Written for nurse practitioners, physician assistants, nurse midwives, and other primary care providers, this new edition of *Advanced Health Assessment of Women* continues to deliver the clinical skills required to address the unique healthcare needs of women. This text delves into the growing role of the advanced practice clinician, establishing a foundation for and an understanding of the rationale behind the techniques and procedures described. Master’s level and doctoral level curricula provide basic content for the advanced practice clinician but may not provide sufficient education and advanced training in skills and procedures pertaining to women’s health. This practical manual is designed to fill that gap, linking theory to clinical practice using critical thinking.

Using a clear and concise outline format, *Advanced Health Assessment of Women* avoids unnecessary jargon and cuts straight to the clinical skills, techniques, and procedures the advanced practice provider needs to know. Content progresses from simple to complex, covering basic assessment and physiology, health history, physical examination, and specific investigative procedures. Each technique and procedure outlined contains detailed descriptions, strategies for patient preparation, and recommended follow-up. In this new edition, all content has been reviewed and expanded to reflect the most updated evidence-based clinical practice guidelines.

**Key Features:**
- Clinical procedures that are on the leading edge of the expanding role of the advanced practice clinician
- Detailed descriptions of advanced assessment techniques with plentiful tables and figures
- Special chapter on urinary incontinence, including diagnosis of bladder dysfunction
- Appendices contain patient information handouts and practice forms that can be adapted for practice
- Unique chapter on the selection and insertion of the vaginal pessary

**New to this edition:**
- New chapter: Gynecological Examination of the Transgender Patient
- Revisions of clinical guidelines and procedures for menopause, cervical cancer screening, and osteoporosis
- Treatment summary sections on topics including polycystic ovarian syndrome, abnormal uterine bleeding, vulvodynia, obesity, and urinary incontinence
Advanced Health Assessment of Women
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Dr. Secor has received several awards for her contributions to the NP profession, including the 2013 Lifetime Achievement Award from the Massachusetts Coalition of Nurse Practitioners (MCNP) and the 2015 Student Service Award from Rocky Mountain University.
Advanced Health Assessment of Women
Clinical Skills and Procedures
Fourth Edition

Helen A. Carcio, MS, MEd, ANP-BC
R. Mimi Secor, DNP, FNP-BC, FAANP

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Preface

This comprehensive manual contains essential elements aimed at improving the quality of healthcare provided to women across the life span. Women of today are empowered and proactive, actively seeking access to high-quality and sensitive care, which is a key component in the prescription for women’s health equity. The majority of individuals who seek healthcare are women. As baby boomers age at record numbers, an increasing number of women are seeking professional care. With healthcare reform, renewed emphasis is being placed on the knowledgeable and expert assessment of women to provide high-quality care for all. In today’s rapidly changing healthcare climate, advanced practice clinicians are viewed as providers who are well qualified to care for the unique healthcare needs of women. In addition, the scope of their practice is broadening to include more advanced clinical skills and procedures. Advanced Health Assessment of Women: Clinical Skills and Procedures, fourth edition, provides clear and concise, factual information related to the health assessment and management of women.

This text provides an enhanced definition of the role and clinical skills of providers, including physician assistants (PAs), certified nurse midwives (CNMs), and nurse practitioners (NPs). These practitioners play a vital role in managing the health of women in a variety of settings, including internal medicine and primary care; family practice; and specialty areas such as women’s health, pelvic wellness, aesthetics, fertility, and obstetrics and gynecology.

Some of the procedures described in this manual are more advanced and are appropriate only within certain practice settings. It must be emphasized that advanced practice clinicians are under a mandate to practice within their legal and professional scope of practice, as well as within their personal comfort level. This is especially important when considering performing advanced techniques and procedures. Consult your state association and/or licensing board if in doubt about the legality of performing any of the procedures described in this text. The scope of practice varies among NPs, PAs, and CNMs in relation to educational programs, practice settings, geographical location, and state laws and regulations. This text provides guidance so that each practitioner may become increasingly aware of when to practice independently, when to comanage, when to consult, and when to refer.

Many of the assessment skills, techniques, and procedures described are fast becoming routine to the advanced practice clinician. Advanced practice clinicians are educated in a variety of different ways, with differing approaches.
within today’s nursing and medical models. Master’s-level and even doctoral-level (DNP, PhD) curricula provide basic content for the advanced practice clinician (NP, midwife, and PA), but may not provide sufficient education and training regarding advanced women’s health skills and procedures. This text is designed to fill that gap.

This fourth edition of Advanced Health Assessment of Women: Clinical Skills and Procedures offers an integrated and unique approach to the healthcare of women. It goes beyond content commonly found in texts related only to health assessment. It provides an excellent resource to link theory to clinical practice using critical thinking skills. This manual is practical and user friendly. It provides detailed descriptions, enhanced by tables and figures, to clearly describe these advanced skills. The assessment of many aspects of care related to women is outlined, with sample assessment forms, such as the Assessment of Sexually Transmitted Infections, integrated throughout. In addition, many educational handouts—including a bladder-tracking diary and information on how to perform Kegel exercises—further enhance the educational aspects of the text.

An outline format was chosen because this clear and concise layout allows the information to flow in a logical sequence without one having to wade through unnecessary jargon. When techniques are explained, a comprehensive list of equipment necessary for each technique or procedure is given as well as information on patient preparation and recommended follow-up. The entire text is enhanced with a plethora of boxes, figures, and tables. The practical format offers easy access to pertinent information.

The different techniques and procedures were selected because they are within the expanding scope of the practitioner’s experience but are often not included in the advanced practice clinician’s curriculum or described in assessment books. This manual delineates strategies that are on the leading edge in the expanded role of the advanced practice clinician. Obviously, one cannot expect to learn the technical aspects from simply reading about them. This manual provides a foundation for, and an understanding of, the rationale behind the assessments and procedures described. Please note that it is a good idea to observe a new procedure first and then be supervised for as many times as it takes to feel comfortable performing that procedure. Always carefully read manufacturers’ recommendations that accompany any instrumentation you might use in addition to the information found in this text. This manual is not meant to dictate how procedures should be performed or to supply a strict recipe for techniques and procedures. It does, however, provide a clear starting point for developing practice guidelines specific to each individual’s clinical scope, expertise, and practice setting.

The contents of all of the chapters have been reviewed and expanded to reflect current research, evidence-based clinical guidelines, and new technologies. The text begins with a comprehensive review of the basic anatomy and physiology of women. A complete understanding of the complexities of the menstrual cycle and normal vaginal flora, examined at the cellular level, is imperative for accurate understanding and diagnoses of conditions that affect women.
Chapter 3, the health history chapter, discusses elements of a comprehensive, developmentally relevant health history with a unique approach to the physiological, psychological, and sociocultural components involved. Advanced health history techniques are detailed in the context of an equal partnership between provider and patient. Critical issues related to the assessment of HIV infection are summarized. The basic techniques of the physical examination—with a focus on the gynecologic examination—are outlined, with possible clinical alterations listed for each area assessed. Evaluation of the breast includes basic techniques with a section on how to examine the augmented breast (an explanation not commonly found in traditional health assessment books).

