1 Applying Pharmacotherapy Principles and Practice: How to Use This Study Guide

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As health care becomes more and more complex in the 21st century, the health professional student is increasingly challenged to learn a rapidly expanding amount of information as well as necessary skills to apply that knowledge in a patient care setting. Students of pharmacotherapy quickly learn that the field is rapidly changing as our knowledge of human disease evolves and new drugs are developed to improve patient outcomes. Students also learn that while drug therapy can have tremendous beneficial effects on patient outcomes, such therapy also has the potential to cause harm. The "art" of pharmacotherapy is in applying knowledge and making therapeutic decisions that are most likely to have maximum positive benefit *for a specific patient*. As a companion book to *Pharmacotherapy Principles and Practice*, 2nd ed. (*PPP*), this Study Guide is designed to assist the student in learning to apply didactic knowledge to specific patient situations. Such application requires skills that cannot be learned in lectures or in other passive learning situations, but must be learned by practice and repetition. The more students practice applying their knowledge, using their patient assessment skills, and making therapeutic decisions in their preclinical courses, the more prepared they will be to apply these skills to real patients in their clinical rotations.

This Study Guide is more than a book of patient cases, but it uses patient cases to help students learn to apply pharmacotherapeutic knowledge and skills. Case-based learning is not a new concept in health sciences curricula. As a form of active learning, case-based learning allows the student to practice the skills necessary to provide patient care. The focus of the cases in this Study Guide is, of course, pharmacotherapeutics. A unique feature of this study guide is the expectation that the student will develop a pharmacotherapy care plan as the "output" for each case. What follows is a general discussion of the patient care process and then specific information regarding the use of the Study Guide and development of the pharmacotherapy care plan.

PHARMACEUTICAL CARE AND THE PATIENT CARE PROCESS

Most pharmacy students are taught about pharmaceutical care early in their pharmacy curriculum. Pharmaceutical care, first described in the late 1980s and early 1990s,[1] can be summarized as "… patient-centered practice in which the practitioner assumes responsibility for a patient's drug-related needs and is held accountable for this commitment."[2] Although the definition of pharmaceutical care does not explicitly state that pharmacists are to perform these tasks, many feel that pharmaceutical care is the central mission of the pharmacy profession.

Although it may seem obvious that health professionals practice in a patient-centered way, all too often, practitioners become distracted by technical or administrative tasks. Pharmacy students, upon graduation, commit to patient-centered practice in the Oath of a Pharmacist:[3]

> I promise to devote myself to a lifetime of service to others through the profession of pharmacy. In fulfilling this vow:
>
> - I will consider the welfare of humanity and relief of suffering my primary concerns.
> - I will apply my knowledge, experience, and skills to the best of my ability to assure optimal outcomes for my patients.
> - I will respect and protect all personal and health information entrusted to me.

- I will accept the lifelong obligation to improve my professional knowledge and competence.
- I will hold myself and my colleagues to the highest principles of our profession's moral, ethical and legal conduct.
- I will embrace and advocate changes that improve patient care.
- I will utilize my knowledge, skills, experiences, and values to prepare the next generation of pharmacists. I take these vows voluntarily with the full realization of the responsibility with which I am entrusted by the public.

A central tenet underlying pharmaceutical care and our desire to improve drug therapy outcomes is the recognition that patients have drug therapy needs. Although sometimes these needs are obvious ("What can I take for my headache?"), in many cases the patient's drug therapy needs are unrecognized. For the practitioner committed to responsibility for a patient's drug-related needs, identifying such needs in an accurate and timely way is paramount. During any pharmaceutical care encounter, the patient must be assessed to determine whether the following drug therapy needs are being met:[2]

1. The medication is appropriate
2. The medication is effective
3. The medication is safe
4. The patient is adherent

The challenge for the beginning pharmacotherapeutic practitioner is in application. How does a student learn to take the scientific and factual information learned in the classroom and in readings and then apply it to patients so that drug therapy outcomes are maximized? The Study Guide is designed for this purpose, to teach the student the patient care process: how to organize patient information, assess patients in a systematic way, and develop a pharmacotherapy care plan.[4]

All clinicians need a structured rational thought process for making clinical decisions. What sets each profession and professional apart is the application of a unique knowledge base and set of clinical skills to identify and solve problems and to prevent problems from occurring. In the context of drug therapy, Cipolle et al. have termed this structured process the "Pharmacotherapy Workup."[2]

There are three steps that comprise the patient care process and constitute the Pharmacotherapy Workup (see Fig. 1-1): patient assessment, development of the pharmacotherapy care plan, and evaluation of the impact or results of the care plan. As Figure 1-1 indicates, each stage of the process is connected to the other stages, and the process is ongoing as the patient's situation changes.

Assessment

The purpose of assessment is to gather patient-specific information and then determine if the patient's drug therapy needs are being met.[5] To develop the best possible pharmacotherapy plan for the patient, the information gathered must be as accurate and complete as possible. Inaccurate or incomplete information may result in bad therapeutic decisions. There are a variety of sources from which such information is gathered. Although the specific sources may differ on the basis of the patient's situation, the clinician must strive to obtain information from all available sources. The patient is a crucial source of information, as are family members, caregivers, and other health professionals. In a health-system setting (hospitals, ambulatory care clinics, etc.), the clinician also will have access to subjective and objective information recorded in the patient's medical record and other institutional databases. For the pharmacotherapy workup, particular attention must be given to obtaining a complete and accurate medication history. Remember that since the patient care process is continuous, the gathering of patient-specific information also must be ongoing. Such information must be documented in an organized and easily

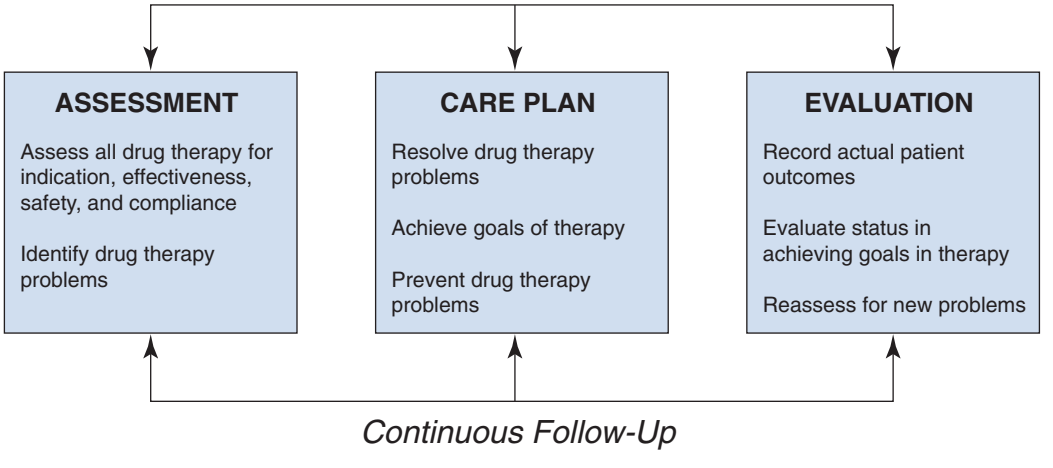

FIGURE 1-1. The Patient Care Process. (Reproduced with permission from Cipolle RJ, Strand LM, Morley PC. Pharmaceutical Care Practice. The Clinician's Guide, 2nd ed. New York, McGraw-Hill, 2004, p. 246.)

retrievable way that maintains patient confidentiality. Since there may be a large volume of patient-specific information generated, particularly in a hospitalized patient, the use of a standardized patient data form facilitates the organization and retrievability of patient-specific information. Despite the clinician's best effort, in most cases there will be information that is inaccurate and/or incomplete. Never assume that you have all the information you need or that the information you have is correct. The clinician must be mindful of this and seek to "fill in the blanks" by asking appropriate follow-up questions or seeking additional information from other sources.

