What Is A Normal Menstrual Period for an Adolescent?

- **Menarche**
  - median age: 12 ½ years; 98% achieve menarche by 15 years

- **Cycle length***
  - median: 31 days (normal range: 21-45 days)

  * day 1 of one menstrual period to day 1 of next period

- **Duration of menses**
  - Mean: 3-7 days

- **Flow/Blood loss**
  - Highly variable, subjective and *very* difficult to quantify
  - Average: 30-40 ml/period = 3-6 pads/tampons per day
What happens in a normal menstrual cycle in a woman with a mature hypothalamic-pituitary-ovarian (HPO) axis?

1. GnRH $\rightarrow$ FSH $\rightarrow$ follicular development $\rightarrow$ estrogen secreted $\rightarrow$
   - Endometrium proliferates
   - (-) feedback to FSH (no more follicles mature)
   - (+) feedback to LH

2. LH surge $\rightarrow$ ovulation $\rightarrow$ corpus luteum $\rightarrow$ progesterone $\rightarrow$
   - Secretory (stable) endometrium

If no conception, estrogen and progesterone fall $\rightarrow$ menses
What happens in an adolescent with an immature hypothalamic-pituitary-ovarian axis?

Increasing estrogen level does NOT:

- cause (-) feedback on FSH so estrogen production continues $\rightarrow$ endometrium continues to proliferate
- cause LH surge $\rightarrow$ no ovulation $\rightarrow$ no progesterone $\rightarrow$ fragile endometrium

Result: heavy and/or irregular bleeding
Types of Abnormal Bleeding Patterns in Adolescents

- **Abnormal frequency** of cycles (<21 days or > 40 days)
- **Excessive flow** or bleeding > 7 days
  - (regular cycles) **(menorrhagia)**
- **Irregular bleeding**: variable flow, irregular intervals **(metrorrhagia)**
- **Irregular and heavy** **(menometrorrhagia)**
Etiology of Abnormal Menstrual Bleeding in Adolescents

- Immature HPO axis (= DUB)
- Pregnancy-related disorders
- Coagulation disorders
- Miscellaneous causes
**Etiology: Dysfunctional Uterine Bleeding**

- Bleeding due to immature HPO axis/anovulatory cycles (i.e., no underlying pelvic pathology)
- Characterized by painless, irregular bleeding—usually including periods of both amenorrhea and prolonged and/or heavy bleeding
- Is the most common cause of abnormal menstrual bleeding in young teens
- Usually occurs in the first two years post menarche
- Is a diagnosis of exclusion
Pathogenesis of DUB

What happens in an adolescent with an immature hypothalamic-pituitary-ovarian axis?

Increasing estrogen level does NOT:
- cause (-) feedback on FSH so estrogen production continues → endometrium continues to proliferate
- cause LH surge → no ovulation → no progesterone → fragile endometrium

**Result:** heavy and/or irregular bleeding
Etiology: Pregnancy-Related Bleeding**

- Implantation/1st trimester bleeding
- Threatened/incomplete abortion
- Ectopic pregnancy
- Post-abortion or post-partum endometritis

**Almost always painful bleeding
**Acute onset
Etiology: Coagulation Disorders

- Platelet disorders (quantitative, qualitative)
- von Willebrand disease
  - Excessive menstrual bleeding is often the presenting sign
- Leukemia
- Aplastic anemia
- Medication-induced (ASA, NSAIDs, etc.)
- Clotting factor deficiency
Coagulation Disorders (continued)

Uncommon etiology of abnormal menstrual bleeding BUT needs to be strongly considered in certain clinical circumstances:

- Adolescents with severe anemia secondary to menstrual bleeding (i.e., Hgb < 9)
- Adolescents whose severe menstrual bleeding begins at menarche
- Personal or family history of bleeding/bruising problems, prior anemia, transfusion, etc.
Etiology: Pelvic Pathology
(RARE in adolescents)

Vagina: vaginitis
trauma
foreign body
neoplasm

Cervix: cervicitis (Chlamydia, Gonorrhea)
polyp
neoplasm

Uterus: RARE: polyp, fibroid, neoplasm, AVM

Other: endometriosis
Etiology: Endocrine Disorders

- Functional hyperandrogenism (PCOS)
- Thyroid disorders (hypo- and hyper-)
- Prolactinoma
- Late-onset congenital adrenal hyperplasia
- Cushing disease
- Premature ovarian failure
Etiology: Systemic Diseases

- Severe liver disease
- Chronic renal failure
- Other chronic disease (e.g., poorly controlled DM)
Etiology: Miscellaneous Causes

