Too Many Periods
Facilitator's Guide

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Topic: Dysfunctional Uterine Bleeding

Abstract:
Irregular menses are common in adolescent girls, particularly in the 1 to 2 years after menarche. Primary care clinicians need to be able to take a history and plan the evaluation of the adolescent girl presenting with too few or too many menstrual periods. Some clinicians will feel comfortable performing the pelvic examination. Others will want to consult with an obstetrician-gynecologist or adolescent medicine specialist. This case introduces Lisa, a 13 year old girl presenting with frequent (every 2 to 3 weeks) menstrual periods for the past 6 months. Her menarche occurred 1½ years ago. Her physical examination is normal but she has iron deficiency anemia. She is ultimately diagnosed with anovulatory dysfunctional uterine bleeding (DUB) and is treated with oral contraceptives for several months.

Goals:
To provide learners with a basic understanding of normal menstrual cycles and the skills needed to diagnose and manage anovulatory dysfunctional uterine bleeding in a young adolescent.

Objectives:
By the end of the session, learners will be able to:
1. Take a history of normal and abnormal menstrual function.
2. Describe the typical presentation of an adolescent with anovulatory DUB.
3. List a differential diagnosis for abnormal menstrual bleeding in an adolescent and formulate a diagnostic plan.
4. Describe the basic management of DUB.

Prerequisite Case: N/A

Related Cases:
"The Shortest in the Class" (Turner Syndrome and Short Stature)
"Different From My Friends" (Turner Syndrome and Delayed Puberty)
"Will I Ever Get My Period?" (Growth and Chronic Disease)
"The Hidden Agenda" (Contraception)
"The Telephone Call" (Oral Contraceptive Scenarios)

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Themes:
Adolescent Health

Key Words:
Menstrual cycle, menarche, adolescence, oral contraceptives, estrogens uterine hemorrhage, menorrhagia, anemia, reproductive history

Bright Futures Core Concepts:
While all of the Core Concepts are included in each case, this particular case can be used to highlight communication, partnership, and prevention/health promotion.

Materials Provided:
- Facilitator's Guide
- 3-part Case Narrative: Part I, Part II, Epilogue
- Handout #1: Dysfunctional Uterine Bleeding
- Bibliography

Facilitator Preparation:
Facilitators should thoroughly review this guide and the other materials provided. They should also prepare or photocopy a diagram of the normal ovulatory cycle.

At the end of the guide we have included a section entitled, "**Independent Learning/Prevention Exercises**," that will further stimulate group and individual education on this topic.

Suggested Format of a One Hour Session:
We anticipate that case facilitators will modify implementation of the case session to best fit their educational setting and learners. For detailed recommendations on case facilitation, please see the chapter entitled, "A Brief Guide to Facilitating Case Discussion," found in *The Case Teaching Method; and Growth in Children and Adolescents* (book 1 of this series).

Introduction: Primary care clinicians frequently see young adolescents with irregular menstrual cycles. Although pathology may be present, the most common diagnosis is anovulatory cycles. A history and physical examination are usually reassuring. A CBC is essential since adolescent girls easily develop iron deficiency anemia. A urine HCG test is important to exclude pregnancy. Treatment depends on the degree of irregularity and the hemoglobin level, and ranges from observation to oral contraceptive pills.

Open the Discussion: Introduce the case title and the session goal. Explain that this will be an interactive case discussion and not a lecture. Distribute Part I of the case and ask one or more of the participants to read it aloud.

Part I

Lisa, a 13 year old eighth grader, presents to your office with *"too many periods."* She tells you that she had her first menstrual period at age 11½ , and it lasted 10 days. She then had menstrual periods at irregular intervals, averaging every 2 to 3 months, and lasting 7 to 10 days. Over the past 6 months, she tells you that her periods have been occurring more frequently, about every 2 to 3 weeks.

Her mother interrupts, *"No Lisa, the periods come every two weeks. Doctor, they're heavy and last 7 to 10 days."*
You look back at Lisa, *"When did your last period begin?"*
She hesitates, *"About five days ago. I really hate all this bleeding."*

Following this reading, ask all participants "*So what do you think about this case? What would you like to focus on during our discussion today*?" List agenda items on a blackboard or flipchart. Then use the questions below to guide the discussion. Remember that the key to successfully leading a small group is facilitation of the discussion rather than lecture. Draw as many participants as possible into the discussion. Allow silences while group members think about questions. Present material from the discussion guide only when needed to complement or redirect the group discussion.