After all available information is collected, the next step is to develop a problem list.[6] The concept of problem list development is well established in the context of the problem-oriented medical record and the use of the SOAP (Subjective, Objective, Assessment, Plan) method of charting progress notes. The development of an accurate and complete problem list based on the patient's drug therapy needs is crucial in that the development of the pharmacotherapy care plan is derived from the patient's problem list. If a problem is not listed or is not accurate, then the plan will be incomplete or suboptimal. The problem list must be prioritized to ensure that the most important problems are addressed in a timely fashion. For the student learning pharmacotherapy, developing an accurate and complete list of problems is challenging since many pieces of subjective and objective information (findings) have to be interpreted before something can be labeled as a problem. In many cases, problems are medical diagnoses (hypertension, type 2 diabetes, etc.), and in some cases the problem may be a symptom (headache, nausea, pain, etc.). Keep in mind that the definition of a problem may change as more information is gathered. For example, a patient may present with fatigue and, in the absence of other information, that is how the patient's problem is defined at that specific time. However, if the patient is referred to a physician and is found to have hypothyroidism, then the patient's problem list is changed to hypothyroidism, with fatigue as a symptom of the patient's hypothyroidism. A common trap for the beginning student is listing every finding as a problem. With thought and, ultimately, experience, the student will begin to see that the patient's signs and symptoms may be "lumped" into broader problems. If the above-mentioned patient also has cold intolerance, cognitive impairment, weight gain, elevated TSH, and slightly elevated LDL cholesterol, the patient's problem is still hypothyroidism, since each of those findings is a common sign/symptom of hypothyroidism. Although the pharmacotherapy problem list may be very similar to the problem list generated by other clinicians or the problem list present in the patient's medical record, remember that the pharmacist, having a unique body of knowledge, should have a different way of looking at the patient, and the problem list may not be entirely the same. The pharmacotherapy workup must be focused on drug therapy issues, particularly on the presence or risk of drug therapy problems (DTPs). During the entire process, always ask yourself:

- Could the patient's problem(s) be caused by drug therapy?
- Could the patient's problem(s) be managed by a change in drug therapy?

Drug Therapy Problems

The primary focus of the pharmacotherapy workup is the identification and management (treatment and prevention) of DTPs. A DTP is defined as any undesirable event or risk experienced by the patient that involves or is suspected to involve drug therapy and that actually or potentially interferes with a desired patient outcome.[7] Strand et al.'s original list of DTP categories has been expanded to 14 categories:

- Correlation between drug therapy and medical problems
- Need for additional drug therapy
- Unnecessary drug therapy
- Appropriate drug selection
- Wrong drug
- Drug regimen
- Dose too low
- Dose too high
- Therapeutic duplication
- Drug allergy/adverse drug event
- Interactions
- Failure to receive therapy
- Financial impact
- Patient knowledge of drug therapy

Since there are so many categories and specific types of DTPs, and since patients often receive multiple medications, it is important to use an organized, systematic approach to identify actual and potential DTPs. Once a DTP is identified and categorized, it is then necessary to identify the cause of the problem, thereby leading to potential solutions. When multiple DTPs are identified, they need to be prioritized to determine which problems should be addressed first. The patient's concerns must be considered in determining the problems that have the highest priority. Remember that the process of DTP identification is connected to the basic tenets of assessing the patient's drug therapy needs—appropriateness, effectiveness and safety of medications, and the patient's adherence.

Pharmacotherapy Care Plan

The pharmacotherapy care plan[8,9] is the roadmap to achieving improved pharmacotherapy outcomes. It is the action plan developed on the basis of the assessment components described above. Care plans have been an integral component of nursing care, and other professionals or certain health care settings may utilize components of a care plan. However, there is no standard or widely accepted method of care plan development in Pharmacy. Guideline 12.1 of the accreditation standards for pharmacy education in the United States[10] states that "… the college or school must ensure that graduates are competent to provide patient-centered care, through the ability to design, implement, monitor, evaluate and adjust pharmacy care plans that are patient-specific… ."

Ideally, the patient's care plan should be constructed with the patient's involvement and, in a multidisciplinary fashion,

developed and altered in a cooperative way by all who are involved with the patient's care. Further, pharmacotherapy care planning should be a component of the patient's overall care plan. Care plans developed in isolation or not shared with the patient or other professionals are less likely to have the desired effect on patient outcomes. A pharmacotherapy care plan must be generated as part of the systematic patient care process and should be a dynamic document that reflects changes in the patient's conditions and drug therapy needs. The care plan is developed in a problem-oriented fashion. Each item in the patient's problem list must be addressed in the care plan, and the care plan should be prioritized in the same way as the problem list.

The pharmacotherapy care plan has several key components for each problem:

- Current drug regimen
- Drug therapy problems
- Therapy goals, desired endpoints
- Therapeutic recommendations
- Rationale
- Therapeutic alternatives
- Monitoring
- Patient education

In patients who have multiple problems, there likely will be some redundancy in the pharmacotherapy care plan in that some problems may be related, and some medications may be used for multiple indications. As the care plan is developed, it is important for the student to see and understand the connections among multiple problems and the pharmacotherapy plan. For example, a patient with hypertension, type 2 diabetes, and chronic kidney disease may be treated with an ACE-I to lower blood pressure, slow progression of renal disease, and reduce risk of cardiovascular events. The student must understand not only that the one drug may be used for several reasons but that the drug could affect the patient's problems in a variety of ways, such as improving blood pressure control while causing an increase in serum potassium or an acute rise in serum creatinine. The risk and significance of these effects must be considered on the basis of the overall clinical picture. In some patients, unintended effects, at least to a defined point, may be acceptable.

