Treatment of Menorrhagia
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Menorrhagia is defined as excessive uterine bleeding occurring at regular intervals or prolonged uterine bleeding lasting more than seven days. The classic definition of menorrhagia (i.e., greater than 80 mL of blood loss per cycle) is rarely used clinically. Women describe the loss or reduction of daily activities as more important than the actual volume of bleeding. Routine testing of all women with menorrhagia for inherited coagulation disorders is unnecessary. Saline infusion sonohysteroscopy detects intracavitary abnormalities such as endometrial polyps or uterine leiomyoma and is less expensive and invasive than hysteroscopy. Endometrial biopsy is effective for diagnosing precancerous lesions and adenocarcinoma but not for intracavitary lesions. Except for continuous progestin, medical therapies are limited. The levonorgestrel-releasing intrauterine device is an effective therapy for women who want to preserve fertility and avoid surgery. Surgical therapies include endometrial ablation methods that preserve the uterus; and hysterectomy, which results in high satisfaction rates but with potential surgical morbidity. Overall, hysterectomy and endometrial ablation result in the greatest satisfaction rates if future childbearing is not desired. Treatment of menorrhagia results in substantial improvement in quality of life. (Am Fam Physician 2007;75:1813-9,1820. Copyright © 2007 American Academy of Family Physicians.)

The term “abnormal uterine bleeding” encompasses noncyclic and cyclic bleeding. Anovulatory bleeding is the most common type of noncyclic uterine bleeding. Menorrhagia is defined as excessive cyclic uterine bleeding that occurs at regular intervals over several cycles, or prolonged bleeding that lasts for more than seven days. Anovulatory bleeding and menorrhagia, although often grouped together in discussions of treatment, do not have the same etiology or require the same diagnostic testing.

Average menstrual blood loss is between 30 and 40 mL per cycle. An early population-based study concluded that the upper limit of normal menstrual blood loss was between 60 and 80 mL, with the upper limit subsequently adopted as the classic definition of menorrhagia. A greater prevalence of impaired iron status was noted with a loss of more than 60 mL. There are shortcomings to this volume definition because actual blood loss is largely subjective and difficult to quantify objectively.

In 34 percent of women, the subjective complaint of “heavy periods” appears to correlate with a significantly higher quantified average blood loss. Some women, however, do not consider heavy menstrual flow to be abnormal. Of women who rated their flow as very heavy, 25 percent had losses of less than 35 mL per cycle, and 25 percent of those who rated their periods as heavy had losses of more than 82 mL. Physicians may be unable to judge volume from patient history or may consider measurements unimportant in deciding treatment. Pictorial blood loss assessment charts may not accurately reflect the hygiene products used. Additionally, women change hygiene products at a varied frequency whether saturation has occurred or not. Therefore, the criterion of loss of more than 80 mL is of doubtful clinical significance.

The clinical features associated most strongly with blood loss volume include the rate of change of sanitary protection during full flow, and the total number of pads and tampons used. Other associations include the size of clots and the number of clots greater than about 1 inch in diameter. A low ferritin level correctly predicts 60 percent of women with periods with measured losses of more than 80 mL; therefore, a loss of more than 80 mL can be predicted moderately well by a model that includes ferritin levels, clot size, and the rate of pad change during full flow.

Dysmenorrhea, mood change, and a perceived increase in the volume of menstrual bleeding are reported more often as severe...
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problems by women with menorrhagia than is absolute
blood loss. Patient distress may be related more to disrup-
tions in work, sexual activity, or quality of life than
menstrual volume alone. These perceptions are impor-
tant, because the amount of blood loss alone is not linked
to a decision to proceed with hysterectomy. A woman’s
perception of blood loss and the disruption that it causes
are the key determinants of subsequent treatment.

Risk Factors

Established risk factors for menorrhagia include increased
age, premenopausal leiomyomata, and endometrial
polyps. Parity, body mass index, and smoking are not
risk factors. For some women, a cause of menorrhagia
is not identified.

Abnormalities of platelet function, such as von Wille-
brand’s disease, appear to be more prevalent in women
with menorrhagia than in the general population. The
prevalence of von Willebrand’s disease in women with
menorrhagia varies from 5 to 24 percent. There are no
data suggesting that a lower quality of life occurs more
commonly in women with menorrhagia and von Wille-
brand’s disease than in those with menorrhagia alone.

Diagnostic Testing

The American College of Obstetricians and Gynecolo-
gists (ACOG) recommends testing for von Willebrand’s
disease in adolescents with severe menorrhagia, in adult
women with menorrhagia, and in women undergoing
hysterectomy for the sole indication of menorrhagia. A
more stringent meta-analysis concluded that there are
inadequate data to justify routine testing for all women
with menorrhagia. Generally, if the patient has von
Willebrand’s disease, it is already known at the time of
evaluation.