Guiding Questions for Discussion:

What defines a normal menstrual period? The adult menstrual cycle is 21 to 35 days, and an adult tends to have the same interval month-to-month. Adolescents have more variability within this range. The normal duration of flow is 3 to 7 days, with a flow of greater than 8 to 10 days considered excessive. Normal blood loss is 30 to 40 ml per menstrual period, which translates into 10 to 15 soaked tampons or pads per cycle. However, estimation of blood loss by self-report is often inaccurate. Blood loss of greater than 80 ml per menstrual period, which defines significant DUB, would likely result in iron deficiency anemia.

What is involved in the normal ovulatory feedback system? A diagram from a textbook of gynecology (e.g. Emans, Laufer, Goldstein p.131, or similar text) should be photocopied in advance. The menstrual cycle is divided into a follicular phase, an ovulatory phase, and a luteal phase. In the follicular phase, pulsatile GnRH secreted from the hypothalamus stimulates the secretion of FSH and LH from the pituitary. FSH then increases the number of granulosa cells in the ovarian follicle, increases the number of receptors for FSH on the granulosa cells, and induces the granulosa cells to acquire an aromatizing enzyme that allows the conversion of androgen precursors to estradiol. Estradiol also amplifies the effect of FSH. The theca cells, under LH stimulation, secrete androstenedione, testosterone, and estradiol. A dominant follicle emerges by day 5 to 7 of the cycle, and the rising estradiol level causes proliferation of the number of glandular cells and stroma in the endometrium of the uterus. After the LH surge midcycle, ovarian follicular rupture occurs and the oocyte is released. The corpus luteum develops from the ruptured follicle and secretes progesterone. Under the influence of rising estrogen and progesterone levels, the endometrium enters the secretory phase, characterized by coiling of the endometrial glands and increased vascularity of the stroma. Within 8 or 9 days after

ovulation, if fertilization does not occur, regression begins. Progesterone and estrogen levels begin to decline, and the endometrium undergoes necrotic changes that result in menstrual bleeding. As estrogen levels decline in the late luteal phase, the negative feedback of estrogen on FSH secretion decreases and FSH begins to rise to initiate new follicular development.

Why does dysfunctional uterine bleeding (DUB) occur in anovulatory adolescents?

Most adolescents are anovulatory in the first year following menarche. Yet many do not have abnormal bleeding because normal negative feedback of rising estrogen levels suppresses FSH production and results in anovulatory but limited menstrual flow. The group of adolescents with DUB have delayed positive feedback and delayed establishment of ovulatory menses, and also lack normal negative feedback. Rising levels of estrogen do not cause a fall in FSH and subsequent suppression of estrogen secretion. The endometrium becomes excessively thickened, and heavy irregular menstrual flow results.

What is the differential diagnosis of abnormal menstrual bleeding?

The most common disorders are listed below:

- Anovulatory uterine bleeding (dysfunctional uterine bleeding)
- Disorders of pregnancy: threatened abortion, miscarriage, ectopic pregnancy, trophoblastic disease
- Pelvic inflammatory disease
- Hematologic disorders:
  Thrombocytopenia, leukemia, aplastic anemia, clotting disorders, von Willebrand's disease
- Endocrine disorders:
  Hypo- or hyperthyroidism, adrenal disease, diabetes mellitus, hyperprolactinemia, polycystic ovary syndrome, ovarian failure
- Other gynecological disorders:
  - Vaginal abnormalities: carcinoma, laceration
  - Cervical disorders: cervicitis, polyp, hemangioma
  - Uterine disorders: congenital anomalies, breakthrough bleeding associated with oral contraceptive use, ovulation bleeding, submucous myoma (fibroid)
  - Ovarian cysts, tumors
  - Endometriosis
  - Foreign body (e.g., retained tampon)
- Systemic diseases
- Trauma
- Medications: anticoagulants, platelet inhibitors, androgens, spironolactone, tricyclic antidepressants, anti-psychotics

Irregular bleeding resulting from pregnancy or pelvic infection should always be considered early in the evaluation.

What questions and physical examination findings would narrow the differential diagnosis? Questions should focus on the date of menarche, menstrual pattern, flow, and presence of dysmenorrhea. Ask about the use of tampons or other foreign objects. The patient should be asked confidentially whether she is sexually active, and if she is using oral contraceptive pills. The review of systems should include questions regarding pregnancy, sexually transmitted diseases, blood dyscrasias, endocrine disorders, and anatomic abnormalities. Include questions about recent stresses, weight changes, eating disorders, visual changes, headaches, heat/cold intolerance, palpitations, skin changes, fatigue, signs of androgen excess (hirsutism, acne), intermenstrual spotting, and cyclic abdominal pain. A history of a bleeding disorder and the use of any medications as well as a family history of polycystic ovary syndrome or bleeding disorders should be obtained. Assess the dietary intake of iron in the teen with heavy menses.