Defining therapy goals and endpoints are crucial. You cannot determine whether the patient's desired outcomes are being achieved if you do not know what those desired outcomes are. Think of goals as broad or general outcomes, whereas endpoints are more specific parameters often used as indicators or surrogate markers to indicate that our goals are being achieved. The goals of therapy must be achievable and realistic for the patient. Drug therapy may aim to (1) cure a disease; (2) reduce or eliminate signs and/or symptoms; (3) slow or halt the progression of a disease; (4) prevent a disease; (5) normalize laboratory values; and/or (6) assist in the diagnostic process. Goals and endpoints must be observable, measurable, and describable using specific parameters. Going back to our diabetic, hypertensive patient mentioned above, the goals of treating those disorders are to prevent cardiovascular disease (stroke, coronary artery disease, peripheral vascular disease), kidney disease, other microvascular complications of diabetes (retinopathy, neuropathy), etc. We also want the patient to feel better and have improved quality of life (QOL). An important goal of any pharmacotherapy care plan is the avoidance of adverse events. We do not want the patient to have side effects or a worsened QOL due to our recommended drug therapy. What would be endpoints for our patient? In our hypertensive diabetic patient, some endpoints would include BP <130/80 mm Hg, glycated hemoglobin <6.5–7% (0.065–0.07), LDL cholesterol <130 mg/dL (<3.36 mmol/L), and weight loss of 10 kg. Goals and endpoints should be associated with a time frame, describing, if possible and realistically, when the goal or endpoint is to be achieved (BP <130/80 mm Hg in 1 month; 22 lb (10 kg) weight loss in 6 months, etc.). The goals and endpoints part of the plan will be directly tied to the monitoring part of the plan, since monitoring is the way we will know if our goals and endpoints have been achieved.

Therapeutic recommendations are the interventions made to meet the patient's drug therapy needs. The recommendations must be specific and individualized to the patient's condition and drug therapy problems. For most problems, there are several ways to intervene to achieve the desired goals and endpoints. The clinician must consider all the possibilities and recommend a therapeutic course that is best for that patient, based on scientific evidence, patient history, cultural and health beliefs, psychosocial issues, health literacy, and cost. Remember that therapeutic recommendations for one problem may have an impact on other problems, so do not lose sight of the big picture.

Although it is important for the clinician to make appropriate therapeutic recommendations, providing a rationale for those recommendations is necessary. The rationale is *why* you are recommending what you are recommending. From an educational standpoint, providing a well-reasoned rationale shows that the student is thinking and understanding, rather than repeating what is in a book, guideline, or said by others. In the clinical practice setting, it is common for pharmacists to be asked to provide their rationale to physicians as part of a discussion about a patient's therapy. Pharmacists need to be adept at providing such a rationale in a succinct way. The rationale should be stated in a way that clearly describes why the recommendation was made for this patient, including why it was chosen over other alternatives, and any evidence available to support the recommendation should be provided.

In determining your therapeutic recommendations, several reasonable alternative regimens typically are available. Even after you have recommended your primary plan, the best alternatives must be kept in mind. The patient or prescriber may not agree with your primary recommendation and request an alternative. Your primary plan may not be effective, or an intolerable adverse event may occur, thereby requiring implementation of an alternative plan. As

with your therapeutic recommendations, be specific with your alternative recommendations and base your alternative choices on relative effectiveness and safety based on the best evidence available.

Monitoring and follow-up are important components of the pharmacotherapy care plan and the overall patient care process.[11] Monitoring is how we determine whether our goals and endpoints (achieving positive goals and avoiding negative endpoints) are being reached. An effective monitoring plan must be realistic for the patient setting and include specific monitoring parameters (clinical and laboratory/diagnostic test), frequency of monitoring, and when the patient needs to be seen again for follow-up. Students often struggle with developing a monitoring plan since references often provide only general recommendations for what to monitor and how often. In most patients, the intensity and frequency of monitoring are dynamic. In a critically ill hospitalized patient, some pharmacotherapy monitoring parameters may be assessed multiple times daily. As the patient becomes more stable, leaves the intensive-care unit (ICU), and is, hopefully, discharged home, monitoring becomes less frequent. A patient initiated on warfarin in the hospital may have an INR measured daily. After discharge with a therapeutic INR, monitoring may be done weekly, and as the patient's INR and clinical status remain stable, the frequency is slowly reduced until the INR is measured on a monthly basis. If the INR or the clinical picture changes, the frequency of INR monitoring likely will be increased temporarily. Regardless of the setting, the frequency of monitoring, particularly for those parameters involving blood collection or other invasive tests, must be realistic and based on how often the information truly is needed, what the patient can or is willing to allow, availability of vascular access, and, in the outpatient setting, the ability of the patient to travel to a laboratory or the availability of home care services. In the home setting, some of the monitoring may be done by the patient, such as assessing presence and severity of signs and symptoms, basic physical assessment parameters (e.g., weight, presence of edema), and certain diagnostic or laboratory tests (e.g., blood pressure, blood glucose). The monitoring plan must be specific—what parameters, frequency of monitoring, who will monitor, and when and with whom the patient will follow-up. The results of monitoring naturally will influence the pharmacotherapy care plan, and in many cases, there should be an upfront determination of what action will be taken based on the results of the monitoring plan (e.g., "if the patient's INR is <2, the warfarin dose will be increased from 4 to 5 mg daily").

Patient education is the final piece of the pharmacotherapy care plan. Patient adherence to drug therapy can be improved with effective and ongoing patient education, and ideally, such education should be provided with verbal communication and written materials. Pharmacy students should utilize skills learned in their communications courses and information available in books[12,13] and begin applying those skills in case-based learning, small group discussions, and internship experience in preparation for their pharmacy practice experience rotations and, ultimately, pharmacy practice. The pharmacotherapy care plan must include a summary of what you will tell and provide the patient regarding their drug therapy.

Remember that our model for the patient care process involves continuous follow-up. As the pharmacotherapy care plan is implemented, the patient's response to therapy is monitored, and changes in therapy may be necessary. Changes in previous problems or the development of new signs and symptoms will require the assessment process and changes in the pharmacotherapy care plan. Although the patient care process and the application of your didactic knowledge to the patient care setting may seem daunting, by working through the cases in the Study Guide, your skills can only get better and better. Although this book can be used for self-study, ideally, some of the cases in this Study Guide will be used in a small group discussion setting under the guidance of a group facilitator, so you can see how other students think. Group settings also provide the opportunity to discuss and defend your therapeutic recommendations and practice your verbal communication skills. As you work through the patient cases, you will make mistakes and perhaps choose suboptimal therapy that even could cause harm. Beginners always make mistakes, and you should use the mistakes made by you and your fellow students as powerful learning opportunities. Here are some tips for success in patient care:

- CARE about the patient!
- Know your stuff—be prepared
- Realize that every patient is different
- Review and assess *all* available information
- Be organized and consistent in your approach
- Do not make snap judgments—is your assessment and approach supported by the evidence?
- NEVER make assumptions
- Be skeptical
- Think ahead, and think it through ("… then what?")