ACOG does not recommend a complete blood count,
thyroid function test, or prolactin test for women with
menorrhagia. Evidence-based guidelines from the Royal
College of Obstetricians and Gynaecologists, however,
recommend these tests, although thyroid function and
bleeding disorders should be evaluated only if other his-
torical or clinical features suggest specific conditions.

ACOG lists menstrual irregularity as a risk factor for
endometrial cancer, and it is reasonable to exclude
cancer in adult women with persistent menorrhagia. This
is particularly true in cases where it is difficult
to determine whether the menorrhagia is caused by
anatomic causes, such as fibroids or polyps, or is a func-
tion of abnormal uterine bleeding. An exception is in
adolescents, in whom endometrial cancer is rare and
in whom most abnormal uterine bleeding is a result of
physiologic anovulation. Invasive diagnostic modalities
include endometrial biopsy, transvaginal ultrasonog-
raphy, saline infusion sonohysteroscopy, and hysteros-
copy1 (Table 17-21). Although abnormal uterine bleeding
in adolescents is usually physiologic, reproductive-age
women with menorrhagia require evaluation for a spe-
cific cause.
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The detection rate of endometrial cancer using endometrial biopsy is 91 percent, with a 2 percent false-positive rate in premenopausal women,12 making it an accurate diagnostic test for women with abnormal uterine bleeding.19 Greater sensitivity (97 percent) and negative predictive value (94 percent) can be achieved by combining endometrial biopsy with saline infusion sonohysteroscopy.19 Saline infusion sonohysteroscopy incorporates real-time ultrasonography with static images during infusion of sterile saline into the uterus.22 If bleeding persists despite a negative endometrial biopsy or saline infusion sonohysteroscopy, hysteroscopy (sensitivity 86 percent, specificity 99 percent) should be considered despite the cost and invasive nature of the procedure.23

The most common anatomic causes of menstrual disorders in premenopausal women are uterine polyps and submucous fibroids.20 Transvaginal ultrasonography (sensitivity 60 percent, specificity 93 percent) and endometrial biopsy are less effective than saline infusion sonohysteroscopy for diagnosing intracavitary abnormalities. Saline infusion sonohysteroscopy is more accurate for detecting uterine fibroids (sensitivity 87 percent, specificity 92 percent) than for endometrial polyps (sensitivity 86 percent, specificity 81 percent); therefore, a negative test does not rule out intracavitary abnormalities.23 It is unknown if structural lesions missed on saline infusion sonohysteroscopy are diagnosed more efficiently with hysteroscopy.21 Saline infusion sonohysteroscopy is a more effective initial diagnostic test for intracavitary abnormalities in premenopausal women than transvaginal ultrasonography if the goal is to avoid expensive and invasive hysteroscopy.20,21,24

Treatment of Menorrhagia

Menorrhagia can result in severe anemia. Of 115 women with physician-diagnosed menorrhagia, 58 percent reported a history of anemia, for which 89 percent received treatment.11 Additionally, 4 percent had received transfusion. Treatment of menorrhagia results in substantial improvement in quality of life.25

MEDICAL THERAPIES

The treatment of choice for anovulatory bleeding is medical therapy with oral contraceptive pills or progestogens.1 High-quality comparative evidence on which to base therapy for menorrhagia, however, is limited. Oral progestogens are the most commonly prescribed therapy for menorrhagia.26 When administered solely in the luteal phase, they are significantly less effective than the levonorgestrel-releasing intrauterine device (IUD; Mirena).26 Oral progestin therapy for 21 continuous days (days 5 to 26 of the menstrual cycle) effectively reduces menstrual blood loss, but patient satisfaction is higher with the levonorgestrel-releasing IUD. This regimen has the strongest role in the short-term treatment of menorrhagia.26

There is insufficient evidence to assess the effectiveness of monthly oral contraceptive pills for reducing

<table>
<thead>
<tr>
<th>Evaluation type</th>
<th>Reliability</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Endometrial biopsy</td>
<td>Sensitivity, 91 percent; false-positive rate in premenopausal women, 2 percent</td>
<td>To rule out neoplasia in adult women; office procedure, well tolerated, anesthesia and cervical dilation usually not required; limitations include cervical stenosis and insufficient samples if endometrial atrophy present</td>
</tr>
<tr>
<td>Transvaginal ultrasonography</td>
<td>Sensitivity, 60 percent; specificity, 93 percent</td>
<td>Less effective than saline infusion sonohysteroscopy for identification of intracavitary abnormalities</td>
</tr>
<tr>
<td>Saline infusion sonohysteroscopy</td>
<td>For fibroids, sensitivity, 87 percent; specificity, 92 percent For polyps, sensitivity, 86 percent; specificity, 81 percent Negative predictive value, 94 percent when combined with endometrial biopsy</td>
<td>Sterile isotonic fluid is infused into the uterus under continuous visualization of the endometrial surface with transvaginal ultrasonography</td>
</tr>
<tr>
<td>Hysteroscopy</td>
<td>Sensitivity, 86 percent; specificity, 99 percent</td>
<td>Highest cost; may require cervical dilation; does not reduce hysterectomy rate despite absence of intracavitary pathology; used as the preferred method over other procedures</td>
</tr>
</tbody>
</table>

