless***
- Chancroid- *Hemophilus ducreyi*, single, soft, ***painful***
- LGV- *C. trachomatis,* ulcer transient, groove sign
- Granuloma Inguinale- *Donovanosis* (Klebsiella granulomatis) rare in the US, painless, progressive lesion without adenopathy

VAGINITIS

- Leukorrhea - physiologic
- Bacterial vaginosis – clue cells, ph>4.5, Metronidazole 500 mg BID x 7 days
- Candidiasis - C Albicans, Fluconazole 150 mg once
- Trichomoniasis- T Vaginalis (protozoa) Metronidazole 2g once

CLUE CELLS

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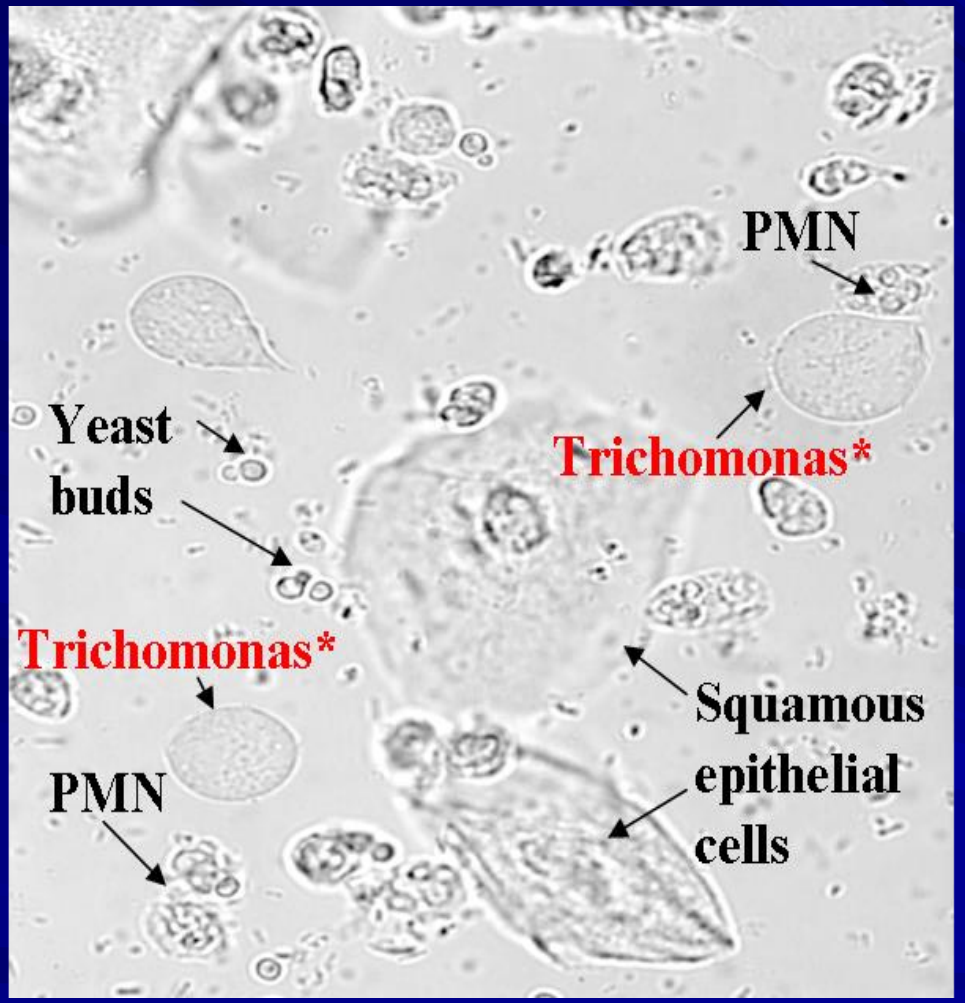
TRICHOMONAS VAGINITIS

SIGNS:

- Discharge often visible on vulva.
- ***Frothy discharge***
- Strawberry cervix <5%
- Wet mount
  - Flagellated organisms
  - WBCs

TREATMENT: 2 grams of metronidazole


PMN
Yeast buds
Trichomonas*
Trichomonas*
Squamous epithelial cells
PMN

CERVICITIS

- Chlamydia
- Gonorrhea
  - Herpes
  - HPV

- Pus from the cervical os and friability
- Screen asymptomatic youth yearly but if high-risk then every six months

A 17 year old female presents with the complaint of prolonged menstrual bleeding associated with severe menstrual cramping pain. Her menarche was at age 13 years. Subsequent menstrual cycles were monthly, lasting five days, with average flow associated with mild to moderate pain relieved by over the counter pain medications. The current cycle began a month ago and is associated with severe lower abdominal pain. She admits to sexual activity with one partner and uses condoms intermittently. On examination she is afebrile, in discomfort, with a heart rate of 120 beats/minute. She does not appear anemic and has good capillary refill. She has diffuse abdominal pain with significant tenderness over both the right lower and right upper quadrant.