HOW THE CASES ARE ORGANIZED

Each patient case in the Study Guide has been prepared in a standard format, similar to how you will see cases presented in a clinical setting. The use of an organized case format will assist you in learning where to find information about the patient and help you get accustomed to the format for when you will be presenting patients yourself in case discussions or rotations. The patient cases in the Study Guide are meant to be realistic. Patients usually will have multiple, sometimes related, problems, though each case will focus on one primary topic or problem. Patients will have DTPs requiring identification and management. The components of each case in the Study Guide will include:

1. *Patient Identification*—name, age, etc.
2. *Chief Complaint*—why the patient is seeking help, in the patient's own words

3. *History of Present Illness* (HPI)—the patient's story about why they are seeking help
4. *Past Medical History* (PMH)—including all significant illnesses, surgical procedures, injuries
5. *Family History*—age and health of immediate family (parents, siblings, children); for deceased relatives, the age and cause of death are included; any hereditary diseases should be noted
6. *Social History*—may include where the patient is from or lives, ethnicity/race, marital status, number of children, educational background, occupation, diet
7. *Tobacco/Alcohol/Substance Use*
8. *Allergy/Intolerances/Adverse Drug Events* (ADEs)—a common area where information from the patient is missing or incomplete
9. *Medication History*—should include current (or medications prior to admission if hospitalized) and previous medications; the list should include what the patient *actually* is taking, not just what is prescribed, and must include OTC drugs and dietary supplements (including herbal and complementary/alternative products).
10. *Review of Systems* (ROS)—systematic, head-to-toe questions asked to elicit symptoms and potential problems not noted by the patient in the HPI. Postitive findings and pertinent negatives (significant absence of a symptom) are included.
11. *Physical Examination* (PE)—nature and completeness of the examination will depend on the patient's history and overall clinical picture. Rarely will a complete PE be done; rather, the examination will be targeted to the situation. Positive and pertinent negative findings will be included in the PE. If you are not familiar with the meaning or significance of some of the examination findings, make sure you look those up. Components of the PE may include:
    - General
    - Vital Signs (include pain as fifth vital sign)
    - Skin
    - HEENT
    - Neck and Lymph Nodes
    - Chest
    - Breasts (in women)
    - Cardiovascular
    - Abdomen
    - Neurology
    - Extremities
    - Genitourinary
    - Rectal
12. *Laboratory and Other Diagnostic Tests*—only data that are common and/or directly relevant to the case will be included. A list of normal laboratory values is included as Appendix B of this Study Guide. All laboratory results will be presented in conventional units typically used in the United States and in Systéme Internationale (SI) units for students using the book in other countries. If you are not familiar with the meaning or significance of some of the laboratory findings, make sure you look those up.
13. *Assessment*—the clinician's impression and/or diagnosis.
14. *Student Workup*—for each case, you will be asked if there is missing information and to evaluate and develop a Patient Database, Drug Therapy Problem Worksheet, and Pharmacotherapy Care Plan. When you are working with actual patients, you will find that the patient's history and information from other sources will be incomplete and/or inaccurate. Patient cases in the Study Guide will have missing information, and it is important that, as you evaluate each case, you recognize what needed information is missing so that you can make an accurate assesment of the patient. One way to remember to assess for missing information is to always create as one of your patient's problems "Inadequate Database," and then list the missing information elements under that problem in your Care Plan. A more detailed description of the Patient Database, Drug Therapy Problem Worksheet, and Pharmacotherapy Care Plan forms will follow.
15. *Targeted Questions*—each case will include a series of questions targeted toward helping you better understand the key elements of the case and the patient's primary problems. A unique feature of this Study Guide is that each question will be followed by a Hint, guiding you to the pages in *Pharmacotherapy Principles and Practice*, 2nd ed. (*PPP*) where you can find the information to answer the question.
16. *Follow-up*—some cases will provide a brief clinical follow-up that may include some outcomes of your initial Care Plan. The Follow-up section may include additional Targeted Questions, with Hints to further assist your studies.
17. *Global Perspective*—another unique feature of this Study Guide is the inclusion of a Global Perspective section that highlights an issue related to the case that is important to countries outside North America or involves different ethnic groups or races. Global Perspectives may highlight differences in disease incidence or manifestations, pharmacokinetics or pharmacodynamics, treatment standards, culturally based beliefs and/or treatments, and drug response.
18. *Case Summary*—a short summary of the key points addressed by the case
19. *References*—will be included in the patient case only if a key reference has been published that is not included in *PPP*. For most cases, the references included in the relevant *PPP* chapters are excellent sources for you to obtain additional information.

STUDENT CASE WORKUP

The desired student workup of each case in this Study Guide is the development of a Pharmacotherapy Care Plan. The principles of the pharmacotherapy workup, patient assessment, and development of a care plan were reviewed earlier in this chapter. Your workup of the Study Guide cases will apply these principles. To facilitate your accomplishing these tasks in a thoughtful, organized and systematic way, you are provided three forms—Patient Database, Drug Therapy Problem Worksheet (DTPW), and Pharmacotherapy Care Plan. The forms used in this Study Guide are adapted with permission from those originally developed by the American Society of Health-System Pharmacists (ASHP) in the early 1990s as part of their Clinical Skills program,[5,6,8,11] and these forms are currently used by particpants in the ASHP Clinical Skills Competition (www.ashp.org/Import/ABOUTUS/Awards/ClinicalSkillsCompetition.aspx).

Different clinicans and institutions use many different types of patient-monitoring forms. Think of the forms used in this Study Guide as a tool to help you learn to provide the best patient care. The forms are designed to help you organize information and to help you organize your thinking. Although you will find the use of such forms helpful, do not obsess about the forms or using them "right." Again, the forms are a tool to help you achieve what you *should* obsess about—making the patient's drug therapy the best it can be.

To help you understand how to best utilize these forms as you workup the Study Guide cases, we have prepared a practice case presented in the same format as other cases in the Study Guide and a completed student workup. Before you embark on your first Study Guide patient case, look over the practice case and the completed forms. We have added some tips in certain places in the practice case forms to help you better understand their application. Learning to effectively assess patients and develop a care plan involves skills that require practice and repetition. As you begin learning pharmacotherapeutics, applying your didactic knowledge to patient situations may seem difficult, and it is likely you will make mistakes. That's OK! The point of this Study Guide is to help you learn and to develop your skills. Through your coursework, reading, and use of this Study Guide, you will see your knowledge and skills increase and you will become a great practitioner who will improve patient drug therapy outcomes.

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PRACTICE CASE

Case Learning Objectives

- Recognize the signs, symptoms, and risk factors for hypovolemia, hypokalemia, and metabolic alkalosis
- Develop an appropriate treatment and monitoring plan for hypovolemia, hypokalemia, and metabolic alkalosis
- Recognize the impact of pregnancy on medication choice and disease management

PATIENT PRESENTATION

Chief Complaint

"I feel so tired and dizzy, and I can't stop throwing up."

History of Present Illness

Susan Jones is a 23-year-old woman brought to the Urgent Care Center c/o severe weakness and dizziness. She states it started 3 days ago when she began to have frequent vomiting. She thinks that "maybe I ate something bad." She also says that her bowel movements have been "a little looser than normal." She states that before she got sick 3 days ago, she felt fine.