Bright Futures questions appropriate for this assessment include:

- *How do you feel about your weight? Are you trying to change your weight? How?*
- *What do you usually eat in the morning? At noon? In the afternoon? In the evening?*
- *Have you begun having sexual intercourse?*
- *Has anyone ever touched you in a way you didn't like? Forced you to have sex?*
- *How often do you miss school?*

Ask also whether she needs help with menses from mother or school personnel (for example, a nurse or coach).

Categorizing bleeding as cyclic or acyclic may be useful. An adolescent with normal cyclic intervals but heavy bleeding during her cycle may have a blood dyscrasia or clotting disorder such as Von Willebrand's disease. An adolescent with normal cycles but superimposed abnormal bleeding throughout the cycle may have a sexually transmitted infection, foreign body, uterine polyp, congenital malformation of the uterus, or endometriosis. Adolescents with no cyclicity or cycles of less than 21 days or more than 45 days usually have anovulatory DUB.

The examination should include height, weight, blood pressure and orthostatics, evidence of androgen excess (acne, hirsutism, clitoromegaly), thyroid exam, breast exam, signs of bleeding, and a pelvic examination (if it can be done atraumatically).

How can you assess parent/adolescent interactions? What are strategies for talking to a teenager alone? In the joint interview, does the parent allow the adolescent to answer some of the questions? Is the parent supportive of the adolescent? How does the adolescent react to being interviewed alone? How does the parent react to being asked to wait outside? Is the parent able to discuss sensitive topics?

Teens need to be seen alone, even if only briefly to ask sensitive questions. Explaining this to the parent is important. Confidentiality must be protected for teens unless a clinician identifies a serious risk. To interview Lisa alone, leave the room with her mother while she is undressing and then return to ask questions later. An adolescent girl

should be offered the choice of having her mother in or out of the room during the examination.

What laboratory tests should be ordered? The most important test is a complete blood count (with differential and platelet count) to assess if the adolescent is anemic. In the face of a normal hemoglobin/hematocrit and an impressive history of bleeding, a reticulocyte count can indicate the magnitude of actual blood loss. Another important test is a serum or urine HCG test to exclude pregnancy. Adolescents who have ever been sexually active should be evaluated with a pelvic exam and tests for *Neisseria gonorrhoeae* and *Chlamydia trachomatis*. Other tests which may be helpful include an erythrocyte sedimentation rate to assess for infection, coagulation studies if a bleeding disorder is a strong possibility (heavy bleeding since menarche, a personal or family history of excessive bleeding, liver dysfunction, or if there is a significantly low hemoglobin level), type and cross match if there is a possible need for transfusion, and endocrinologic studies if there is long standing dysfunctional bleeding or suspicion of polycystic ovary syndrome or a thyroid disorder (e.g. TSH, LH, FSH, prolactin, testosterone, DHEAS). An ultrasound is helpful if a pelvic mass is felt, a uterine anomaly is suspected, or bimanual examination cannot be accomplished in a girl with significant bleeding.

Distribute Part II of the case and have participant(s) read it aloud.

Part II

You ask Lisa for a more detailed history of her menstrual cycles. She states that she does not have intermenstrual spotting. However, her periods are often so heavy that she has to change a pad every 1/2 to 1 hour. She has used tampons. She denies new stresses in her life, weight changes, a history of easy bleeding or bruising, visual changes, headache, hirsutism, acne, heat or cold intolerance, palpitations, and skin changes. She plays soccer about 2 hours a day.

Her mother's menarche was at age 13. She had irregular, but not frequent or heavy periods, for the first 2 to 3 years.

After her mother leaves the room, you ask Lisa about sexual activity, alcohol and tobacco use, weight control methods, and family and school stresses. She tells you that she has dated, but she has never had sexual intercourse. You counsel her about healthy sexual decision-making. You explain to her the components of an examination for irregular menses. She prefers her mother to be present for the physical examination.

She appears to be slightly pale. Her height and weight are 25th percentile for age, and her heart rate is 82 supine and 90 standing. Blood pressure is 105/68 supine and 110/70 standing. Thyroid exam is normal, and breasts are Tanner IV without galactorrhea. Her abdomen is benign. Her pubic hair is Tanner IV and external genitalia are normal. A one-finger bimanual vaginal/abdominal exam reveals a firm, small uterus and normal ovaries bilaterally. She has no hirsutism, acne, petechiae or ecchymoses.