- Oral contraceptive pills/patch
- Depo-Provera
- IUD
- Excessive use of NSAIDs
- Anti-coagulant therapy
- Stress [typically \(\rightarrow\) amenorrhea; irregular menses]
- Eating disorders [as above]
- Excessive exercise [as above]
EVALUATION OF ABNORMAL BLEEDING IN ADOLESCENTS
History

Gynecologic history

- Age at menarche (precise as possible)
- Sexual history; use of contraception (confidential)
- Usual pattern of bleeding: frequency
  - # days of bleeding
  - cramps??
  - LNMP?
  - PNMP?
History (continued)

ROS: bleeding/bruising problems
medications
growth/pubertal development
presence of male-pattern hair
signs/sx of thyroid disease
chronic disease

Family hx: menstrual; bleeding; fertility [mom, sisters]
Physical Exam — to include:

- Height, weight and %; BMI and %
- Vital signs (include orthostatic P, BP if heavy bleeding)
- Male pattern hair (Ferriman-Gallwey Scale)
- Skin: acne, bruising, petechiae
- Thyroid
- Tanner stages (breasts, pubic hair)
- External genitalia
Ferriman-Gallwey Scale

Score ≥ 8 = hirsutism
Physical exam: pelvic exam??

**Always:**
- sexually active
- painful bleeding
- acute onset of abnormal bleeding

**Rarely:**
- menarche $\leq 2$ years earlier
- painless bleeding
- never sexually active
Laboratory Evaluation

Always: CBC, platelets
(pregnancy test)

As indicated: tests for chlamydia, gonorrhea
TSH, free T4
PT, PTT
Additional Laboratory Evaluation

- If chronically irregular menses, with periods of amenorrhea: LH, FSH, prolactin, free and total testosterone
- If hirsute, +/- obese, +/- acne: LH, FSH, free and total testosterone, DHEA-S
- If suspect pelvic mass, or c/o localized pelvic pain, or inadequate exam: pelvic ultrasound
Treatment of Excessive Menstrual Bleeding

- Typically based on severity/chronicity of bleeding
- Important to consider the adolescent’s distress level
- Numerous “recipes” available; goal is to stop the bleeding
Treatment: Mild DUB *(no anemia)*

- Reassure
- Have patient keep a menstrual record
- Reassess in 2-3 months
- Consider OCPs if:
  - Bleeding has been prolonged
  - Teen is very stressed re. irregular bleeding
Treatment: Moderate DUB (Hgb 9-11)

**Acute management** (various regimens):
If not bleeding heavily, start 30-35 mcg combination estrogen and progesterone OCP BID until bleeding stops; then 1/day to complete the pack

**OR**
If bleeding heavily, 35 mcg estrogen/progesterone OCPs
1 QID X 3 days
1 TID X 2 days
1 BID X 1 ½ days (= 21 active pills)
Long-term management:

- Regular combination estrogen/progesterone OCPs, 1/day, for a total of 3-4 months of good cycle control
- Iron in therapeutic dose until H/H normalizes
- Keep menstrual calendar
- Be prepared to adjust therapy as needed
Treatment: Severe DUB (Hgb < 9)

Acute management:
- Assess hemodynamic status, treat accordingly
- Stop the bleeding! (different regimens)
  - Conjugated estrogens (Premarin) 25 mg IV q 4 hr until bleeding stops; need to add estrogen/progesterone OCP soon
  - 50 mcg estrogen/progesterone OCP q 6 hr X 24-48 hours; taper to 1/d over the next week
Treatment: Severe DUB (continued)

OR

- Multidose OCPs as listed for moderate DUB
  (= 21 active pills over 7 days)

- Transfuse as needed
- D & C rarely needed in adolescents

Long-term management: OCPs X 6 mo; iron; menstrual calendar
DUB: Prognosis

- Most adolescents will develop more normal cycles with time (may take up to 4 years).
- 1 study: abnormal bleeding continued for up to 10 years in 1/3 of patients with severe DUB (many eventually diagnosed with PCOS).
- Regular re-evaluation is essential to assess for recurrence and/or emerging pathology.
Case 1: History

A previously healthy 11 8/12 yo with a history of 16 days of heavy but painless vaginal bleeding (with clots). She had menarche 1 month prior, bleeding for only 1 day. Her second period was the current one.

