

FIRST AID FOR THE®

SURGERY clerkship

THIRD EDITION



- A survival manual for the surgery clerkship
- Tips on what you must know to excel on the shelf exam and impress on rounds
- Updated to reflect the latest protocols and guidelines

FIRST AID FOR THE[®] **Surgery Clerkship**

Third Edition

Latha Ganti, MD, MS, MBA, Fa CEP
Professor of Emergency Medicine and Neurology
University of Central Florida College of Medicine
Orlando, Florida

Matthew S. Kaufman, MD
Associate Director
Department of Emergency Medicine
Richmond University Medical Center
Staten Island, New York

Anita Mishra, MBBS, Fa CS
Assistant Professor
Department of Surgery
Mayo Clinic
Phoenix, Arizona



New York Chicago San Francisco Athens London Madrid Mexico City
Milan New Delhi Singapore Sydney Toronto

First Aid for the® Surgery Clerkship, Third Edition

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No t i c e

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Dedication

To my dad, Dr. Ganti L. Rao for constantly encouraging me to achieve; and to my children, Thor, Tej, Trilok, Karthik & Vaishnavi who put up with their mother's very busy career demands.

—Latha Ganti, MD, MS, MBA, FACEP

For Jenny G—New York's best

—Matthew S. Kaufman, MD

My work in this book is dedicated to my parents, Mr. Rajeshwar Mishra and Mrs. Indu Mishra.

—Nitin Mishra, MBBS, MS, MRCS (UK)

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contributors

a wais a shfaq, Md

Resident, General Surgery
Mayo Clinic
Phoenix, Arizona
Cardiothoracic Surgery

Michael p. a st, Md

Director, Outpatient Joint Replacement
Mercer County Surgery Center
Director, Robotic Assisted Joint Replacement Program
Robert Wood Johnson University Hospital-Hamilton
Mercer Bucks Orthopaedics
Lawrenceville, New Jersey
Orthopedics
The Hand

ismael c ubero, Md

Residency Site Director
Department of Emergency Medicine
New York City Health and Hospitals-Harlem
New York, New York
Trauma

o naona g urney, Md

Resident, Surgery
State University New York-Downstate Medical Center
Brooklyn, New York
Ward/Exam Tips

Michael J. klein, Md

Resident, Surgery
State University New York-Downstate Medical Center
Brooklyn, New York
Ward/Exam Tips

Nitin Mishra, MBBS, Fa c S

Assistant Professor
Department of Surgery
Mayo Clinic
Phoenix, Arizona
Acute Abdomen
Anesthesia
The Appendix
Burns
Colon, Rectum, and Anal Canal
Ear, Nose, and Throat Surgery
The Endocrine System
The Esophagus
Hernia and Abdominal Wall Problems
Neurosurgery
Pediatric Surgery
Small Bowel

The Stomach
The Surgical Patient
Wounds

Sneha Mishra, Md

Hospitalist
Overlook Medical Center
Summit, New Jersey
Fluids, Electrolytes, and Nutrition
The Spleen

kate X. peng, Md

Resident, General Surgery
General Surgery
Mayo Clinic
Phoenix, Arizona
Critical Care
The Breast
Vascular Surgery

d avid r advinsky, Md

Resident, General Surgery
State University New York-Downstate Medical Center
Brooklyn, New York
Ward/Exam Tips

v inay r ai, Md, Fa c S

Assistant Professor
Department of Surgery
University of New Mexico
Albuquerque, New Mexico
Transplant

Sandeep a . Sathyanarayana, Md

Assistant Professor, Surgical Oncology
School of Medicine
Meharry Medical College
Nashville, Tennessee
Hepatobiliary System
Pancreas

d enny Simon

Medical Student
Class of 2016
State University New York-Downstate College of Medicine
Brooklyn, New York
Ward/Exam Tips

Michael a . Zell, Md

Resident, Urology
Mayo Clinic
Phoenix, Arizona
Genitorurinary System

Faculty reviewer




Deven Unadkat, DO

Associate Medical Director
Department of Emergency Medicine
Newark Beth Israel Medical Center
Newark, New Jersey

introduction

This book is designed in the tradition of the First Aid series of books. It is formatted in the same way as the other books in the series. You will find that, apart from preparing you for success on the clerkship exam, this resource will also help guide you in the clinical diagnosis and treatment of common surgical conditions.