Chapter 15, Assessment of Vulvar Pain and Vulvodynia, addresses the diagnoses and management of vulvodynia and vestibulitis, including a new treatment summary table. Obesity is becoming a national epidemic. This text includes a chapter that provides a comprehensive guide to the assessment of obesity and body mass index (BMI) and also includes a new treatment summary table.

New chapters, such as Chapter 10, Gynecological Examination of the Transgender Patient, have been added in response to changing healthcare trends and increased recognition of the unique needs of special populations. Chapters on menopause (Chapter 10), cervical cancer screening (Chapter 30), and osteoporosis (Chapter 12) have also been extensively updated to reflect the most recent evidence-based clinical practice guidelines.

Additional topics are explored: For example, the assessment of skin is described in Chapter 5, lesbian health in Chapter 9, pelvic pain in Chapter 14, abnormal uterine bleeding in Chapter 17, and polycystic ovarian syndrome (PCOS) in Chapter 16. With the aging population, detection of skin cancer and accurate diagnosis of dermatologic conditions are essential. The chapter on lesbian health addresses critical aspects of taking a history and special considerations essential for all clinicians. Abnormal uterine bleeding, also known as abnormal vaginal bleeding, is a problem most clinicians need to evaluate properly to diagnose and manage these patients appropriately. PCOS, which is associated with serious cardiometabolic sequelae and other risks, is increasingly common and clinicians need to know how to assess, diagnose, and manage this condition. A new treatment summary table is also included in this updated chapter.

Pelvic health issues are more in evidence as the population of women ages. Unique chapters include the investigative procedures and advanced skills sections as an adjunct to Chapter 18, describing pelvic organ prolapse, and Chapter 19, which explores treatment for urinary incontinence and includes information about pelvic floor electrical stimulation, pelvic floor rehabilitation, and percutaneous tibial nerve stimulation.

Information provided in Chapter 31, Vaginal Microscopy, is the most comprehensive description of the interpretation and evaluation of the wet mount available in any current text. Chapter 30, Cervical Cancer Prevention, covers the Pap test and human papillomavirus (HPV) and recommendations for interpretation and follow-up of an abnormal Pap test, reflecting the new
American Society of Colposcopy and Cervical Pathology (ASCCP) guidelines for screening and follow-up. The new recommendations for HPV testing are also included.

Chapter 35, on urinalysis, offers a fresh look at an old test. Differential diagnosis of gynecologic versus urologic conditions is always challenging in women. This chapter contains an in-depth analysis of the components of urinalysis, and a step-by-step explanation of urine microscopy—a skill with which every advanced practice clinician should feel comfortable. Concerns of older women are addressed in the comprehensive new sections on menopause and urinary incontinence. Mastering the technique of acrochordonectomy, or the removal of skin tags, described in Chapter 41 will please many patients bothered by unsightly skin tags. New information on how to perform a simple cystometrogram, provided in Chapter 36 is important in diagnosing the cause of urinary incontinence.

Two newly emerging techniques that are becoming an integral part of assessment of women are sonohysteroscopy and bone densitometry. The various machines used are described and interpretation of results is clearly explained.

Up-to-date information on emerging topics such as BRCA gene testing is provided. Content on BRCA gene testing in Chapter 34 will help identify those women at risk and provide the clinician with skills necessary to help a woman choose whether or not to be tested.

Chapter 23, Initial Evaluation of Infertility, has been updated and presents guidelines for the assessment, evaluation, and management of the woman who is unable to conceive. Controversies and clinical dilemmas are explained. Techniques for evaluation of the infertile woman and intrauterine and donor insemination are clearly delineated.

In Unit VI, this text contains critical information regarding women at risk. A nationally tested questionnaire is included to help identify the victims of violence and abuse. Management guidelines and follow-up of the rape victim are also included.

Another unique section of this text is found in Chapter 46, Pessary Insertion. Such descriptive information is not found in any comparable text. As baby boomers age, the incidence of genital prolapse, often accompanied by incontinence, is increasing. A decade ago, use of pessaries was replaced by surgical alternatives, which were not risk free. Today pessaries offer a viable conservative alternative to urologic surgery. The fitting of pessaries requires patience, knowledge, and experience. Advanced-level clinicians are in a key position to assume care of this rapidly expanding population of women. Emphasis is now appropriately placed on the broader issue of pelvic health and wellness and away from specific entities such as urinary incontinence.

Technical skills related to insertion of various contraceptive devices are outlined in Unit VIII. Characteristics, such as the advantages and disadvantages, mechanisms of action, and contraindications of each device, are necessary to educate the woman in making an informed decision regarding her contraceptive management. The techniques of fitting contraceptive devices and follow-up care are outlined in detail. In Chapter 27, information on the technique of insertion and removal of Nexplanon and use of the FemCap is clearly
described, with figures supplied for clarification. Chapter 28, Intrauterine Contraception, has been expanded to include not only the levonorgestrel-containing Mirena, but also the new, smaller Kyleena device.

In the final section, the more advanced techniques are explained. Performing endometrial biopsy surgery requires skill and practice. It is also important to understand the indications for biopsy study, its implications, and interpretation of the results. Chapter 40 describes the necessary equipment required and walks the practitioner through each step.

Advanced Health Assessment of Women offers a variety of clinical tools to enhance content. Feel free to use any information provided and adapt it to your organization. End-of-chapter appendices contain a special patient education series that may be used and/or adopted for use by your practice. Finally, we are excited to announce that selected chapters, such as Chapter 8, Assessment and Clinical Evaluation of Obesity in Women; Chapter 15, Assessment of Vulvar Pain and Vulvodynia; Chapter 16, Polycystic Ovarian Syndrome; Chapter 17, Abnormal Uterine Bleeding; and Chapter 19. Urinary Incontinence, now include treatment summary sections at the end of each chapter. Students and busy clinicians alike will welcome the addition of these treatment summaries. Qualified instructors may obtain access to ancillary instructor’s PowerPoints by emailing textbook@springerpub.com.

This text offers practical guidance to help advanced practice students, preceptors, faculty, and clinicians. The content reflects an extensive review of current literature integrated with our years of clinical experience and teaching. In addition, we welcome our expanded panel of clinical experts from a wide variety of women’s health specialties who have generously shared their expertise as contributing authors and reviewers.

Helen A. Carcio
R. Mimi Secor
Acknowledgments

Thanks to my husband, Frank; and sons Marc, Ben, and Christian John, who are willing to share their mother with a computer. It was not always easy, but it is certainly always rewarding.

—Helen A. Carcio

Thanks to Helen for all her support as we updated this textbook with new chapters involving new authors. I also want to thank my husband, Mike; daughter, Katherine; and my mom for their understanding and support throughout this process. It was an interesting and rewarding experience.

—R. Mimi Secor

The preparation of this fourth edition of *Advanced Health Assessment of Women* was exciting, challenging, and, as usual, a lot of hard work, which we could not have managed without the many people who helped make it all happen. We are enormously grateful to Elizabeth Nieginski, Executive Editor, Nursing, for her continuing advice and abundant enthusiasm over the years and help with this the fourth edition of *Advanced Health Assessment of Women*. She was always extremely optimistic and her “gentle reminders” helped keep us on track. In addition, her flexibility and her “you can do it” attitude helped spur us on when deadlines seemed overwhelming. We also gratefully acknowledge and thank Joanne Jay, Vice President of Production, and Rachel X. Landes, Assistant Editor, Nursing, for their professionalism, astute suggestions, knowledge, insight, patience, and support through the lengthy publication process. Their optimism and encouragement during the sometime tedious business aspects of manuscript preparation are invaluable. We also thank them for always being extremely responsive to all our critical questions and concerns. We would like to thank Ashita Shah from Newgen Digital Works for her work on the composition of the book.