Past Medical History

Bulimia with two psychiatric hospitalizations

Depression, s/p suicide attempt × 1 (slashed wrists)

Pelvic inflammatory disease

Family History

Mother died from drug overdose at age 34; she does not know her father.

Social History

Single community college student; no children; works part time in restaurant.

Tobacco/Alcohol/Substance abuse

(+) cigarettes ½ ppd; admits to occasional marijuana use, denies current other illicit or unprescribed drug or alcohol use; used IV heroin until 1 year ago.

Medications

Prozac 20 mg bid PO

Trazodone 50 mg q hs PO

K-DUR 40 mEq q AM PO

Methadone 120 mg q AM PO

Prilosec 20 mg q day PO

Lo-Estrin 1 q AM PO

Review of Systems

(+) Weakness, dizziness, fatigue, nausea, and diarrhea; denies headache, chest pain, or abdominal pain; (+) dysuria; (–) vaginal pain or discharge.

Physical Examination

▸ *General*

Very thin, chronically ill–appearing young woman who fainted when sitting up.

▸ *Vital signs*

BP 105/75 mm Hg lying, 70/0 mm Hg sitting; P 110 lying, 160 sitting; RR 12, T 37.1°C

Weight 47 kg (103.4 lb), height 5′4″ (163 cm)

▸ *Skin*

Dry, poor skin turgor; no rashes or lesions noted

▸ *HEENT*

PERRLA; mouth very dry; poor dentition

▸ *Neck and lymph nodes*

JVD 0 (neck veins flat); thyroid gland normal; no lymphadenopathy

▸ *Chest*

Clear to auscultation and percussion

▸ *Breasts*

Examination deferred

▸ *Cardiovascular*

Tachycardic; normal S_1, S_2; no murmurs, rubs, or gallops

▸ *Abdomen*

No tenderness or organomegaly; bowel sounds slightly hyperactive

▸ *Extremities*

Very thin; trace pedal edema; multiple "tracks" both arms

▸ *Genitourinary*

Normal vaginal discharge; uterus appears to contain approximately 12-week pregnancy

▸ *Rectal*

Mild hemorrhoids; Hemoccult (–)

Laboratory Tests

Fasting, obtained upon admission

	Conventional Units	*SI Units*
Na	126 mEq/L	126 mmol/L
K	2.1 mEq/L	2.1 mmol/L
Cl	87 mEq/L	87 mmol/L
CO_2	32 mEq/L	32 mmol/L
BUN	8 mg/dL	2.86 mmol/L
SCr	0.5 mg/dL	44.2 µmol/L
Glu	110 mg/dL	6.11 mmol/L
Ca	8.7 mg/dL	2.18 mmol/L
Mg	1.8 mEq/L	0.90 mmol/L
Phosphate	3.6 mg/dL	1.16 mmol/L
WBC	$7.4 \times 10^3/mm^3$	$7.4 \times 10^9/L$
Hgb	11.6 g/dL	116 g/L; 7.2 mmol/L
Hct	34.6%	0.346

Albumin	3.2 g/dL	32 g/L
PT	17 s	
INR	1.3	

Urine pregnancy test (+)

ABG: pH 7.56, pO_2 98 mm Hg (13.03 kPa), O_2 sat 99%, pCO_2 44 mm Hg (5.85 kPa), HCO_3 31 mEq/L (31 mmol/L)

Urine toxicology screen: (+) cocaine, THC, methamphetamine, nicotine, HCTZ

Electrocardiogram: flat T waves; (+) U wave

Assessment

Twenty-three-year-old pregnant woman with ECF volume depletion, vomiting and ? diarrhea, significant hypokalemia with ECG changes, hyponatremia, and metabolic alkalosis. Urine tox screen indicates active illicit drug use.

Student Workup

Missing Information?

Evaluate: Patient Database
Drug Therapy Problems
Care Plan (by Problem)

TARGETED QUESTIONS

1. What signs and symptoms of ECF volume depeletion, hypokalemia, and metabolic alkalosis does the patient have?
   Hint: See pp. 255, 480, 487–488, 502–503 in PPP
2. What are the causes of this patient's alkalosis?
   Hint: See pp. 502–503 in PPP
3. What are the risks of administering potassium intravenously?
   Hint: See p. 488 in PPP
4. What are the signs and symptoms of opioid withdrawal, and what drug interactions may occur with methadone?
   Hint: See pp. 615, 620 in PPP
5. What medications have proven teratogenic effects in humans?
   Hint: See p. 824 in PPP

FOLLOW-UP

Three months later, the patient calls you after being discharged from an inpatient substance abuse program. She says she feels great, is staying clean, and her baby is doing well ("Look how fat I am!"). Her obstetrician recently told her that she has low thyroid and wants her to take levothyroxine. She is aftraid that it will hurt her baby and she wants your advice. You look up her laboratory tests in the computer and note that her TSH is 10.1 mU/L (10.1 µU/L). What is your advice to her?

Hint: See p. 772 in PPP

GLOBAL PERSPECTIVE

Depression is a common mental disorder that presents with depressed mood, loss of interest or pleasure, feelings of guilt or low self-worth, disturbed sleep or appetite, low energy, and poor concentration. These problems can become chronic or recurrent and lead to substantial impairments in an individual's ability to take care of his or her everyday responsibilities. At its worst, depression can lead to suicide, with the loss of about 850,000 lives every year.

Depression in the year 2000 was the leading cause of disability worldwide as measured by years lived with disability (YLD) and the fourth-leading contributor to the global burden of disease based on disability-adjusted life-years (DALYs). By the year 2020, depression is projected to reach second place in the ranking of DALYs calculated for all ages, both sexes. Today, depression already is the second cause of DALYs worldwide in the age category 15 to 44 years for both sexes combined. According to the World Health Organization, fewer than 25% of depressed patients have access to care, and in some countries fewer than 10% have access to care. Barriers to effective care include the lack of resources, lack of trained providers, and the social stigma associated with mental disorders, including depression.

REFERENCE

World Health Organization. www.who.int/mental_health/management/depression/definition/en/index1.html. Accessed January 31, 2010.

CASE SUMMARY

- Young pregnant woman with history of depression, eating disorder, and substance abuse who presents with ECF volume depletion, hypokalemia, and metabolic alkalosis due to vomiting and diuretic use. Volume and potassium replacement must be initiated, and the underlying causes addressed to prevent recurrence.
- She is actively abusing drugs, placing her and the fetus at risk for multiple complications. Substance abuse treatment referral is warranted
- The patient needs a referral to an obstetrician for assessment and prenatal care.

For more information on the care plan and facilitator's guide please visit http://www.mhpharmacotherapy.com.

