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General Surgery

CORRELATIONS & CLINICAL SCENARIOS

for the USMLE Step 3

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NIKET SONPAL • CONRAD FISCHER

General Surgery

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Correlations and **C**linical **S**cenarios

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Correlations and Clinical Scenarios

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To my grandparents, Purshottam Thacker and Zaver Rachh.
Their guidance, love, and blessings have inspired me to be the educator
I am today.

HOW TO USE THIS BOOK

The primary purpose of this book is to coach you in the precise sequence through time to manage the computerized case simulation (CCS) portion of the step 3 exam, specifically for questions pertaining to the specialty of Surgery. You will find directions on moving the clock forward in time and the specific sequence in which each test or treatment should be done in managing a patient. This will cover the order in which to give treatments, order tests, and how to respond to test results. All CCS-related instructions appear in RED TYPE.

If you have never seen a particular case, this book is especially for you. It never has statements about "using your judgment" because you basically do not have any in these areas. We have made a cookbook that says "Do this, do that, do this." We do not consider the term "cookbook" to be inappropriate in this case.

You need to learn the basics of surgery. Less than ten percent of physicians are in this specialty, but the other 90% need to have at least a working knowledge of it.

This book will prepare you for multiple-choice questions, which comprise the majority of the exam, as well as the computerized clinical case simulations and the new basic science foundations that have just been added to the exam.

USMLE Step 3 or COMLEX Part 3 is the last phase in getting your license. Most of you are in residency and have no time to study. Here is how to best use this book.

First read about the disease or subspecialty in any standard text book. We personally suggest either *Master the Boards Step 3* book (Conrad Fischer) or the *Current Medical Diagnosis and Treatment book.*

The cases in this book are meant to enhance your understanding of the subject. All initial case presentations and their continuing scenarios appear in yellow boxes. There are also hundreds of new multiple-choice questions that are not in anyone's Q bank.

Every single case has related basic science foundations (which appear in blue boxes), so you will get a solid grasp of these simply by following along in the case. You do not have to consult any of your old step 1 books or basic science texts. The basic science correlates should be painless. You need not search for extra information. Just learn what we have selected in these chapters.

We always wanted to write something specifically for CCS. This is it. Because new test changes are frightening and the basic science questions are new for step 3, we made one book to cover both the simulations and the basic science.

Niket Sonpal, MD
Conrad Fischer, MD

CONTENTS

CHAPTER 1

PREOPERATIVE EVALUATION

CASE 1: Preoperative Assessment for Low-Risk Patients

Setting: *Office*

CC: *"I am having a knee replacement."*

VS: *BP, 106/54 mm Hg; R, 12 breaths/min; P, 75 beats/minute; T, 98.6°F*

HPI: *A 65-year-old woman presents after seeing her orthopedic surgeon 1 week earlier. Her right knee osteoarthritis (OA) is no longer tolerable, and she is planning to undergo a total right knee replacement next month. Her surgeon tells her she needs to have "clearance" before surgery. She is only able to walk two blocks or climb one flight of stairs before feeling tired. However, she denies shortness of breath and chest pain while walking.*

PMHx:
- *Right knee OA*
- *Mild obesity*

PSH:
- *History of smoking; quit 5 years ago*
- *Drinks socially*

ROS:
- *No chest pain on exertion*
- *No shortness of breath on exertion*

Physical Exam:
- *Crepitations on flexion and extension of right knee*
- *Swelling and pain to palpation of the lateral right knee*
- *Decreased range of motion in the right knee*
- *Antalgic gate favoring the left leg*

Which perioperative risk category does a total knee replacement fit into?

a. High risk
b. Intermediate risk
c. Low risk

Answer b. Low risk

Surgeries involving the intraperitoneal and intrathoracic regions, carotid endarterectomy, head and neck surgery, orthopedic surgery, and prostate procedures are all considered intermediate risk and carry up to 5% perioperative risk. Low-risk or less than 1% perioperative risk for death are endoscopic and superficial procedures, cataract surgery, breast surgery, dental procedures, and ambulatory surgery. High-risk procedures that carry a greater than 5% perioperative risk are those that involve peripheral vascular structures or the aorta.

Higher risk = Higher complication rate = Higher mortality rate

About which of the following lifestyle factors should this patient receive counseling regarding the risk of perioperative complications?

a. Exercise
b. Smoking
c. Alcohol use

Answer a. Exercise

This patient has poor preoperative exercise tolerance. A patient's ability to exercise is a strong predictor of postoperative complications from neurologic or cardiac events. This patient does not have shortness of breath, which in the setting of congestive heart failure (CHF) can prohibit surgery if the ejection fraction is less than 35%. Her exercise tolerance is low; we want patients to be able to walk more than four blocks or climb more than two flights of stairs. This patient would benefit from preoperative physical therapy. Smoking any kind of tobacco increases the risk of pulmonary complications after surgery. Therefore, if any patient smokes, he or she should be told to abstain for at least 8 weeks before surgery. Outcomes data have shown abstinence for this period of time or greater significantly decreases perioperative complications. This patient quit more than 5 years ago and therefore does not need to be counseled on smoking cessation. Alcohol consumption increases the risk of perioperative complications, especially in elderly adults. During all preoperative evaluations, the evaluating physician must ask about the quantity, use, and times since the patient's last drink. Physicians should also assess the use of illicit substances. Our patient only drinks socially, which on the USMLE means less than two drinks per week.