We sincerely thank all the contributing authors for finding time in their already busy schedules to contribute to our book and for their attention to format, content, and maintaining deadlines. Sharing their special expertise is paramount to the success of this manual. We are proud to have you as part of our list of elite contributors.

We both thank Springer Publishing Company for its special dedication to educating practitioners and commitment to women’s healthcare.
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Advanced Health Assessment of Women: Clinical Skills and Procedures, Fourth Edition
Assessment of Pelvic Pain

Amy Mandeville O’Meara

I. Pelvic pain
   A. Definition
      1. Pelvic pain refers to pain in the region of a woman’s internal reproductive organs.
      2. It may be a symptom of infection or may arise from pain in the pelvic bone or in nonreproductive internal organs, such as the bladder or colon.
      3. It can very well be an indication that there may be a problem with one of the reproductive organs in the pelvic area (uterus, ovaries, fallopian tubes, cervix, or vagina).
      4. It is important to do a thorough health history assessment and focused physical examination (see Chapters 3 and 4).

II. Pelvic pain assessment
    A. Symptom review (Box 14.1)
       1. Location of pain
       2. Description of pain: sharp, dull, throbbing, intermittent, and continuous
       3. Does pain radiate?
       4. What activities, if any, make the pain worse?
       5. What measures, if any, relieve the pain?
       6. Any unintentional or recent weight gain or loss?
       7. Rate pain on a scale of 1 to 10, 10 being the worst.
       8. Has similar pain occurred before?
       9. Presence of urinary or gastrointestinal symptoms
          a. Diarrhea or blood in stool or urine
       10. Vaginal bleeding or discharge
       11. Pain with intercourse
12. Timing in relation to menses, change in character

13. Sexual history
   a. Exposure to sexually transmitted infections
   b. Change in sexual partner
   c. Unprotected intercourse
   d. Change in contraception
   e. Use of sex toys

14. Pelvic surgery in past 12 to 24 months

B. Abdominal assessment
   1. Scars indicate previous surgery or injury; penetration of the peritoneum may result in adhesions (see section IV.C)
   2. Bowel sounds may be altered by paralytic ileus, peritonitis, intestinal obstruction, diarrhea
   3. Percussing
      a. Tympany may suggest intestinal obstruction.
      b. Dullness may suggest enlarged liver or spleen, distended bladder, pregnancy, or tumor.
   4. Palpation
      a. Light palpation: Persistent involuntary muscle spasm with relaxation suggests peritoneal inflammation (acute abdomen).
      b. Deep palpation: Sources of masses include tumors, pregnant uterus, bowel obstruction, abdominal aortic aneurism.
   5. Pain mapping: A process by which the patient and provider identify and document the exact location and intensity of pain; patients may also do this outside of the office visit if pain is not active at that time.

C. Pelvic examination (see Chapter 4)
   1. Pelvic muscles (see Chapter 18)
   2. Visualize vagina and cervix
   3. Assess uterine size, mobility, cul-de-sac nodularity
   4. Ovaries

BOX 14.1 Pelvic Pain Assessment: COLDERR

- Character: What does the pain feel like? (sharp, dull, crampy)
- Onset: Does the pain come on suddenly or gradually? Is it cyclic or constant?
- Location: Is the pain localized or diffuse?
- Duration: How long has the pain been present and how has it changed over time?
- Exacerbation: What activities or movements make it worse?
- Relief: What medication, activities, and positions make it better?
- Radiation: Does the pain radiate anywhere? (back, groin, flank, shoulder)
D. Cervical motion tenderness (Chandelier sign)
   1. Traditionally associated with pelvic inflammatory disease (PID) and may also be seen in the following:
      a. Present in twenty-eight percent of patients with appendicitis (note: usually limited to right side with appendicitis, and is bilateral with PID)
      b. Ectopic pregnancy
      c. Endometriosis
      d. Ovarian cysts
      e. Degenerating uterine fibroids
      f. Ovarian torsion

E. Rectal examination
   1. Assess for masses, lesions, tenderness, discharge.

F. Figure 14.1 shows the pain sites within the abdominal and pelvic cavities.

III. Acute pelvic pain (APP). Most common type of pelvic pain, often experienced by patients after surgery or other soft tissue traumas and tends to be immediate, severe, and short lived

A. Pregnancy related
   1. Spontaneous abortion

![FIGURE 14.1 Pelvic pain sites.](image-url)
Inevitable abortion: Cervix is dilated, bleeding occurs, and cramping is intense.

Incomplete abortion: Heavy bleeding and cramping occur with passage of products of conception (POC).

Complete abortion: Cramping and bleeding decrease, cervix closes.

Missed abortion: Amenorrhea is the only symptom; no cramping, bleeding, or cervical changes.

Septic abortion: An abortion complicated with an upper genital tract infection.

Labs/imaging: Perform ultrasound and serial beta human chorionic gonadotropin (hCG), Rh, and complete blood count (CBC) testing as indicated.

Ectopic pregnancy

Should always be in the differential diagnosis for APP.

1. Risk factors
   - History of PID
   - Prior tubal surgery
   - Current intrauterine contraception (IUC) use
   - Prior ectopic pregnancy
   - If the patient has had one ectopic pregnancy, the chance of a second is 10% to 20%.

2. Imaging/labs
   - Ultrasound: Gestational sac should be visible by ultrasound at 5.5 weeks and/or beta hCG of 1,500 to 2,400 mIU/mL.
   - Serial beta hCG: Levels should increase by at least 50% every 2 days.

Gynecologic, infectious

1. PID
   - Treat all women with pelvic or lower abdominal pain who, on examination, have cervical motion tenderness or uterine tenderness or adnexal tenderness.
     - Leukocytes in vaginal secretions (most women with PID will have this); its absence argues strongly against PID
     - Cervical exudates
     - Cervical friability
     - Temperature greater than 101°F (38.3°C)
     - Labs:
       - Elevated sedimentation rate
       - Elevated C-reactive protein
       - Gonorrhea and chlamydia
   - Outpatient PID treatment detailed in Table 14.1

2. PID indications for hospitalization
   - Surgical emergency (e.g., appendicitis) cannot be ruled out.
   - Patient is pregnant.
   - Patient does not respond to oral antibiotics.
   - Patient is unable to follow or tolerate oral medications.
3. Tubo-ovarian abscess
   a. Occurs in 15% to 34% of cases of PID.
   b. May spread to other structures, such as the bladder.
   c. Diagnosis made by bimanual examination, ultrasound, or laparoscopy.
   d. Surgical management is indicated.