Laboratory tests reveal:

urine pregnancy test	negative
white blood cell count	9,500/mm^3
hemoglobin	10.1 gm/dl
hematocrit	29.6%
MCV	71 fl
platelets	321,000/mm^3

What is your diagnosis now? Her history, examination and laboratory tests are consistent with anovulatory bleeding.

How would you categorize her DUB? Mild, moderate or severe?
A useful categorization of DUB is as follows:

Mild DUB:
1. Menses are longer than normal or cycle is shortened to less than 21 days (1st day of one menstrual period to 1st day of next menstrual period) for 2 or more months. Flow is slightly to moderately increased.
2. Normal hemoglobin.

Moderate DUB:
1. Menses are moderately prolonged or cycle is shortened with frequent menses (every 1-3 weeks). Flow is moderate to heavy.
2. Mild anemia.

Severe DUB:
1. Prolonged bleeding with disruption of normal cycles, and very heavy flow.
2. Hemoglobin reduced, often to less than 9 gm. Clinical signs of blood loss may be present.

Lisa has moderate DUB.

How would you approach management for Lisa's DUB? It is important to first decide if she needs medical treatment, or if she can be observed. Sometimes, maturation of the hypothalamic-pituitary-ovarian axis will result in normal cycles. Medical treatment consists of estrogen therapy to stimulate endometrial proliferation and progestins to induce endometrial stability. The goals of therapy are to stop bleeding, prevent recurrence, and provide long-term follow-up. Lisa needs therapy with oral contraceptives because of her anemia.

Distribute Handout #1 and allow a few minutes for learners to review its contents.

Guidelines for treatment:

Mild DUB: Observation, reassurance. The patient should keep a menstrual calendar. Iron supplements are given to prevent anemia. Nonsteroidal anti-inflammatory drugs (e.g. naproxen sodium, ibuprofen) can be prescribed to lessen flow.

Moderate DUB: Oral contraceptive pills are the simplest treatment. Medroxyprogesterone can be used if the patient is not bleeding at the time of the visit, the patient or parent does not want to use oral contraceptives, or there is a medical contraindication to estrogens. For most patients, estrogen/progestin therapy such as 0.3 mg norgestrel/30 μg ethinyl estradiol (LoOvral) or 0.15 mg levonorgestrel/30μg ethinyl estradiol (Levlen, Nordette, Levora) are good choices. The hormone tablets are taken twice a day (b.i.d.) for 3 to 4

days until bleeding stops, then daily (q.d.) to finish a 21-day cycle. If the patient does not respond or is significantly anemic, the oral contraceptive (OC) may need to be given more frequently (see Severe DUB, below): initially three times a day (t.i.d.) or four times a day (q.i.d.) to stop bleeding, then decreased to b.i.d. Oral contraceptives can cause nausea, so patients need close follow-up and may require antiemetics. OCs are continued for 3 to 6 months. Iron should be given to treat anemia.

If oral medroxyprogesterone acetate is used, it is given as 10 mg q.d. for 10 to 14 days, starting on the 14th day of the menstrual cycle (e.g., day 14-28) or starting on the first day of each month (eg. October 1-14, November 1-14, December 1-14).

Severe DUB: The patient should be considered for admission if the initial hemoglobin is less than 7 gm, if orthostatic signs are present, or bleeding is heavy and the hemoglobin is less than 10 gm. Transfusion should be considered only if the hematocrit is very low and vital signs are unstable. Clotting studies should be obtained in these patients. One effective regimen is 0.3 mg norgestrel/30 μg ethinyl estradiol (LoOvral) every 4 hours until bleeding slows or stops, then q.i.d. for 4 days, t.i.d. for three days, and b.i.d. for 2 weeks. Iron should be given to correct anemia.

Distribute the Bibliography page and Epilogue. Ask someone to read the Epilogue aloud.

Epilogue

You discuss with Lisa and her mother the results of your evaluation. You prescribe an iron supplement as well as a 0.3 mg norgestrel/30 μg ethinyl estradiol oral contraceptive pill, and describe the side effects of this medication. She will take them twice a day until the bleeding slows or stops, then daily to complete the 21-day package.