The content of the book is based on the objectives for medical students as determined by the Association for Surgical Education (ASE). Each chapter contains the major topics central to the practice of general surgery and has been specifically designed for the medical student. The book is divided into general surgery, which contains topics that comprise the core of the surgery rotation, and subspecialty surgery, which may be of interest but is generally considered less high yield for the clerkship. Knowledge of a subspecialty topic may be useful if observing a related surgery or if requesting a letter from a surgeon in that field.

The content of the text is organized in the format similar to other texts in the First Aid series. Topics are listed with bold headings, and the “body” of the topic provides essential information. The outside margins contain mnemonics, diagrams, summary or warning statements, and tips. Tips are categorized into Exam Tip , Ward Tip , and OR tip .

How to contribute

To continue to produce a high-yield review source for the surgery clerkship, you are invited to submit any suggestions or correction. Please send us your suggestions for:

- New facts, mnemonics, diagrams, and illustrations
- Low-yield facts to remove

For each entry incorporated into the next edition, you will receive personal acknowledgment. Diagrams, tables, partial entries, updates, corrections, and study hints are also appreciated, and significant contributions will be compensated at the discretion of the authors. Also let us know about material in this edition that you feel is low yield and should be deleted. You are also welcome to send general comments and feedback, although due to the volume of e-mails, we may not be able to respond to each of these.

The **preferred way** to submit entries, suggestions, or corrections is via **email**. Please include name, address, school affiliation, phone number, and e-mail address (if different from the address of origin). If there are multiple entries, please consolidate into a single e-mail or file attachment. Please send submissions to:

frstaidclerkships@gmail.com

Otherwise, please send entries, neatly written or typed to:

**Latha G. Stead, MD
C/o Catherine A. Johnson
Executive Editor
McGraw-Hill Education
Two Penn Plaza, 9th Floor
New York, NY 10121**

All entries become property of the authors and are subject to editing and reviewing. Please verify all data and spellings carefully. In the event that similar or duplicate entries are received, only the first entry received will be used. Include a reference to a standard textbook to facilitate verification of the fact. Please follow the style, punctuation, and format of this edition if possible.

note to contributors

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How to Succeed in the Surgery clerkSHIP

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The surgery clerkship is unique among all the medical school rotations. Even if you are dead sure you do not want to be a surgeon, it can be a very fun and rewarding experience if you approach it prepared. There are three key components to the rotation: (1) what to do in the OR, (2) what to do on the wards, and (3) how to study for the exam.

in the operating Room . . .

One of the most fun things on the surgery rotation is the opportunity to scrub in on surgical cases. The number and types of cases you will scrub in on depends on the number of residents and students on that service and how busy the service is that month. At some places, being able to go to the OR is considered a privilege rather than a routine part of the rotation. A few tips:

- **Eat before you begin the case.** Some cases can go on for longer than planned and it isn't cool to leave early because you are hungry (read unprepared!) or, worse, to pass out from exhaustion. As a student, your function in the OR will most likely be to hold retraction. This can be tedious, but it is important to pay attention and do a good job. Not pulling in the right direction obscures the view for your attending, and pulling too hard can destroy tissue. Many students get light-headed standing in one position for an extended period of time, especially when they are not used to it. Make sure you shift your weight and bend your knees once in a while so you don't faint. If you feel you are going to faint, then say something—ask one of the surgical techs to take over or state discreetly that you need relief. Do not hold on to the bitter end, pass out, and take the surgical field with you (believe it or not, this has actually happened; we print this advice from real experience).
- **Find out about the case as much as possible beforehand.** Usually, the OR schedule is posted the night before, so you should be able to tell. Read up on the procedure as well as the pathophysiology of the underlying condition. Know the important anatomic landmarks. Read up on the patient's H&P, with attention paid to PMH, PSH, medications, allergies, and relevant laboratory and radiology results.
- **Find out who you are working with.** If you can, do a quick bibliography search on the surgeon you will be working with. It can never hurt to know which papers (s)he has written, and this may help to spark conversation and distinguish you among the many other students they will have met.
- **Assess the mood in the OR.** The amount of conversation in the OR directed to you varies by attending. Some are very into teaching and will engage you during most of the surgery. Many others act as if you aren't even there. Some will interact if you make the first move; others nuke all efforts at interaction. You'll have to figure it out based on the situation. Generally, if your questions and comments reflect that you have read about the procedure and disease, things will go well.
- **Keep a log of all surgeries** you have attended, scrubbed on, or assisted with (see Table I-1). If you are planning to go into general surgery or a surgical subspecialty, it can be useful during residency interviews for conveying how much exposure/experience you have had. This is particularly true if your school's strength is clinical experience. The log can also be useful if you are requesting a letter from the chairman of surgery whom you have never worked with. It gives her/him an idea of what you have been doing with your rotation. Many rotations will set a minimum number of surgeries you are to attend. Try to attend as many as possible, and document them. This serves both to increase your exposure, and confirm your interest.