4. Endometritis: Pregnancy-related inflammation of endometrium
   a. Occurs after 1% to 3% of normal spontaneous vaginal deliveries (NSVDs) 1% to 3% and after 13% to 90% of cesareans
   b. Unlike PID, endometritis is not associated with infertility or chronic pelvic pain (CPP)
   c. Presentation
      (1) Fever, usually within 36 hours of delivery (100.4°F) but within 10 days of delivery, 101.6°F within first 24 postpartum hours
      (2) Uterine tenderness
      (3) Lower abdominal pain
      (4) Foul-smelling lochia
      (5) Abnormal vaginal bleeding and/or discharge
      (6) Malaise

5. Dysmenorrhea
   a. Recurrent, crampy, subrapubic pain during first few days of menses
   b. Typically occurs for the first time within 2 years of menarche
   c. More commonly a cause of CPP than APP
   d. Caused by overproduction of or heightened response to endometrial prostaglandins

TABLE 14.1 Outpatient PID Treatment

<table>
<thead>
<tr>
<th>MEDICATIONS</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ceftriaxone 250 mg IM single dose</td>
<td>Patient should return to clinic within 3 days to monitor care.</td>
</tr>
<tr>
<td>PLUS</td>
<td></td>
</tr>
<tr>
<td>Doxycycline 100 mg PO BID for 14 days</td>
<td>Patient should return again after treatment for evaluation</td>
</tr>
<tr>
<td>WITH or WITHOUT metronidazole 500 mg BID for 14 days</td>
<td></td>
</tr>
</tbody>
</table>

BID, twice a day; IM, intramuscular; PID, pelvic inflammatory disease; PO, per os.
Dysmenorrhea after years of pain-free menses is suggestive of endometriosis.

**Major causes of secondary dysmenorrhea**
- Endometriosis
- Adenomyosis
- PID
- Adhesions
- Uterine fibroids
- Cervical stenosis (stenosis without obstruction is a very rare cause)
- Inflammatory bowel disease
- Irritable bowel syndrome (IBS)
- Psychogenic disorders
- Uterine polyps

**Treatment (Box 14.2)**

6. Uterine fibroids
   - Most commonly present with pain after 35 years of age
   - Present in approximately 20% to 25% of women of reproductive age

   **(1)** Typically presents as feeling of chronic pressure. May be acute pain with fibroid degeneration or torsion of pedunculated fibroid.

   **(2)** On examination, uterus may feel firm, nontender, irregularly enlarged, textured.

   **(3)** Ultrasound is diagnostic.

c. Medication treatment (Table 14.2)

7. Ovarian cysts
   - Physiologic cysts

   **(1)** Should not cause pain unless there is rupture, torsion, or hemorrhage. Most physiologic cysts will resolve spontaneously in 1 to 2 months.
<table>
<thead>
<tr>
<th>TABLE 14.2 Initial Medication Treatment for Fibroids and Endometriosis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NSAIDs</strong></td>
</tr>
<tr>
<td>Naproxen base</td>
</tr>
<tr>
<td>Indomethacin</td>
</tr>
<tr>
<td>Meloxicam</td>
</tr>
<tr>
<td><strong>Combined oral contraceptive</strong></td>
</tr>
<tr>
<td><strong>Progestin therapy</strong></td>
</tr>
<tr>
<td>Norethindrone acetate</td>
</tr>
<tr>
<td>Etonogestrel implant</td>
</tr>
<tr>
<td>Levogestrel intrauterine device</td>
</tr>
</tbody>
</table>

**SPECIALTY MEDICAL INTERVENTIONS**

<table>
<thead>
<tr>
<th>Progesterone receptor modulators (note: this treatment applies to fibroids but not to endometriosis)</th>
<th>Ullipristal acetate</th>
<th>5 mg or 10 mg for 13 weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>GnRH agonists (use of these medications typically includes add-back therapy with norethindrone 5 mg PO daily to minimize hypoestrogenic effects)</td>
<td>Leuprolide acetate</td>
<td>3.75 mg IM monthly OR 11.25 mg IM every 3 months</td>
</tr>
<tr>
<td></td>
<td>Nafarelin acetate</td>
<td>Intranasal 200 mcg BID</td>
</tr>
<tr>
<td>GnRH antagonists</td>
<td>Elagolix</td>
<td>150 mg PO QD OR 200 mg BID</td>
</tr>
<tr>
<td>Androgen therapy</td>
<td>Danazol</td>
<td>100–400 mg PO BID</td>
</tr>
<tr>
<td>Aromatase inhibitors</td>
<td>Anastrozole</td>
<td>1 mg PO QD</td>
</tr>
<tr>
<td></td>
<td>Letrozole</td>
<td>2.5 mg PO QD</td>
</tr>
</tbody>
</table>

BID, twice a day; DMPA, depot medroxyprogesterone acetate; GnRH, gonadotropin-releasing hormone; IM, intramuscular; NSAID, nonsteroidal anti-inflammatory drug; PO, per os; QD, every day; SQ, subcutaneous; TID, three times a day.

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b. Ovarian cysts, rupture
   (1) Release of fluid from a follicular cyst.
   (2) Fluid may irritate the peritoneum.
   (3) Pain onset may be sudden and severe, but resolves spontaneously within 24 to 48 hours.

c. Ovarian cysts, hemorrhage
   (1) Rupture of a corpus luteum cyst
   (2) Highly vascular, may lead to severe hemorrhage and pain similar to that of ectopic pregnancy
   (3) May be managed by watchful waiting, or surgery may be indicated

8. Adnexal torsion
   a. Presents as sudden unilateral, colicky, lower abdominal pain. Nausea and vomiting in two thirds of cases.
   b. Enlarged, tender adnexa occurs in 90% of patients.
   c. Adnexa twists along utero-ovarian ligament; may involve fallopian tube as well.
   d. Is typically proceeded by enlargement of ovary by cyst or neoplasm.
   e. Low-grade fever may be present.
   f. Hemorrhage may rarely lead to anemia, and necrosis resulting in infection may manifest as leukocytosis.
   g. Requires acute referral and management.

9. Gastrointestinal, acute
   a. Appendicitis
   b. Gastroenteritis
   c. Diverticulosis/diverticulitis
   d. See section IV.E (approximately 49% of CPP as well)
   e. Inflammatory bowel disease
   f. Bowel obstruction
   g. Mesenteric lymphadenitis
   h. Constipation
   i. See Section IVC

10. Urinary tract, acute
   a. See Chapter 35
   b. Interstitial cystitis (IC)
   c. Pyelonephritis
   d. Nephrolithiasis
      (1) Symptoms
         • Pain of differing degrees that comes and goes in waves
         • Pain with urination
         • Frequent urge to urinate
         • Pink, red, or brown urine
         • Nausea and vomiting
         • Foul smelling, cloudy urine
      (2) Medication treatment (Table 14.3)

C. Box 14.3 summarizes the differentials in the diagnosis of APP.
### TABLE 14.3 Medication Treatment of Nephrolithiasis

**Acute treatment**  
*Note: All patients should be instructed to strain urine for stones and bring them to the provider for analysis that will inform preventative treatments.*

<table>
<thead>
<tr>
<th>Analgesics</th>
<th>dosage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ibuprofen</td>
<td>400–600 mg every 4–6 hr</td>
</tr>
<tr>
<td>Naproxen base</td>
<td>500 mg initial dose; 250 mg every 6–8 hr</td>
</tr>
<tr>
<td>Indomethacin</td>
<td>25 mg TID</td>
</tr>
<tr>
<td>Meloxicam</td>
<td>7.5 mg QD</td>
</tr>
<tr>
<td>Ketorolac</td>
<td>20-mg initial dose; then 10 mg every 4–6 hr (maximum daily dose 40 mg/day)</td>
</tr>
</tbody>
</table>

**Stone passage (for stones <10 mm in diameter)**  
Tamsulosin  
8 mg/day

QD, every day; TID, three times a day.