PID SYMPTOMS

- Lower abdominal pain
- Vaginal discharge
- Fever
- Heavy periods

PID SIGNS

CDC-minimum criteria (at least 1 of 3 required)

- Uterine tenderness
- Cervical motion tenderness
- Adnexal tenderness (unilateral or bilateral)

OTHER

- Fever,↑ WBC, ↑ESR/CRP
- Evidence of infection (gram stain, culture, probes from endo-cervix or urine/vaginal PCR)
- FITZ-HUGH-CURTIS syndrome is peri-hepatitis

INDICATIONS FOR HOSPITALIZATION

- All adolescents?
- Severe illness
- Noncompliant patient
- Intolerance of OP management
- Non-response to OP management
- Pregnant
- Unclear diagnoses/surgical abdomen
- Tubo-ovarian abscess (TOA)

TREATMENT/ PROGNOSIS

- Early on the cause is GC and CT so treat with Cefoxitin + doxycycline for a minimum of 14 days

- Later on you get multiple organisms so add treatment for gram negative and anerobes i.e. add metronidazole

<u>PROBLEMS:</u>

- Chronic pelvic pain
- Ectopic pregnancies
- Infertility
- Fitz Hugh Curtis-perihepatitis

16-year-old female patient for recent onset of heavy menses.

Her menarche was at age 12 years and her periods have been regular with normal flow and minimal pain, till two months ago.

Her menstrual flow for her last two periods has been heavier and has lasted about 10 days each time without any increase in pain.

Her review of symptoms is otherwise negative with no history of anemia and she is not on any medications.

She had previously disclosed to you that she is lesbian, has no history of abuse, is well adjusted and currently has no signs of depression.

On examination you do not note any pallor and her vital signs are stable. Her BMI is 23.5 and there are no focal findings on a general examination.

Evaluate her for a bleeding disorder
Obtain a urine sample for a drug screen
Reassure her and ask her to return in three months for a follow-up
Screen her for sexually transmitted infections
Start her on hormonal treatment to control her bleeding

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BEHAVIORAL ISSUES

FEMALE ATHLETE TRIAD

- Three interrelated components:
  - disordered eating
  - amenorrhea
  - osteoporosis

- The risk of the disorder is greatest among those participating in endurance sports

VEGAN DIETS

You are seeing a 16-year-old girl for her annual health supervision visit. The girl has become a vegan and her mother is concerned about possible nutritional deficiencies. The girl has no symptoms and has not lost any weight in the last six months. Her menses are regular and her physical examination is unremarkable.

Of the following, the girl is at GREATEST risk of a deficiency of

- Calcium, iron, Vitamins A, B12 or D

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DRINKS

- Energy drinks are marketed for their stimulant effect and may contain caffeine, vitamins and herbal supplements

- Sports drinks are made for those undertaking physical activity lasting over an hour at a time. They contain carbohydrates and electrolytes and help to reduce fatigue by maintaining hydration, electrolyte balance and blood glucose levels during endurance sports.

DIAGNOSTIC CRITERIA

ANOREXIA NERVOSA

Requires all 3 of the following:

- Energy restriction leading to low body weight adjusted for age, developmental trajectory, physical health and sex
- Fear of weight gain or behavior interfering with weight gain (‘becoming fat’)
- Disturbance in self-perceived weight or shape

INDICATIONS FOR HOSPITALIZATION

- Weight loss of more than 30%
- Continued weight loss despite treatment
- Rapid weight loss (over 3 months)
- Cardiovascular compromise
  - Cardiac arrhythmias, postural hypotension, BP < 70 mm Hg, bradycardia (< 45bpm)
- Hypothermia (<36˚C)

INDICATIONS FOR HOSPITALIZATION

- Electrolyte disturbances (e.g., K less than 2.5 mEq/L)
- Significant dehydration
- Other stresses in a compromised host (e.g. infection)
- Psychiatric conditions
  - Suicidal ideation or intent
  - Out of control behavior
  - Unsupportive family (family crisis)
- Need to confirm diagnosis in the face of an unusual or uncertain presentation

REFEEDING SYDROME

- Rapid re-feeding may result in abnormalities in
  - fluid balance
  - glucose metabolism
  - vitamin deficiency
  - ***Hypophosphatemia***
  - ***Hypomagnesemia***
  - ***Hypokalemia***

BULIMIC VS RESTRICTIVE GROUP

- Slightly older onset
- Prevalence 1-4% VS <1%
- ***Can be less, more than or normal weight***
- ***Binging must be present***
- ***May have normal, irregular or absent menses vs. amenorrhea***
- More impulsive- in eating and other areas
- Differ in personality characteristics

EFFECTS OF VOMITING

- Sub-conjunctival hemorrhage
- Metacarpal phalangeal callus formation (Russell sign)
- Salivary gland stimulation and enlargement
- Dental enamel erosion
- Esophagitis
- Dehydration
- Alkalosis
- Hypokalemia
- Aspiration pneumonia
- Cardiac toxicity if abusing ipecac

CAUSES OF MORTALITY IN ADOLESCENTS

- Accidents
- Suicides
- Homicides

- Substance use is associated with >50% of these three top causes
- Firearms

DRUG SCREENS

- No single lab test can detect all drugs in the urine
- Dose of the drug, frequency of use, time from use to urine collection, specific lab procedure used
- Thin layer chromatography most commonly used technique-low cost (alcohol/ LSD/PCP)

CAUTION

- Should preferably be voluntary-AAP endorses this
- Risk jeopardizing the doctor-patient relationship

- False positives
- False negatives

BEST OF LUCK!