Lisa calls you one week later and says that the bleeding stopped after 3 days on the oral contraceptives. She is not having any side effects. Lisa returns for follow-up 6 weeks later. Her hemoglobin is 11.4 gm and hematocrit is 33.2%.

How long should Lisa stay on oral contraceptives? This depends on the initial severity of the DUB as well as how psychologically distressing the bleeding is to her. Most patients take OCs for at least 3 to 6 months before they are discontinued. Lisa should continue iron supplements and return for follow-up in 3 months, or sooner if she is experiencing abnormal bleeding.

Refer back to group's learning agenda and summarize the key teaching points that were made. This will give the group a sense of accomplishment, and emphasize the important messages. Suggest further sources of reading or other information if there are agenda items that were not covered in the discussion.

Independent Learning/Prevention Exercises: Facilitators may wish to assign "Independent Learning/Prevention Exercises" to the group, particularly if time constraints hinder the completion of the case. The following list includes suggestions to explore the available community resources that focus on anovulatory DUB, as well as other avenues of pertinent interest that can be integrated during or after the session. If the exercise is done in the absence of the facilitator, learners should take notes on their experience, then discuss with a faculty member for feedback.

1. Give a menstrual calendar to a patient with irregular cycles and review in 3 months. Ask a patient how irregular menstrual cycles affect her life.
2. Discuss with a school nurse special challenges for girls who experience early menstruation in 4^{th} and 5^{th} grade.
3. Review a curriculum for teaching students about menarche and menstrual cycles in a local school system.
   Determine:
   a.) The grade this curriculum is presented,
   b.) The age of the students receiving the presentation (does it precede the age of menarche?),
   c.) The accuracy of the information.
4. Check out web sites for information about menstrual cycles and iron deficiency anemia (e.g**.,** **http://www.youngwomenshealth.org**)

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Part I

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Part II

You ask Lisa for a more detailed history of her menstrual cycles. She states that she does not have intermenstrual spotting. However, her periods are often so heavy that she has to change a pad every 1/2 to 1 hour. She has used tampons. She denies new stresses in her life, weight changes, a history of easy bleeding or bruising, visual changes, headache, hirsutism, acne, heat or cold intolerance, palpitations, and skin changes. She plays soccer about 2 hours a day.

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Epilogue

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Lisa calls you one week later and says that the bleeding stopped after 3 days on the oral contraceptives. She is not having any side effects. Lisa returns for follow-up 6 weeks later. Her hemoglobin is 11.4 gm and hematocrit is 33.2%.

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Handout #1: Dysfunctional Uterine Bleeding

Normal Menstrual Function

Normal adult ovulatory cycle: range 21-35 days, flow 3-7 days
Excessive $\geq$ 8-10 days.
Normal blood loss: 40-80 cc/cycle
(10-15 soaked tampons/pads per cycle)

Etiology of dysfunctional uterine bleeding (DUB)

Definition of DUB: excessive, prolonged, unpatterned bleeding from the endometrium unrelated to structural or systemic disease

Mechanism: anovulation $\rightarrow$ unopposed estrogen $\rightarrow$ inadequate stabilization of thick proliferative endometrium due to lack of progestin effect $\rightarrow$ bleeding.

Differential diagnosis of abnormal vaginal bleeding

- Anovulatory uterine bleeding (dysfunctional uterine bleeding)
- Disorders of pregnancy: threatened abortion, miscarriage, ectopic pregnancy, trophoblastic disease
- Pelvic inflammatory disease
- Hematologic disorders:
  Thrombocytopenia, leukemia, aplastic anemia, clotting disorders, von Willebrand's disease
- Endocrine disorders:
  Hypo- or hyperthyroidism, adrenal disease, diabetes mellitus, hyperprolactinemia, polycystic ovary syndrome, ovarian failure
- Other gynecological disorders:
  - Vaginal abnormalities: carcinoma, laceration
  - Cervical disorders: cervicitis, polyp, hemangioma
  - Uterine disorders: congenital anomalies, breakthrough bleeding associated with oral contraceptive use, ovulation bleeding, submucous myoma (fibroid)
  - Ovarian cysts, tumors
  - Endometriosis
  - Foreign body (e.g., retained tampon)
- Systemic diseases
- Trauma
- Medications: anticoagulants, platelet inhibitors, androgens, spironolactone, tricyclic antidepressants, anti-psychotics

Pregnancy or pelvic infection should always be considered early in the evaluation.

Evaluation

History (menstrual calendar invaluable!)
Age of menarche, menstrual pattern, sexual activity, STDs, vaginal discharge, abuse. Recent stress, weight change, eating habits, sports, chronic diseases, bleeding problems, hirsutism, medications.