---

**IV. CPP:** To be considered chronic, pelvic pain must last for 6 or more months. Fifteen percent to 20% of women aged 18 to 50 years have CPP for 1 or more years. Box 14.4 lists those historical factors that increase the risk for CPP.

**A. Endometriosis**

1. The number one leading cause of gynecologic pelvic pain
2. Occurs in 7% to 10% of women in the United States; four out of 1,000 hospitalized annually
3. The presence of endometrial mucosa implanted in sites other than uterine cavity
4. The tissue responds to normal hormonal cycling, causing bleeding, an inflammatory response, and so forth
5. Implants found on ovaries, fallopian tubes, inside and outside bowel, inside and outside urinary bladder, kidney, spleen, nasal mucosa, spinal canal, breast
6. The amount of ectopic tissue does not appear to have any correlation with severity of symptoms
7. Risk factors
   a. Delayed childbearing
   b. Long menses
   c. Short menstrual cycle
   d. Early menarche
   e. Family history (10-fold increased incidence)
   f. Structural defects
BOX 14.3  APP Differentials

**APP Differential by Quality**

**Abrupt and severe pain**
- Perforation (ectopic pregnancy)
- Strangulation (ovarian torsion)
- Hemorrhage (ovarian cysts)

**Crampy pain**
- Dysmenorrhea
- Miscarriage

**Colicky pain (comes in waves)**
- Ovarian torsion
- Nephrolithiasis

**Burning or aching pain**
- Inflammatory process
- PID
- Appendicitis

**APP Differential by Age: Menarche to 21 Years**

- Dysmenorrhea
- PID
- Ovarian cysts
  - Rupture
  - Hemorrhage
  - Torsion
- Pregnancy
  - Miscarriage
  - Ectopic pregnancy
- Appendicitis
- IBS

**APP Differential by Age: 21 to 35 Years**

- Ovarian cysts
- Hemorrhage
- Torsion
- Rupture
- Endometriosis
- Pregnancy
  - Miscarriage
  - Ectopic pregnancy
- PID
- IBS

**APP Differential by Age: 35 Years to Menopause**

- Uterine fibroids
- Endometriosis
- Ovarian tumor benign or malignant

(continued)
**BOX 14.3  APP Differentials (continued)**

Pregnancy  
  Miscarriage  
  Ectopic pregnancy  
Nephrolithiasis  
IBS  
Diverticulitis  
Hernias  
PID  

**APP Differential by Onset: Seconds to Minutes**  
Ovarian cysts  
  Rupture  
  Hemorrhage  
  Torsion  
Tubo-ovarian abscess  
Abdominal aortic aneurysm  
Ectopic pregnancy  
Aortic dissection  
Nephrolithiasis  
Appendicitis  

**APP Differential by Onset: Hours to Days**  
Diverticulitis  
Herpes zoster  
Gastroenteritis  
Mittelschmerz  
Primary dysmenorrhea  
Miscarriage  

**APP Differential by Onset: Days to Weeks**  
Neoplasms  
Cystitis  
Pyelonephritis  
Ectopic pregnancy  
PID  
Diverticulitis  
Miscarriage  
Abdominal aortic aneurysm  

**APP by Associated Symptom**  
With nausea, vomiting, anorexia  
  Peritoneal irritation  
  Hemoperitoneum  
  Ovarian cyst rupture or hemorrhage  
  Appendicitis  

(continued)
g. Iron deficiency
h. Because it is estrogen dependent, primarily seen before menopause
  i. Seen in 20% to 50% of infertile women
  j. Endometriosis found in 20% to 50% of asymptomatic women

8. Symptoms
   a. New-onset dysmenorrhea
   b. Dyspareunia
   c. Pain with urination and bowel movements

9. Endometriosis, examination
   a. Fixed, retroverted uterus
   b. Nodularity and/or tenderness in the cul-de-sac and uterosacral ligaments

<table>
<thead>
<tr>
<th>BOX 14.3  APP Differentials (continued)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PID</td>
</tr>
<tr>
<td>Tubo-ovarian abscess</td>
</tr>
<tr>
<td>With vaginal bleeding</td>
</tr>
<tr>
<td>Pregnancy-related disorders</td>
</tr>
<tr>
<td>PID</td>
</tr>
<tr>
<td>Neoplasm</td>
</tr>
<tr>
<td>Fibroids</td>
</tr>
<tr>
<td>Polyps</td>
</tr>
</tbody>
</table>

APP, acute pelvic pain; IBS, irritable bowel syndrome; PID, pelvic inflammatory disease.

<table>
<thead>
<tr>
<th>BOX 14.4  Historical Factors That Increase the Risk of CPP</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Physical or sexual abuse (40%-50% of women with CPP have a history of abuse)</td>
</tr>
<tr>
<td>● PID (18%-35% of women with PID will develop CPP)</td>
</tr>
<tr>
<td>● Endometriosis (seen laparoscopically in 33% of women with CPP)</td>
</tr>
<tr>
<td>● IC (38%-85% of women with CPP may have IC)</td>
</tr>
<tr>
<td>● IBS (symptoms seen in 50%-80% of CPP)</td>
</tr>
</tbody>
</table>

CPP, chronic pelvic pain; IBS, irritable bowel syndrome; IC, interstitial cystitis; PID, pelvic inflammatory disease.
c. Ovarian enlargement

(1) Surgery diagnostic

10. Medication treatment for endometriosis is the same as that for fibroids (Table 14.2)

B. Adenomyosis: Endometrial tissue within the myometrium

1. Most often asymptomatic
2. Average onset: 40 years of age
3. Increased parity may be a risk factor
4. May cause long heavy periods, dyspareunia, dyschezia, dysmenorrhea
   a. Uterus diffusely enlarged, soft, tender during menses; movement of uterus not restricted

C. Pelvic adhesions

1. Webs of intra-abdominal scar tissue
2. Most often have history of previous pelvic surgery or injury
3. Noncyclic pain may be increased with intercourse or activity
4. Chronic pain may be related to restriction of bowel mobility, distention, and even bowel obstruction

D. Pelvic congestion

1. Varicosities of pelvic veins
2. Signs and symptoms
   a. Bilateral abdominal and back pain, secondary dysmenorrhea, dyspareunia, chronic fatigue, IBS
   b. Uterus may be bulky, and ovaries enlarged with multiple cysts
   c. Tenderness of pelvic ligaments
   d. Labs/imaging: transuterine venography, pelvic ultrasound, MRI, laparoscopy

E. IBS

1. Accounts for 60% of referrals for pelvic pain
2. Thirty-five percent of people with IBS have CPP
3. Diagnosis (Box 14.5)
4. Treatment (Table 14.4)

**TABLE 14.4 Initial IBS Treatment**

- Reassurance and education
- Stress reduction
- Low FODMAP diet
- Exclusion of high gas-producing foods
- Avoidance of lactose and gluten for those who are intolerant
- Use bulk-forming agents such as psyllium or ispaghula
- Increased physical activity

*(continued)*
TABLE 14.4 Initial IBS Treatment (continued)