Information from references 17 through 21.
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Table 2. Endometrial Ablation Methods

<table>
<thead>
<tr>
<th>Method</th>
<th>Amenorrhea Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First-generation methods</strong></td>
<td></td>
</tr>
<tr>
<td>Rollerball ablation</td>
<td>25 to 60 percent</td>
</tr>
<tr>
<td>Transcervical resection of endometrium</td>
<td>26 to 40 percent</td>
</tr>
<tr>
<td>Laser ablation</td>
<td>37 percent</td>
</tr>
<tr>
<td><strong>Second-generation methods</strong></td>
<td></td>
</tr>
<tr>
<td>Laser intrauterine thermotherapy</td>
<td>71 percent</td>
</tr>
<tr>
<td>Microwave ablation†</td>
<td>61 percent</td>
</tr>
<tr>
<td>Thermal balloon ablation§</td>
<td>58 percent</td>
</tr>
<tr>
<td>Cavaterm</td>
<td>58 percent</td>
</tr>
<tr>
<td>Thermachoice‡</td>
<td>14 to 26 percent</td>
</tr>
<tr>
<td>Cryoablation (Her Option)‡</td>
<td>53 percent</td>
</tr>
<tr>
<td>Radiofrequency ablation (Novasure‡)</td>
<td>41 percent</td>
</tr>
</tbody>
</table>

*—Satisfaction rates with first-generation methods are 80 percent or greater; subsequent hysterectomies are performed on 2 to 21 percent of patients.†—Can be used for patients with uterine polyps, irregularly-shaped uterus, or moderate fibroids.‡—Approved by the U.S. Food and Drug Administration.§—Contraindications include previous cesarean delivery and uterine wall thickness of less than 8 mm.

Information from references 7, 35, and 36.

Table 3. Comparison of Medical and Surgical Therapies for Menorrhagia

<table>
<thead>
<tr>
<th>Therapy*</th>
<th>Effectiveness</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonsteroidal anti-inflammatory drugs</td>
<td>Insufficient evidence</td>
<td>Low cost, cyclic use</td>
<td>Adverse gastrointestinal effects</td>
</tr>
<tr>
<td>Danazol</td>
<td>Insufficient evidence</td>
<td>—</td>
<td>Adverse androgen effects; low compliance with daily use</td>
</tr>
<tr>
<td>Continuous oral contraceptives</td>
<td>Insufficient evidence</td>
<td>Convenience</td>
<td>Common adverse effects and known contraindications</td>
</tr>
<tr>
<td>Oral progestogens</td>
<td>Luteal only, ineffective; 21-day regimen reduces menorrhagia</td>
<td>Low cost, noninvasive progestin therapy</td>
<td>Irregular bleeding, breast tenderness, lower satisfaction than levonorgestrel-releasing IUD</td>
</tr>
<tr>
<td>Levonorgestrel-releasing IUD</td>
<td>More effective than continuous progestin in reducing menorrhagia but significantly less effective than endometrial transcervical resection or balloon ablation</td>
<td>Office procedure, ease of use improves patient satisfaction and compliance</td>
<td>Possible contraindications to IUD, possible irregular bleeding</td>
</tr>
<tr>
<td>Endometrial ablation</td>
<td>Up to 60 percent amenorrhea for hysteroscopic procedures such as rollerball ablation</td>
<td>Some nonhysteroscopic ablations may be done as outpatient under local anesthesia</td>
<td>Equipment failure, technical skill requirement higher for hysteroscopic methods</td>
</tr>
<tr>
<td>Hysterectomy</td>
<td>100 percent amenorrhea</td>
<td>Definitive procedure</td>
<td>One out of 30 women with major adverse event; anesthesia risks; longer recovery time</td>
</tr>
</tbody>
</table>

$ = least expensive; $$$$ = most expensive; IUD = intrauterine device.

*—No medical therapy, including the levonorgestrel IUD, is U.S. Food and Drug Administration approved for treatment of menorrhagia.