PATIENT DATABASE FORM

Patient Name: Susan Jones	**Patient ID:**	**Location:** Urgent Care
Physician:	**Pharmacy:**	
Age (or Date of Birth): 23 yo	**Race:** Caucasian	**Sex:** Female
Height: 5′4″ (163 cm)	**Weight:** 47 kg (103.4 lb)	
Date of Admission/Initial Visit: 6/1/2010	**Occupation:** Student, restaurant worker	

Real patient names are not used in this Study Guide.

Allergies/Intolerances/ADRs	
❑ No known drug allergies/ADRs	
☒ Not known/inadequate information	
Drug:	**Reaction:**

A common area where information is missing or incomplete. No known drug allergies/ADRs is **NOT** the same as Not known. No known means the patients has been asked and/or chart reviewed, while Not known means there is missing information.

HPI, PMH, FH, SH, etc…
Weakness, dizziness, vomiting,? diarrhea × 3 days
Hx eating disorder, depression (s/p suicide attempt), PID
Smokes ½ ppd, uses marijuana, Hx IVDU (+) dysuria on ROS
Appears dry—orthostatic, flat neck veins
Evidence of active IVDU
12 wk pregnant

A summary of the key subjective and objective findings from the case.

Prioritized Medical Problem List	**Medication Profile**
Hypovolemic hyponatremia, d/t vomiting,? diuretic use	
Hypokalemia with ECG changes	K-Dur 40 mEq q AM PO
Metabolic alkalosis due to #1 and #2	
Active substance use with urine (+) cocaine, methamphetamine; no evidence for endocarditis	Methadone 120 mg q day PO
Tobacco use	
12 wk pregnant by exam, (+) urine HCG	Lo-Estrin PO
Hx bulimia, appears to be malnourished	Fluoxetine 20 mg bid PO
? Diarrhea	
Hx depression, s/p suicide attempt × 1	
Dysuria, R/O UTI	
Inadequate database	? Indications for trazodone, omeprazole

List of medications placed next to problem list to facilitate matching medications with indications. Note that some medications may have multiple indications.

Get used to including Inadequate database or Missing Information on your problems list so you will remember to follow-up on all missing information.

Vital Signs, Laboratory Data, and Diagnostic Test Results			
Date	6/1/2010		
Weight (lb/kg)	103.4 (47)		
Temperature (°C)	37.1		
Blood pressure (mm Hg)	105/75 lying, 70/0 sitting		
Pulse	110 lying, 160 sitting		
Respiratory rate	12		
Na 135–145 mEq/L (135–145 mmol/L)	126 (126)		
K 3.3–4.9 mEq/L (3.3–4.9 mmol/L)	2.1 (2.1)		
Cl 97–110 mEq/L (97–110 mmol/L)	87 (87)		
CO_2/HCO_3 22–26 mEq/L (22–26 mmol/L)	32 (32)		
BUN 8–25 mg/dL (2.9–8.9 mmol/L)	8 (2.86)		
Creatinine (adult) Male 0.7–1.3 mg/dL; female 0.6–1.1 mg/dL (male 62–115 µmol/L; female 53–97 µmol/L)	0.5 (44.2)		
Creatinine clearance (adult) 85–135 mL/min (0.82–1.30 mL/s/m^2)	129.9 (1.25)		
Glucose (fasting) 65–109 mg/dL (3.6–6.0 mmol/L)	110 (6.11)		
Total Ca 8.6–10.3 mg/dL (2.15–2.58 mmol/L)	8.7 (2.18)		
Mg 1.3–2.2 mEq/L (0.65–1.10 mmol/L)	1.8 (0.9)		
PO_4 2.5–4.5 mg/dL (0.81–1.45 mmol/L)	3.6 (1.16)		
Hemoglobin Male 13.8–17.2 g/dL; female 12.1–15.1 g/dL (male 138–172 g/L; female 121–151 g/L)	11.6 (116)		
Hematocrit Male 40.7–50.3%; female 36.1–44.3% (male 0.407–0.503; female 0.361–0.443)	34.6 (0.346)		
MCV 80.0–97.6 µm^3 (80.0–97.6 fl)			
WBC 4–10 × 10^3/mm^3 (4–10 × 10^9/L)	7.4 (7.4)		
Differential			
Platelet 140–440 × 10^3/mm^3 (140–440 × 10^9/L)			
Albumin 3.5–5 g/dL (35–50 g/L)	3.2 (32)		
Total bilirubin 0.3–1.1 mg/dL (5.13–18.80 µmol/L)			
Direct bilirubin 0–0.3 mg/dL (0–5.1 µmol/L)			
AST 11–47 IU/L (0.18–0.78 µkat/L)			

Having data in tabular form allows following trends over time (date as column heading).

Vital Signs, Laboratory Data, and Diagnostic Test Results			
ALT 7–53 IU/L (0.12–0.88 μkat/L)			
Alk phos (adult) 38–126 IU/L (0.13–2.10 μkat/L)			
Urine HCG	Positive		
PH 7.35–7.45	7.56		
PO_2 70–95 mm Hg (9.3–12.6 kPa)	98 (13.03)		
O_2 Saturation (90–110%)	99		
PCO_2 35–45 mm Hg (4.7–6.0 kPa)	44 (5.85)		

Not every lab test is included on the blank forms, so you will need to add lab tests, normal values and normal values for tests not already on the form. Normal values may be found in Appendix B. Make sure you understand the significance of each lab test.

Notes
Urine tox screen (+) for cocaine, THC, methamphetamine, HCTZ
ECG: NSR, rate 110, flattened T waves, (+) U wave

This is a free text area to add items that do not fit elsewhere or for quick notes to yourself or other clinicians who may be following the patient.

This Worksheet will help you systematically assess the patient for the presence of and potential for all Drug Therapy Problems. After each problem, is identified, you will then need to assess the significance of each problem, and integrate those problems with your overall Care Plan. Some medications may be associated with multiple problems. Make sure you are as specific as possible in identifying the problem so that appropriate action then can be taken.

DRUG THERAPY PROBLEM WORKSHEET

Type of Problem	Possible Causes		
Correlation between drug therapy and medical problems	Drugs without obvious medical indications	Trazodone, omeprazole	
	Medications unidentified		
	Untreated medical conditions		
Need for additional drug therapy	New medical condition requiring new drug therapy	Pregnancy If dysuria d/t UTI, needs nonteratogenic antimicrobial	Needs prenatal care
	Chronic disorder requiring continued drug therapy		
	Condition best treated with combination drug therapy		
	May develop new medical condition without prophylactic or preventative therapy or premedication		
Unnecessary drug therapy	Medication with no valid indication	Lo-Estrin	Patient is pregnant
	Condition caused by accidental or intentional ingestion of toxic amount of drug or chemical	HCTZ contributed to fluid/electrolyte disorders	
	Medical problem(s) associated with use of or withdrawal from alcohol, drug, or tobacco		
	Condition is better treated with nondrug therapy		
	Taking multiple drugs when single agent as effective		
	Taking drug(s) to treat an avoidable adverse reaction from another medication		
Appropriate drug selection	Current regimen not usually as effective as other choices		
	Current regimen not usually as safe as other choices		
	Therapy not individualized to patient		
Wrong drug	Medical problem for which drug is not effective		
	Patient has risk factors that contraindicate use of drug	Need to assess teratogenic effects of all drugs; hormonal contraceptive in pregnancy	
	Patient has infection with organisms resistant to drug		
	Patient refractory to current drug therapy		
	Taking combination product when single agent appropriate		
	Dosage form inappropriate		
	Medication error		
Drug regimen	PRN use not appropriate for condition		
	Route of administration/dosage form/mode of administration not appropriate for current condition		
	Length or course of therapy not appropriate		
	Drug therapy altered without adequate therapeutic trial		
	Dose or interval flexibility not appropriate		
Dose too low	Dose or frequency too low to produce desired response in this patient		
	Serum drug level below desired therapeutic range		
	Timing of antimicrobial prophylaxis not appropriate		
	Medication not stored properly		
	Medication error		

Identified by comparing problem list and medication list.