<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>MEDICATION</th>
<th>DOSING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constipation refractory to psyllium or ispaghula</td>
<td>PEG 3350</td>
<td>Miralax: 17 g in 4–8 oz of liquid daily for up to 7 days</td>
</tr>
<tr>
<td>Diarrhea</td>
<td>Loperamide</td>
<td>2 mg 45 min before meals</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>MEDICATION</th>
<th>DOSING</th>
</tr>
</thead>
</table>
| Abdominal pain               | Antispasmodics             | Dicyclomine 20 mg PO up to four times daily PRN OR
|                              |                            | Hyoscyamine 0.125–0.25 mg PO or SL three to four times daily PRN |
|                              | Tricyclic antidepressants  | Amitriptyline 10–25 mg PO HS OR
|                              | (use cautiously in patients with constipation) | Nortriptyline 10–25 mg PO HS OR
|                              |                            | Imipramine 10–25 mg PO HS OR
|                              |                            | Desipramine 12.5–25 mg PO HS                 |

FODMAP, fermentable oligosaccharides, disaccharides, monosaccharides, and polyols; HS, at bedtime; IBS, irritable bowel syndrome; IM, intramuscular; PEG, polyethylene glycol; PO, by mouth; PRN, as needed; SL, sublingual.

BOX 14.5 Diagnosis of IBS

Rome Criteria for IBS
- Recurrent abdominal pain or discomfort* at least 3 days/month in the last 3 months. Associated with two or more of the following:
  - Improvement with defecation
  - Onset associated with a change in frequency of stool
  - Onset associated with a change in form (appearance) of stool
  - Criteria must be fulfilled for the prior 3 months with symptom onset at least 6 months prior to diagnosis.

IC clinical management principles
- Treatments must be from most to least conservative; surgery is the last intervention.
- Initial treatment depends on severity of symptoms, patient preference, and clinical judgment.
- Multiple treatments may be offered concurrently.
- Ineffective treatments should be stopped.
- Pain management should be implemented throughout therapy while minimizing side effects.
- Diagnosis should be reconsidered if no improvement is noted.

*Discomfort refers to an uncomfortable sensation not described as pain.

IBS, irritable bowel syndrome; IC, interstitial cystitis.
G. Interstitial cystitis/painful bladder syndrome (IC/PBS)

1. Main GU (genital/urinary) cause of CPP
2. There are currently no biological markers for use in diagnosis; the diagnosis remains one of exclusion
3. Symptoms commonly start in a woman’s 30s and may not be diagnosed until her 40s
4. Associated with remissions and exacerbations; may spontaneously disappear in 9 months (50%)
5. Symptoms
   a. Pelvic pain, pressure, or discomfort related to the bladder, typically associated with a persistent urge to void or urinary frequency in the absence of infection or other pathology
      (1) Urinary frequency is usually more than 8 times the normal rate
      (2) Nocturia
   b. Present for more than 6 weeks
   c. Pain often increases with bladder filling; may diminish during voiding
   d. Worse before or during menstruation
   e. Flares with intercourse, either during or 1 to 2 days after
   f. Women with IC also may suffer from seasonal allergies
   g. Palpable bladder tenderness
6. Etiology
   a. Abnormal bladder epithelial permeability (“leaky bladder theory”)
   b. Neurogenic abnormalities
   c. Inflammatory process—mast cells released
   d. Autoimmune disorders
7. Rule out labs and procedures as indicated
   a. Urinalysis, culture—usually negative
   b. Urine cytology, particularly in the presence of hematuria and smoking to rule out bladder cancer
   c. Postvoid residual—capacity is usually less than 350 mL
      (1) Imaging
      (2) Simple cystometrogram (CMG; see Chapter 36) to rule out overactive bladder
      (3) Vaginal and cervical culture to rule out PID, herpes
      (4) Potassium sensitivity test
      (5) Cystoscopy to assess for Huhner’s ulcers (present 10% of the time) and rule out bladder cancer
8. Initial treatment (Table 14.5)
TABLE 14.5 Initial Treatment of IC

- Heat (hot water bottle, heating pad, etc.)
- Avoidance of trigger foods and beverages (common triggers include caffeine, citrus, spicy foods, tea, alcohol, artificial sweeteners, and chocolate)
- Pelvic physical therapy
- Fluid intake management

IC, interstitial cystitis.

Bibliography


I. Abnormal uterine bleeding (AUB)

A. Definition

1. Any uterine bleeding that occurs outside of the normal menstrual parameters for duration of bleeding, amount of flow, cycle length, and timing is considered AUB.
   a. Duration less than 2 days or more than 7 days
   b. Flow of more than 80 mL
   c. Cycle length of less than 21 days or more than 38 days
   d. Intermenstrual bleeding or postcoital spotting

2. Many different terms have been used historically to describe symptoms or diagnoses of AUB. Terms used to describe AUB are listed in Box 17.1.

3. Due to this lack of consistency in nomenclature used for AUB, a new classification system was adopted by the Fédération Internationale de Gynécologie et d’Obstétrique (FIGO) in November 2010.

4. The FIGO classification system was developed by an international workgroup and used an acronym to identify the possible causes for AUB: PALM–COEIN (Box 17.2).
   a. The FIGO classification system guides clinical evaluation and diagnosis for AUB (see section III).
   b. PALM etiologies are generally structural problems and the COEIN entities are nonstructural.
   c. The FIGO classification system recognizes that a woman may have one or more entities causing AUB and/or have entities that are symptomatic and do not contribute to the bleeding (e.g., leiomyomas, polyps, adenomyosis).
   d. The workgroup also recommended retiring the terms dysfunctional uterine bleeding, menorrhagia, metrorrhagia, and dysfunctional uterine bleeding.
B. Epidemiology

1. Approximately 1.4 million women report AUB annually.
   a. Prevalence is difficult to estimate accurately due to the variations in nomenclature used for AUB.
2. The incidence of abnormal bleeding increases during adolescence and perimenopause.
3. Approximately 10% to 30% of all women report heavy bleeding.
4. Approximately 11% of postmenopausal women have spontaneous bleeding.
5. AUB is more common among White women, younger women (18–30 years), and women who are obese.
6. Approximately 30% of outpatient office visits in gynecology are related to menstrual problems.
C. Health-related complications associated with AUB
   1. AUB is correlated with lower quality of physical and mental health.
   2. Persistent menstrual blood loss of more than 80 mL per cycle is associated with anemia.
   3. AUB accounts for approximately two thirds of all hysterectomies.
   4. AUB is associated with increased healthcare costs.