Complaints included: headaches, fatigue, and some lightheadedness for the past few weeks. She denied any other abnormal bleeding, abnormal bruising and sexual activity. She thought she was overweight but denied dieting, taking diet pills, and weight loss.
Physical Exam

Weight, height at 75% for age
VS:
   BP (sitting): 110/50   (standing): 98/50
   Pulse (sitting): 100   (standing): 88

Skin: mild pallor, no hirsutism or acne
Genitalia: Tanner IV, normal externally
   Blood in vagina
Rectal-abdominal: non-tender, no masses
Case 1: Laboratory evaluation

- H/H = 8/23.5, normal indices, normal plt & WBC
- Pregnancy test = negative
- TSH, T4 = WNL
- PT, PTT = WNL
- Bleeding time = 10.5 sec (normal: 2-9 sec)
What is your differential diagnosis?
What, if any, diagnostic tests do you think need to be done and why?
Case 2

A previously healthy 13 yo was admitted to the PICU with painless, profuse vaginal bleeding, including passing clots. She had menarche 8 months prior, with irregular periods since. The first 3 periods lasted 3 days and were light. The current episode of bleeding started 2 weeks prior, initially with moderate flow but then very heavy for the past 2 days.
She denied any other genito-urinary complaints, history of dysmenorrhea, hirsutism, medication use, other bleeding problems, and sexual activity.

There was no Family History of bleeding or menstrual problems.
Physical exam:

BP lying = 90/50; pulse lying = 96
(pt. couldn’t stand for orthostatics)
Alert, uncomfortable-appearing female
Genitalia: Tanner IV, normal external genitalia,
profuse blood in the vagina, bi-manual refused
Laboratory evaluation:

- H/H = 5.8-16.3
- Platelets = 16,000
- WBC = 1.6 (51 L, 41 S)
- PT, PTT = WNL
- Pregnancy test = negative
- Reticulocyte count - .7
What is your differential diagnosis?
What, if any, diagnostic tests do you think need to be done and why?
DYSMENORRHEA

- = Painful Menstruation
- Derived from the Greek words:
  - *dys* – difficult/painful/abnormal
  - *meno* – month
  - *rrhea* - flow
Dysmenorrhea

- The most common gynecologic problem in adolescents
- Occurs in 60-90% of adolescent girls (though many never bring this problem up with their health care providers)
- Accounts for a large % of school absenteeism, missing work, missing sports activities
- Associated with *ovulatory* cycles
Primary Dysmenorrhea

- Most common type
- = painful menses, not associated with underlying pelvic pathology
- Typical locations: lower abdomen, lower back, thighs
- Typical pattern: starts day before or day 1 of menses and lasts 2-3 days
- Increasing prevalence with increased gynecologic age
- May be associated with any or all of the following:
  - nausea
  - vomiting
  - diarrhea
  - headaches
  - generalized malaise/weakness
Pathogenesis of Primary Dysmenorrhea
Primary Dysmenorrhea: Effective Management Options

- Non-pharmacologic: local heat, TENS
- NSAIDS
  - Ibuprofen (400-800 mg Q 6 hr)
  - Naproxen sodium (Aleve 220-440 mg Q 8 hr; Anaprox DS 550 mg Q 12 hr)
  - Ponstel (mefenamic acid) (500 mg 1st dose, then 250 mg Q 6 hr)
    **Start treatment as soon as possible**
    **Loading dose: double dose if tolerated**
    **Take regularly on days w/ significant sx not PRN**
- Cox 2 inhibitors (e.g., Celebrex)
  - 400 mg 1st dose, then 200 mg BID as needed
- Oral contraceptive pills/patch/Depo-Provera
Primary Dysmenorrhea: Unproven Treatments

Midol® (Bayer Healthcare LLC)
- "Menstrual Complete"—acetaminophen 500 mg, caffeine 60 mg, pyrilamine 15 mg
- "Teen Formula"—acetaminophen 500 mg, pamabrom 25 mg
- “Midol Extended Relief”—naproxen sodium 200 mg
- “Liquid Gels”—ibuprofen 200 mg
- “Midol PM”—acetaminophen 500 mg, dephendydramine citrate 38 mg

Pamprin® (Chattem, Inc)
- "Multi-symptom"—acetaminophen 500 mg, pamabrom 25 mg, pyrilamine 25 mg
- "All Day"—naproxen sodium 220 mg
- "Cramp"—acetaminophen 250 mg, magnesium salicylate 250 mg, pamabrom 25 mg
- “Pamprin Max”—acetaminophen 250 mg, ASA 250 mg, caffeine 65 mg
Secondary Dysmenorrhea

- Related to underlying pelvic pathology
- Etiologies:
  - endometriosis
  - obstructive genital anomaly
  - PID
  - pelvic scarring/fibrosis (radiation, etc.)
- Treatment: treat underlying cause if possible
References

- Good patient handouts can be downloaded at: www.youngwomenshealth.org (Boston Children’s Hospital)