Make sure all new problems are addressed (though all may not require drug therapy).

Even if a medication is indicated for the problem, it may not be the BEST therapy for that patient.

DRUG THERAPY PROBLEM WORKSHEET

Type of Problem	Possible Causes	Problem List	Notes
Dose too high	Dose or frequency too high for this patient	Assess methadone dose with substance abuse provider	
	Serum drug level above the desired therapeutic range		
	Dose escalated too quickly		
	Dose or interval flexibility not appropriate for this patient	Need for bid fluoxetine	
	Medication error		
Therapeutic duplication	Receiving multiple agents without added benefit		
Drug allergy/ adverse drug events	History of allergy or ADE to current (or chemically related) agents		
	Allergy or ADE history not in medical records	Need allergy/ADE history	
	Patient not using alert for severe allergy or ADE		
	Symptoms or medical problems that may be drug induced	HCZT and fluid/ electrolyte disorders Fluoxetine and insomnia	
	Drug administered too rapidly		
	Medication error, actual or potential		
Interactions (drug–drug, drug–disease, drug–nutrient, drug–laboratory test)	Effect of drug altered due to enzyme induction/ inhibition from another drug patient is taking	Fluoxetine and methadone	Slight reduction in methadone clearance; watch QTc
	Effect of drug altered due to protein-binding alterations from another drug patient is taking		
	Effect of drug altered due to pharmacodynamic change from another drug patient is taking	Fluoxetine and trazodone	Both serotonin modulators
	Bioavailability of drug altered due to interaction with another drug or food		
	Effect of drug altered due to substance in food		
	Patient's laboratory test altered due to interference from a drug the patient is taking		
Failure to receive therapy	Patient did not adhere with the drug regimen	Unknown, but likely is nonadherent; likely not taking methadone since not in urine tox	
	Drug not given due to medication error		
	Patient did not take due to high drug cost/lack of insurance	Unknown	
	Patient unable to take oral medication		
	Patient has no IV access for IV medication		
	Drug product not available		
Financial impact	The current regimen is not the most cost-effective		
	Patient unable to purchase medications/no insurance	Unknown	
Patient knowledge of drug therapy	Patient does not understand the purpose, directions, or potential side effects of the drug regimen	Unknown	
	Current regimen not consistent with the patient's health beliefs	Unknown	

Make sure all drug doses have been adjusted for the patient's renal and liver function.

Allergy/ADE information commonly is missing or incomplete.

Assessing for interactions is important, but make sure you assess for the clinical significance of the interaction in the patient.

ALWAYS assess adherence. If adherence problems are identified, find out the reasons for poor adherence and possible solutions.

Financial or insurance problems are a common reason for poor adherence.

Patients often have little understanding about their medications. Make sure you develop an educational plan appropriate for the patient.

PHARMACOTHERAPY CARE PLAN

For acute problems, make sure your therapeutic recommendations are carried through to some resolution or stopping point and/or chronic therapy.

Medical Problem List	Current Drug Regimen	Drug Therapy Problems	Therapy Goals, Desired Endpoints	Therapeutic Recommendations	Rationale	Therapeutic Alternatives	Monitoring
Hypovolemic hyponatremia		HCTZ use may be contributing factor	Normal hemodynamics (BP, pulse, JVD), improved symptoms (weakness, dizziness); prevent recurrence by treating underlying cause	Normal saline IV 1 L now over 15 min, then 500 mL/h × 2. Repeat until no longer orthostatic; if able to take PO, add oral rehydration solution (ORS) 250 mL q 30 min; promethazine 25 mg PO/IM/PR q 4 h PRN N/V; pt needs to stop using HCTZ; if pt has diarrhea, order stool culture, R/O laxative abuse; stop using HCTZ	Severe signs and symptoms, presence of vomiting warrant IV fluid; normal saline best for treating ECF depletion, metabolic alkalosis; hyponatremia will correct with volume replacement	If able to take PO or IV access not available, ORS 500–1000 mL/h as tolerated; metoclopramide 10 mg IV q 6 h PRN nausea	VS q 15 min × 2 h, then q 1 h while in urgent care. Recheck basic metabolic panel (BMP) in 4 h; pt to self-monitor symptoms, weight daily after discharge; repeat BMP in 2 d
Hypokalemia	K-Dur 40 mEq q AM PO	HCTZ	Normal serum K; normal ECG, no symptoms; prevent recurrence by treating underlying cause	KCl liquid 40 mEq PO now, repeat in 2 h; if serum K increasing, change to KCl SR 40 mEq bid × 2 d, then reassess; stop using HCTZ	Oral KCl safer than IV if pt able to take; pt has significant K deficit; need K replacement for correction of alkalosis; use liquid KCl for rapid absorption	If unable to take PO, IV KCl 10 mEq/100 mL with 10 mg lidocaine over 1 h × 4 doses	BMP in 2 h (recheck in 6 h if IV KCl given); ECG in 4 h
Metabolic alkalosis, due to decreased ECF, vomiting, ?diuretic use		HCTZ	Normal ABG, electrolytes, ECF volume; prevent recurrence by treating underlying cause	Volume repletion, K replacement, treat vomiting as above; stop using HCTZ; if alkalosis slow to clear or serum Mg drops, provide Mg replacement as $MgSO_4$ 1 g IV in 100 mL NS over 1 h	Alkalosis will resolve with volume and K replacement and with removal of underlying causes; Mg deficiency can prevent resolution of hypokalemia, alkalosis, though serum Mg now normal	Alternatives to volume, K replacement as above; no indication for IV HCl administration; could give Mg replacement even though serum Mg in normal range	BMP, other monitoring as above; recheck serum Mg in 2 h

Drug therapy problems identified on DTPW listed in this column, tied to medical problem.

Goals and endpoints should be as specific as possible, and should include preventing adverse outcomes as well as seeking positive outcomes.

Therapeutic recommendations and alternatives must be specific (drug, route, dose, frequency, duration).