II. Clinical evaluation of the woman who presents with AUB
   A. History
      1. Establish the onset, duration, severity, and course of the changes in bleeding patterns.
         a. Is this an acute change? Need to stabilize the patient due to heavy bleeding?
         b. Is this a chronic problem—persistent pattern (timing, amount, regularity) for most of a 6-month time period?
      2. Clarify the women's bleeding pattern.
         a. Are her cycles longer, shorter, or irregular?
         b. Is her flow heavier or lighter?
         c. Is she passing clots? Size of clots?
         d. Where does the blood originate?
         e. Are there changes in the pattern of her bleeding (spotting, midcycle bleeding, postcoital bleeding, bleeding after exercise)?
         f. Is there a change in the volume of bleeding? Quantify the number of pads/tampons used (an increase of two or more pads/tampons per day helps to quantify an increase in blood loss).
      3. Has she experienced similar changes in the past?
      4. Has she had previous treatment for this or a similar problem?
      5. Has she tried any alternative or complementary medicine therapies or other methods for self-care?
      6. Does she have symptoms of ovulation?
      7. Identify whether she is experiencing any associated symptoms with a review of systems (ROSs).
         a. Constitutional—fatigue, malaise, myalgia, chills, fever, weight loss, anorexia
         b. Head, eyes, ears, nose, and throat (HEENT)—dizziness, especially with change in position; gum bleeding
         c. Respiratory—shortness of breath, especially with exertion
         d. Cardiac—tachycardia, palpitations
         e. Gastrointestinal—abdominal pain, cramping, pelvic pain, bloating, elimination changes (constipation, diarrhea, bleeding), flatulence
         f. Genitourinary—urinary urgency, frequency, dysuria, hematuria, odor, color changes, flank pain; genital pruritis, lesions, burning, pain, discharge, odor, dyspareunia
         g. Neurological—dizziness, light-headedness, syncope
         h. Skin—rash, bruising
         i. Extremities—arthralgias, joint stiffness, swelling
8. Complete a full gynecologic history.
   a. Pregnancy history summary, including gravida, parous
      (1) How many pregnancies and live births has she had?
      (2) Any problems with bleeding after delivery?
      (3) Has she had any abortions? If yes, were they spontaneous, medical, or surgical?
   b. Menstrual history
      (1) What was her last menstrual period like—normal, late, lighter than normal?
      (2) Age of menarche—what is her usual cycle length, days of flow, flow pattern?
      (3) Does she have any dysmenorrhea? Is it of new onset or worsening?
      (4) If she has a male partner, is she using any form of contraceptive?
      (5) Any history of vaginitis? If yes, how was it treated?
   c. Sexual history
      (1) Partner history—How many currently and over lifetime? Does she have sex with men, women, or both?
      (2) When was her most recent sexual activity?
      (3) What is the frequency and type of sexual activity she engages in? Are there any risky behaviors or activities that correlate with her bleeding?
   d. Sexually transmitted infection (STI) history
      (1) Record any STIs—type, date, treatment
      (2) Date last tested, what tests done, and results
   e. Gynecologic surgery, procedures, problems
   f. Personal hygiene
      (1) Is she douching, using a new type of pads or tampons, or any new products?

9. Social history
   a. Does she have any history of sexual, physical, or verbal abuse?
   b. What is her lifestyle—diet (any history of eating disorders?), exercise (excessive exercise? female athlete triad?), sleep, stressors (excessive stress?), occupation, and recreation, alcohol/drugs, tobacco?
   c. Increased work absence?

10. Medical history
    a. Identify current or past medical conditions—how managed?
    b. Any personal history of bleeding disorders?
    c. Any history of bleeding associated with surgeries or dental work?
    d. Any history of anemia?

11. Medications and allergies
    a. Prescription: Borrowed or self-medicated?
    b. Does she have any allergies to medications, environment, or animals?
c. What over-the-counter medications does she use?
d. Any use of complementary and alternative medication therapies?

12. Family history
   a. Has a sister or mother had similar abnormal bleeding?
   b. Any family history of bleeding disorders?
   c. Any family history of polycystic ovary syndrome?
   d. Any family history of either endometrial or colon cancer?

13. Health screenings
   a. When was her last cervical cancer screening (and results), pelvic examination, mammogram (if of age), colonoscopy (if of age), lipids and fasting glucose or hemoglobin A1c?
   b. Are her immunizations up to date?
   c. Does she need special testing, such as tuberculosis (TB) screening or screening for lung cancer?

B. Physical examination
   1. Vital signs—include orthostatic blood pressures and pulses; include height and weight to calculate body mass index (BMI). Has she lost weight recently?
   2. General appearance and systemic evaluation
      a. Identify level of sexual maturity
      b. Evaluate body habitus
      c. Skin and hair—distribution (hirsute?) acanthosis nigricans? Pallor, petechiae, ecchymoses?
   3. HEENT
      a. Mucosal color
      b. Thyroid examination
   4. Breast examination
   5. Cardiac examination
      a. Evaluate for tachycardia, arrhythmias, murmurs.
   6. Abdominal examination
      a. Evaluate for striae, hepatosplenomegaly, tenderness, masses, ascites.
   7. Pelvic examination
      a. Identify source of bleeding—examine external genitalia, vagina, cervix.
      b. Assess for cervical motion tenderness.
      c. Collect cervical cytology; STI cultures; vaginal discharge for potassium hydroxide (KOH) test, pH test; wet mount (see Chapter 11).
      d. Perform a bimanual examination of her uterus and adnexae—assess for tenderness; uterus size, shape, firmness; adnexa palpability, firmness, fullness, or enlargement.
      e. Rectal exam
         (1) Are there any lesions, hemorrhoids?
         (2) Is there any bleeding at the rectum?
         (3) Test stool for occult blood.
III. Pathophysiology and differential diagnoses

A. The FIGO PALM–COEIN acronym (see Box 17.2) provides guidance to the underlying pathophysiology and potential differential diagnoses for AUB in reproductive-aged women

B. PALM—structural disorders

1. Infections—STIs, cervicitis, vaginitis, endometritis
2. Benign structural abnormalities—endocervical and endometrial polyps (AUB-P), ectropion, cysts, adenomyosis (AUB-A), leiomyomata (AUB-L)
3. Premalignant/malignant lesions (AUB-M)
4. Trauma/irritation—intercourse, sexual assault, presence of foreign body

C. COEIN—nonstructural disorders

1. Endocrine disorders (AUB-O)—hyper-/hypothyroidism, hyperprolactinemia, polycystic ovary syndrome, adrenal hyperplasia/Cushing disease
2. Endometrial (AUB-E)
3. Hematologic disorders (AUB-C)—coagulopathy, leukemia
4. Renal or liver disorders
5. Mucosal diseases—Crohn’s, Bechet’s
6. Extreme stress or extreme exercise
7. Medications—oral contraceptive pills, hormone therapy, selective serotonin reuptake inhibitors, antipsychotics, anticoagulants, corticosteroids
8. Herbal supplements
9. Intrauterine devices
10. Eating disorders
11. Weight loss

D. AUB not specified—diagnosis of exclusion, no cause for bleeding identified (organic, structural)

1. Periodic uterine blood loss of more than 80 mL per cycle
2. Negatively affects woman’s quality of life

E. Different diagnoses are more common among different age groups. Bleeding in a postmenopausal woman is considered malignant until proven otherwise (Table 17.1).

IV. Diagnostic testing

A. Diagnostic testing is ordered based on the most likely differential diagnoses and the FIGO PALM–COEIN categorization.

B. PALM entities are generally structural problems that are identified with direct visualization, imaging (e.g., transvaginal ultrasound, saline infusion sonography), and/or histopathology.

C. COEIN entities are generally nonstructural problems that are not identified with imaging or direct visualization and other laboratory testing may be warranted.
D. Blood test

1. Consider testing for bleeding disorders if the patient has two or more of the following symptoms: bruising one to two times per month, frequent gum bleeding, epistaxis one to two times per month, or a family history of bleeding symptoms; or if she has a history of heavy bleeding since menarche or has had a postpartum hemorrhage, bleeding related to surgery, or bleeding associated with dental work.