Physical examination and pelvic examination

Labs :

CBC, differential, platelet count
Pregnancy test
Tests for GC, Chlamydia (if possibly sexually active)
Other: PT, PTT, von Willebrand panel; if personal or family history of excessive bleeding, heavy bleeding since menarche, liver dysfunction, or significant anemia
Pelvic ultrasound, if mass or examination difficult
Thyroid tests (TSH)
Androgen levels for PCOS, if persistent evidence of anovulation or hirsutism/acne

Treatment

Mild DUB (menses longer than normal or cycle shortened for 2 or more months; hemoglobin is normal). Observation, reassurance. The patient should keep a menstrual calendar. Iron supplements are given to prevent anemia, and nonsteroidal anti-inflammatory drugs (e.g. naproxen sodium, ibuprofen) can be prescribed to lessen flow.

Moderate DUB (menses moderately prolonged and cycle shortened (1-3 weeks), often mild anemia (33-34%)). Oral contraceptive pills are the simplest treatment. Medroxyprogesterone can be used if the patient is not bleeding at the time of the visit, the patient or parent does not want to use oral contraceptives, or there is a medical contraindication to estrogens. For most patients, estrogen/progestin therapy such as 0.3 mg norgestrel/30 µg ethinyl estradiol (LoOvral) or 0.15 mg levonorgestrel/30µg ethinyl estradiol (Levlen, Nordette, Levora) are good choices. They are taken b.i.d. for 3 to 4 days until bleeding stops, then q.d. to finish a 21-day cycle. If the patient does not respond or is significantly anemic, the oral contraceptive (OC) may need to be given more frequently (see *Severe DUB*, below): initially t.i.d. or q.i.d. to stop bleeding, then decreased to b.i.d. Oral contraceptives can cause nausea, so patients need close follow-up and may require antiemetics. OCs are continued for 3 to 6 months. Iron should be given to correct anemia.

If oral medroxyprogesterone acetate is used, it is given as 10 mg q.d. for 10 to 14 days, starting on the 14th day of the menstrual cycle (eg. day 14-28) or starting on the first day of each month (eg. October 1-14, November 1-14, December 1-14).

Severe DUB (prolonged, heavy bleeding; hemoglobin reduced, often <9gm). The patient should be considered for admission if initial hemoglobin is less than 7 gm, if orthostatic signs are present, or bleeding is heavy and hemoglobin is less than 10 gm. Transfusion should be considered only if necessary for very low hematocrit and unstable vital signs. Clotting studies should be obtained. One effective regimen is 0.3 mg norgestrel/30 µg ethinyl estradiol (Lo-Ovral) every 4 hours until bleeding slows or stops, then q.i.d. for 4 days, t.i.d. for three days, and b.i.d. for 2 weeks (other monophasic pills may be also used). Iron should be given to correct anemia and antiemetics prescribed. The patient should take oral contraceptives for 3 to 6 months.

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3. Falcone T, Desjardins C, Bourque J et al. Dysfunctional uterine bleeding in adolescent. *Journal of Reproductive Medicine* 1994;39:761-764.
4. Wathen PI, Henderson MC, Witz CA. Abnormal uterine bleeding. *Medical Clinics of North America* 1995;79:329-343.
5. Cowan BD, Morrison JC. Management of abnormal genital bleeding in girls and women. *New England Journal of Medicine* 1991;324:1710-1715.

Suggested Readings (Annotated)

Emans SJ, Laufer MR, and Goldstein DP. *Pediatric and Adolescent Gynecology,* Fourth edition. Philadelphia: Lippincott, William and Wilkins; 1998. p.237-262.
A section in Chapter 6 is devoted to the clinical presentation, differential diagnosis and management of teens with DUB. Several case scenarios are presented.

Claessens EA, Cowell CA. Acute adolescent menorrhagia. *American Journal of Obstetrics Gynecology* 1981;139:277-280.
A classic study of 59 adolescent patients hospitalized 1971-1980 with DUB. 20% had a primary coagulation disorder.

Falcone T, Desjardins C, Bourque J et al. Dysfunctional uterine bleeding in adolescent. *Journal of Reproductive Medicine* 1994;39:761-764.
A study of 61 adolescents with DUB (1981-1991) in which only 3% had newly diagnosed coagulation disorders. Oral estrogen/progestin therapy was highly effective.

Educational Resources on the World Wide Web:

Educational website for patients with menstrual irregularity:
www.youngwomenshealth.org