Information from references 2, 7, 25, 27 through 31, and 37.
women were satisfied and willing to continue with the IUD compared with the progestin (77 versus 22 percent, respectively).31

Ablation methods (transcervical resection and balloon ablation) resulted in greater reductions of mean menstrual blood loss and higher amenorrhea rates than the levonorgestrel-releasing IUD,30 but the satisfaction rates were similar despite more adverse effects with the IUD.29

When the levonorgestrel-releasing IUD and hysterectomy were compared, there was no difference in quality of life or satisfaction rates, but the surgery was more expensive at one and five years after surgery.31 About 70 percent of women continued with the IUD at 12 months.32 More than 64 percent of women using the levonorgestrel-releasing IUD as a bridge to a previously scheduled hysterectomy for menorrhagia cancelled their surgery.33

SURGICAL THERAPIES

Minimally invasive methods of endometrial destruction have been evaluated as alternatives to hysterectomy in women with menorrhagia. The procedures are divided into first- and second-generation methods depending on whether a hysteroscope is used. Preoperative endometrial thinning with gonadotropin-releasing hormone analogues or danazol improves technical performance and results in higher rates of postoperative amenorrhea.34

Clearly, selection of women is important. Women must have completed childbearing and have a benign cause for their menorrhagia.35 First- and second-generation methods are effective in reducing average blood loss. Complication rates for both are low, and satisfaction is high.7,15 Studies evaluating the effectiveness of endometrial ablation have been performed primarily on women with menorrhagia, not on anovulatory women.1

The first-generation procedures (endometrial resection and rollerball or laser ablation) are performed through a hysteroscope after uterine infusion of a distension medium to improve visualization.35,36 Although considered the standard for endometrial ablation, the first-generation procedures take more time to perform, require regional or general anesthesia, and are technically more difficult than second-generation methods.7 There is a 4 percent risk of fluid overload with first-generation procedures,37 making them unsuitable for women with cardiac or renal disease.35

Second-generation methods are performed “blind” (without a hysteroscope), usually in the outpatient setting under local anesthesia, and require minimal cervical dilation.35,36 These methods include cryoablation, thermal balloon ablation, radiofrequency ablation, microwave ablation, and diode laser thermotherapy.

A Cochrane review of 13 trials comparing first- and second-generation methods found no differences in satisfaction rates at one, three, and five years.7 There were also no significant differences for outcomes of inability to work, amenorrhea rates, or requirements for any additional surgery or hysterectomy. All second-generation methods required significantly less operating time and use of general anesthesia than first-generation techniques.7 There were, however, more reports of equipment failure with the second-generation techniques (Table 2).7,35,36

Hysterectomy is a definitive treatment for menorrhagia, but there is risk of surgical morbidity and the economic cost is high.15,37 Although endometrial resection procedures result in faster return to normal activities than hysterectomy, they are associated with a reintervention rate of up to 22 percent, so the cost difference between hysterectomy and endometrial resection narrows over time.37 There are no randomized controlled trials comparing various surgical methods with hysterectomy for menorrhagia.

Table 32,7,25,27,31,37 compares medical and surgical options for treatment of menorrhagia.
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Clinical Decisions About Treatment
It is important to ask women about the amount of menstrual bleeding and level of fertility they will accept before any treatment recommendations are made. When women with menorrhagia were offered an interview and information packet describing treatment options and outcomes, they were more satisfied with their role in decision making and less likely to undergo hysterectomy. Although amenorrhea as a primary end point is easily measured, it is not required for improved quality of life and patient satisfaction. Lifestyle and amenorrhea outcomes correlate poorly and should not be considered interchangeable.

Women who tolerate menstrual bleeding and wish to maintain fertility can try medical therapy with continuous progestin on days 5 to 26 of the menstrual cycle. The levonorgestrel-releasing IUD is an effective long-term option if future childbearing is desired. This IUD is more effective than continuous progestin in reducing menorrhagia but is significantly less effective than endometrial transcervical resection or balloon ablation.

When medical and transcervical resection (ablation) therapy for menorrhagia were compared, women preferred endometrial resection. Women who continued medical therapy had lower quality of life and menstrual outcomes than women undergoing resection. There were significantly fewer secondary treatments in the resection group.

When randomized to continue cyclic progestin for refractory abnormal uterine bleeding or hysterectomy, hysterectomy was shown to be superior for symptom improvement and may be the optimal choice for women who give high priority to resolving bothersome symptoms of menorrhagia and pain.

Hysterectomy is a well-suited option for women who do not desire further childbearing or menstrual bleeding and are willing to assume the risk of surgery. However, if there is a desire to avoid major surgery, and childbearing is completed, endometrial ablation is a reasonable and effective alternative.

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Author disclosure: Nothing to disclose.

REFERENCES
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44. Abbott J. Immediate endometrial resection for menorrhagia was more effective in the long term than initial medical management [Commentary]. Evidence-based Obstet Gynecol 2002;4:126-7.