2. Complete blood count (CBC) with platelet count is recommended for both women and adolescent females with heavy menstrual bleeding.

### TABLE 17.1 Differential Diagnoses for AUB Categorized by Age

<table>
<thead>
<tr>
<th>AGE GROUP</th>
<th>POTENTIAL DIAGNOSES</th>
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<tbody>
<tr>
<td>Neonate</td>
<td>Estrogen withdrawal</td>
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<tr>
<td>Premenarch</td>
<td>Trauma or foreign body</td>
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<tr>
<td></td>
<td>Infection/vulvovaginitis</td>
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<tr>
<td></td>
<td>Urologic factors</td>
</tr>
<tr>
<td></td>
<td>Precocious puberty (rare)</td>
</tr>
<tr>
<td></td>
<td>Neoplasm (rare)</td>
</tr>
<tr>
<td>Early postmenarch</td>
<td>Anovulation/polycystic ovarian syndrome</td>
</tr>
<tr>
<td></td>
<td>Coagulation disorder</td>
</tr>
<tr>
<td></td>
<td>Pregnancy</td>
</tr>
<tr>
<td></td>
<td>Stress/extreme exercise</td>
</tr>
<tr>
<td></td>
<td>Infection</td>
</tr>
<tr>
<td></td>
<td>Neoplasm (rare)</td>
</tr>
<tr>
<td></td>
<td>Trauma</td>
</tr>
<tr>
<td>Reproductive years</td>
<td>Anovulation</td>
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<tr>
<td></td>
<td>Pregnancy</td>
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<tr>
<td></td>
<td>Infection</td>
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<tr>
<td></td>
<td>Benign growths</td>
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<tr>
<td></td>
<td>Medication</td>
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<tr>
<td></td>
<td>Coagulation disorders</td>
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<tr>
<td></td>
<td>Endocrine disorders</td>
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<tr>
<td></td>
<td>Liver disease</td>
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<tr>
<td></td>
<td>Malignancy</td>
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<tr>
<td></td>
<td>Trauma</td>
</tr>
<tr>
<td></td>
<td>Stress/extreme exercise</td>
</tr>
<tr>
<td>Perimenopause</td>
<td>Anovulation</td>
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<tr>
<td></td>
<td>Medications</td>
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<tr>
<td></td>
<td>Malignancy</td>
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<tr>
<td></td>
<td>Benign growths</td>
</tr>
<tr>
<td>Postmenopause</td>
<td>Malignancy</td>
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<tr>
<td></td>
<td>Medications</td>
</tr>
<tr>
<td></td>
<td>Atrophy</td>
</tr>
<tr>
<td></td>
<td>Benign growths</td>
</tr>
</tbody>
</table>

AUB, abnormal uterine bleeding.
bleeding. Adolescents with abnormalities of platelet function or count may have heavy menstruation.

3. Test thyroid-stimulating hormone (TSH; serum) if signs or symptoms of thyroid disorders.

E. Transvaginal ultrasound is used to identify structural abnormalities and the thickness of the endometrial stripe.
   1. An endometrial stripe less than or equal to 4 mm correlates with very low risk for endometrial cancer (one in 917) and thus endometrial biopsy is not needed.
   2. In adolescents, a transabdominal ultrasound may be more appropriate than transvaginal ultrasound.
   3. Sonohysteroscopy may be indicated if inconclusive ultrasound findings or ultrasound identified a focal lesion.

F. Endometrial biopsy is needed for all postmenopausal women with bleeding and for women older than 40 years and for women younger than 45 years with endometrial cancer risk factors.
   1. Endometrial cancer risk increases with age.
      a. Incidence at age 13 to 18 years is approximately 0.1 out of 100,000 women.
      b. Incidence at age 19 to 34 years is approximately 2.3 out of 100,000 women.
      c. Incidence at age 35 to 39 years is approximately 6.1 out of 100,000 women.
      d. Incidence at age 40 to 49 years is approximately 36.0 out of 100,000 women.

G. Diagnostic studies to consider for women with AUB (Table 17.2).

V. Clinical management of AUB

A. Management is tailored to the cause of the bleeding if one can be identified.

B. The goal of therapy (after pregnancy and malignancy have been excluded) is to restore normal menstrual cycles and minimize blood loss and disruption to the woman’s life.

C. Management options for heavy menstrual bleeding
   1. Medications
      a. Combined oral contraceptive pills
      b. Postmenopausal hormone therapy
      c. Progestin-only contraceptive pills
      d. Depot medroxyprogesterone acetate (DMPA)
      e. Levonorgestrel intrauterine device
      f. Nonsteroidal anti-inflammatory drugs (NSAIDs)
      g. Tranexamic acid
   2. Endometrial ablation. The benefits and risks of various techniques should be considered and discussed with the patient.
   3. Myomectomy
   4. Uterine artery embolization
   5. Hysterectomy (last resort)
TABLE 17.2 Diagnostic Studies to Consider for Women With AUB

<table>
<thead>
<tr>
<th>AGE (YEARS)</th>
<th>DIAGNOSTIC TEST</th>
</tr>
</thead>
</table>
| 13–18       | • hCG to rule out pregnancy  
• Cultures if sexually active  
• Coagulation studies: INR or PT and (PTT, fibrinogen, von Willebrand factor, ristocetin cofactor  
• CBC with platelet count to identify coagulation defects, leukemia, anemia |
| 19–50       | • hCG, cervical cytology, cultures  
• TSH—to identify hypo-/hyperthyroidism, especially if untested in 5 years  
• FSH (controversial), maybe with estradiol, progesterone, LH, FSH:LH ratio  
• CBC with platelet count and serum iron, blood drawn early in cycle (day 3)  
• Coagulation studies if screening questions positive  
• Urine analysis to identify urinary tract infection, renal calculi, bladder cancer  
• Stool guiac test to identify colon polyps, diverticula, gastrointestinal cancers, ulcer, hemorrhoids, fissures  
• Ultrasound to identify leiomyomata, structural abnormalities  
• Endometrial biopsy if 40 years or older and in younger women if any concern for endometrial cancer  
• Consider fasting serum prolactin test to identify pituitary adenoma if bleeding is infrequent or minimal.  
• Consider head magnetic resonance imaging to identify pituitary adenoma.  
• Consider liver function tests and renal function studies to identify systemic illness. |

AUB, abnormal uterine bleeding; CBC, complete blood count; FSH, follicle-stimulating hormone; hCG, human chorionic gonadotropin; INR, international normalized ratio; LH, luteinizing hormone; PT, prothrombin time; TSH, thyroid-stimulating hormone.


D. Management options for anovulatory bleeding

1. Medications
   a. Estrogen or progestin to stop bleeding
   b. Combined oral contraceptive pills
   c. Metformin if the woman has insulin resistance

E. Management options for structural causes of bleeding (polyps, leiomyomata)

1. Medications
   a. Combined oral contraceptive pills
   b. Levonorgestrel intrauterine device

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2. Surgical excision of polyp, leiomyomata
3. Uterine artery embolization (for leiomyomata)
4. High-intensity focus ultrasound (for leiomyomata)
5. Hysterectomy (last resort)

Bibliography