CCS TIP: *In patients with non-urgent surgery, preoperative "tuning up" can be done, and surgery can be delayed to improve outcomes.*

Initial Orders:

- *Physical therapy*
- *Bring the patient back in 1 month*
- *Acetaminophen for pain relief*

Use non–nonsteroidal antiinflammatory pain relievers in elderly adults because of the risk of peptic ulcer disease, renal disease, and aseptic meningitis.

The patient returns 1 month later. Her physical therapist reports her exercise tolerance has improved to 4 blocks and 2 flights of stairs.

What is the best next step in the management of this patient?

a. Electrocardiography (ECG)
b. Liver function tests
c. Complete blood count (CBC)
d. Prothrombin time (PT)
e. Basic metabolic profile

Answer a. Electrocardiography (ECG)

The correct answer is to obtain ECG. In the absence of history or physical findings indicating cardiac disease, ECG is recommended in men older than 40 years of age and women older than 50 years of age. Liver function tests are not indicated unless the patient has a history of chronic liver disease; albumin should be checked in patients with poor nutritional status. A CBC should only be checked when there is anticipation of major blood loss or if the patient has a history of anemia. The PT or partial thromboplastin time (PTT) should only be checked when the patient's history indicates chronic liver disease, history of bleeding diaphysis, or known coagulopathy. A basic metabolic profile to check for electrolytes is only indicated in patients who have renal disease, CHF, or are taking medications that affect electrolytes (e.g., diuretics).

PTT = PiTT—measures the intrinsic pathway
PT = PeT—measures the extrinsic pathway

Order: *ECG in the office*

Turn the clock forward 15 minutes to get the result.

All patients ≥40 years undergoing preoperative assessment require:
- Blood urea nitrogen/creatinine
- Chest radiography
- ECG

The ECG obtained in the office demonstrates a normal sinus rhythm with no abnormalities.

CCS TIP: *After ordering the appropriate tests in a preoperative assessment, change the location to the hospital for surgery and turn the clock forward. The case will end.*

CASE 2: Preoperative Assessment for High-Risk Patients

Setting: *Office*

CC: *"I need my hip fixed."*

VS: *BP, 185/60; HR, 95 beats/min; R, 20 breaths/min; T, 98.6°F*

HPI: *A 70-year-old man with a history of congestive heart failure (CHF) secondary to nonischemic cardiomyopathy presents to the office for preoperative evaluation for total hip replacement. The previous echocardiogram revealed an ejection fraction (EF) of 30%, and he occasionally has shortness of breath with exertion.*

PMHx: *Cirrhosis*

PSH:
- *60-pack-year smoking history*
- *1 pint of whiskey daily*

Medications: *Noncompliant with all medications*

ROS: *Unable to provide ROS*

Physical Exam:
- *Jugular venous distention (JVD)*
- *Lateral and inferior displacement of the apex of the heart*
- *Barrel chest*
- *Faint crackles in bilateral lung fields*
- *2+ pedal edema up to the mid calf*

Which of the following factors in this patient's history and physical examination puts him most at a high risk for perioperative mortality?

a. EF <35%
b. Current smoker
c. History of cirrhosis
d. JVD
e. Chronic alcohol use

Answer a. EF <35%

All of these factors raise this patient's perioperative mortality risk, but the one that raises it the most is the cardiac findings. The EF of less than 35%, the findings of JVD, and shortness of breath on exertion are all indicative of systolic dysfunction and CHF. His physical findings support a diagnosis of CHF as well. Being a smoker raises the mortality risk but not as much as being a heart failure patient; this patient's history of cirrhosis does raise the mortality rate up to 40%, but remember that a person can live with very little liver but cannot live without a heart (Table 1-1).

Table 1-1 Perioperative Mortality Risk Factors

Organ	Risk Factor	Affect on Surgery	Intervention
Cardiac	EF <35% JVD = CHF	Prohibitive of noncardiac surgery	Optimize medications
Pulmonary	Smoking	FEV <1.5 raises pneumonia risk after surgery	Check PFTs before surgery Provide smoking cessation counseling
Hepatic	PT >16 sec Albumin <3.0 g/dL Bilirubin >2.0 g/dL	Indicative of poor synthetic function; thus, bleeding complications increase after surgery	Consider nutrition supplementation and close monitoring of bleeding parameters

CHF, congestive heart failure; EF, ejection fraction; FEV, forced expiratory volume; PFT, pulmonary function test; PT, prothrombin time.

Albumin and PT are surrogate markers of hepatic synthetic function. If their levels are abnormal, the liver is damaged.

Which of the following is the best next step in the management of this patient?

a. Optimize cardiac medications
b. Smoking cessation counseling
c. Hepatology consult

Answer a. Optimize cardiac medications

The correct answer is to begin with medical management of this patient's CHF. A combination of beta-blockers, angiotensin-converting enzyme (ACE) inhibitors, digoxin, and furosemide should be prescribed to optimize cardiac function. Beta-blockers and ACE inhibitors reduce mortality, and in advanced CHF (New York Heart class IV), spironolactone has been shown to reduce mortality rates. With regard to the patient's liver disease, a hepatology consult on the examination will not be helpful for the CCS; on the CCS, it is better to provide alcohol abstinence counseling.

Myocardial infarction = no surgery for a minimum of 6 months.