Make sure monitoring plan is specific (parameters, frequency) and realistic for the setting.

Your rationale should include why you chose your primary therapy (drug, route, etc.) versus the alternative(s); may include why you did not specifically address certain problems.

Note that some problems are connected to others, and their resolution may be connected to treatment of those related problems.

PHARMACOTHERAPY CARE PLAN

Medical Problem List	Current Drug Regimen	Drug Therapy Problems	Therapy Goals, Desired Endpoints	Therapeutic Recommendations	Rationale	Therapeutic Alternatives	Monitoring
Substance use	Methadone 120 mg q day PO	Urine tox (+) for cocaine, THC, methamphetamine	No use of illicit drugs; avoidance of medical complications of injection use such as skin abscesses endocarditis Not all problems can be addressed or resolved. Some will require referral to other professionals or institutions.	Hold methadone since pt seems not to be taking and no evidence of narcotic withdrawal; if signs of withdrawal develop, begin methadone 20 mg q day inpatient; if methadone used, watch for potential interactions; blood cultures × 3 to R/O endocarditis; refer back to substance abuse provider after discharge; encourage enrollment in smoking cessation program; test for HIV, hepatitis B and C	Since urine tox was not positive for methadone, pt likely not taking; narcotic withdrawal not life-threatening, so best to wait to see if withdrawal signs develop and then treat with low-dose methadone; while no evidence of endocarditis (fever, murmur), best to R/O with blood cultures especially since she is pregnant	Begin methadone 20 mg q day if patient was taking methadone or other opioids chronically	Signs and symptoms of drug withdrawal; temperature q 6 h while in facility, then by pt daily; examine injection sites daily; CBC in 2 d; QTc if on methadone
Pregnancy		Lo-Estrin, drugs of abuse, tobacco	Cessation of behavior that is high risk to the fetus; adequate prenatal care	DC Lo-Estrin; substance abuse program as per substance abuse provider; refer to OB for full assessment, prenatal care; prenatal vitamin 1 q day; nutrition consult; smoking cessation; need to review all current and future drugs for teratogenic effect	Substance abuse and malnutrition will severely compromise development and health of fetus	None	As per substance abuse provider, OB

PHARMACOTHERAPY CARE PLAN

Medical Problem List	Current Drug Regimen	Drug Therapy Problems	Therapy Goals, Desired Endpoints	Therapeutic Recommendations	Rationale	Therapeutic Alternatives	Monitoring
Eating disorder, depression	Fluoxetine 20 mg bid PO	Drugs of abuse; fluoxetine bid ? causing insomnia; HCTZ use, ? laxative use	Normal eating patterns, no use of diuretics or laxatives; normal mood with no s/s depression	If patient has been taking fluoxetine, continue at 20 mg q day; psych consult; if insomnia, withhold hypnotics at this time since may be due to fluoxetine regimen and stimulant use; nutrition consult as above	Avoid SSRI withdrawal syndrome if she has been taking fluoxetine; if insomnia, may resolve with change in fluoxetine regimen, stimulant detox	Change antidepressant to less stimulating agent, i.e., sertraline 50 mg q day	As per psych
Dysuria			No symptoms; cure UTI if present	Urinalysis; if (+) for UTI, send for culture and start cephalexin 250 mg q 8 h × 7 d, start after all three blood cultures drawn	Cephalosporins safe in pregnancy, active against most common organism	Augmentin 500 mg q 8 h × 7 d	UTI s/s daily; repeat UA after antibiotic completed; stool frequency, consistency
Inadequate database				Need allergy/ADE Hx; indications for trazodone, omeprazole; frequency of substance use; adherence with prescribed medications; use of diuretics, laxatives; screen for HIV, viral hepatitis; liver enzymes; previous pregnancies, deliveries			

Therapy may be initiated or altered as missing information is obtained. In such cases make sure that you note when such therapy will be started based on obtaining certain information.

For the Study Guide cases, all you can do is list missing information. In a real-life setting, you must try to obtain the missing information from the appropriate sources (patient, family, medical record, other professionals or institutions).

PATIENT EDUCATION SUMMARY

Summarize your patient education in the type of language you would use with a real patient. Avoid use of medical terms or lingo, and keep in mind the patient's language skills, educational background, and culture.

Notes

- The problems you are having with your fluid and electrolytes are all related and are causing your weakness and dizziness. There are several reasons why these problems developed, including your vomiting and lack of food and fluid intake and your drug abuse. It appears that you are using an unprescribed diuretic, and that is causing or worsening these problems. Although we can easily treat these problems here, it is important that you take steps so that it does not happen again. You can help prevent this in the future by making sure you eat and drink fluids properly, do not use diuretics, and stop abusing drugs. After we give you some IV fluids, we will be giving you some oral fluids, as well as some oral potassium. It is very important that you take these as directed so that we can get your fluid and electrolyte levels back to normal. We have prescribed a medication, promethazine, for nausea and vomiting. Take it only if you need it and are unable to keep down oral fluids. Sometimes this medication can cause you to be a little drowsy or have a dry mouth. Let us know if that happens.
- From your urine screen and looking at your arms we can tell that you are actively abusing drugs. It will be crucial for you and your baby that you stop using immediately. We will refer you back to your substance abuse provider after you are discharged, and we strongly urge that you get involved with a program that will help you stay clean. Since it appears that you have not been using your methadone, we are going to withhold that for the time being. Since injecting drugs can put you (and your baby) at risk for infections like HIV and hepatitis, we are going to test you for those infections. Also, we are going to test you for a bacterial infection of the heart that happens sometimes in people who inject drugs. Smoking tobacco also is very harmful to you and your baby, and we strongly encourage you to stop smoking. Your substance abuse provider can help you with that also.
- We found that you are about 12 wk pregnant. We want to help you have a healthy baby, but the first thing you need to do is stop abusing drugs since they are so harmful to the development of your baby. Also, your nutrition does not appear to be very good, and you need to eat well enough so that your baby can get nutrients. We will refer you to an obstetrician, and we will start you on a prenatal vitamin to be taken every day. Since many medications can harm the baby during pregnancy, make sure all your providers know you are pregnant, and do not take any medication unless you check with your obstetrician or pharmacist. Do not start taking your birth control pills when you get home since you are pregnant.
- You had been prescribed fluoxetine (Prozac) for your depression and bulimia. If you have been taking it on a regular basis, we do not want to stop it suddenly. When you take this medication later in the day, sometimes it can cause problems sleeping, so we will give it to you just in the morning. We are going to have a psychiatrist consult with you so that we can determine the best way to manage these problems, with medications and with counseling.
- We noticed that you are complaining of some pain or burning when you urinate. This may be caused by a urinary tract infection, and we are going to test you for that. If you do have a urine infection, we will give you an antibiotic for that. Make sure you take every dose since a urine infection can harm your baby as well as you. The antibiotic we will give, cephalexin, will not harm your baby. Sometimes it can cause some diarrhea or skin rashes, so if that happens, please let us know.