t ABLe i-1. example of an operative case log

| | OperatiOn | S/O | attending | date | Mr # | COMMeNtS |
|---|------------------|-----|-----------|-----------|--------|---|
| 1 | cholecystectomy | S | Dr. Wolfe | 5/28/2003 | 123456 | Got to close, placed 28 nonabsorbable sutures |
| 2 | Appendectomy | S | Dr. tau | 5/30/2003 | 246800 | Used laparoscope |
| 3 | cataract surgery | o | Dr. Mia | 6/1/2003 | 135791 | |

S, scrubbed in; O, observed; MR, patient's medical record number.

On the Wards . . .

Be on Time

Most surgical ward teams begin rounding between 6 and 7 a.m. If you are expected to “pre-round,” you should give yourself at least 10 minutes per patient that you are following to see the patient and learn about the events that occurred overnight. Like all working professionals, you will face occasional obstacles to punctuality, but make sure this is occasional. When you first start a rotation, try to show up at least 15 minutes early until you get the routine figured out.

Dress in a Professional manner

Even if the resident wears scrubs and the attending wears stiletto heels, you must dress in a professional, conservative manner. Wear a short white coat over your clothes unless discouraged.

Men should wear long pants, with cuffs covering the ankle, a long collared shirt, and a tie. No jeans, no sneakers, no short-sleeved shirts.

Women should wear long pants or knee-length skirt, blouse, or dressy sweater. No jeans, no sneakers, no heels greater than 1½ inches, no open-toed shoes.

Both men and women may wear scrubs occasionally, especially during overnight call or in the operating room. Do not make this your uniform.

Be Pleasant

The surgical rotation is often difficult, stressful, and tiring. Smooth out your experience by being nice to be around. Smile a lot and learn everyone's name. If you do not understand or disagree with a treatment plan or diagnosis, do not “challenge.” Instead, say “I'm sorry, I don't quite understand, could you please explain . . .” Be empathetic toward patients.

Be aware of The hierarchy

The way in which this will affect you will vary from hospital to hospital and team to team, but it is always present to some degree. In general, address your questions regarding ward functioning to interns or residents. Address your medical questions to attendings; make an effort to be somewhat informed on your subject prior to asking attendings medical questions.

aDDr ess PaTienTs anDsTaff in a r esPecTful way

Address patients as Sir, Ma'am, or Mr., Mrs., or Miss. Do not address patients as “honey,” “sweetie,” and the like. Although you may feel that these names are friendly, patients will think you have forgotten their name, that you are being inappropriately familiar, or both. Address attending physicians as “doctor” unless told otherwise.

Take r esPonsiBiliTy for your PaTienTs

Know everything there is to know about your patients, their history, test results, details about their medical problem, and prognosis. Keep your intern or resident informed of new developments that he or she might not be aware of, and ask for any updates you might not be aware of. Assist the team in developing a plan and speaking to radiology, consultants, and family. Never give bad news to patients or family members without the assistance of your supervising resident or attending.

r esPecT PaTienTs' r ighTs

1. All patients have the right to have their personal medical information kept private. This means do not discuss the patient's information with family members without the patient's consent, and do not discuss any patient in hallways, elevators, or cafeterias.
2. All patients have the right to refuse treatment. This means they can refuse treatment by a specific individual (you, the medical student) or of a specific type (no nasogastric tube). Patients can even refuse life-saving treatment. The only exceptions to this rule are if the patient is deemed to not have the capacity to make decisions or understand situations (in which case a health care proxy should be sought) and if the patient is suicidal or homicidal.
3. All patients should be informed of the right to seek advanced directives on admission. Often, this is done by the admissions staff, in a booklet. If your patient is chronically ill or has a life-threatening illness, address the subject of advanced directives with the assistance of your attending.

Vol unTeer

Be self-propelled, self-motivated. Volunteer to help with a procedure or a difficult task. Volunteer to give a 20-minute talk on a topic of your choice. Volunteer to take additional patients. Volunteer to stay late.

Be a Team Pl ayer

Help other medical students with their tasks; teach them information you have learned. Support your supervising intern or resident whenever possible. Never steal the spotlight, steal a procedure, or make a fellow medical student look bad.

Be honesT

If you don't understand, don't know, or didn't do it, make sure you always say that. Never say or document information that is false (a common example: “bowel sounds normal” when you did not listen).

keep Patient Information handy

Use a clipboard, notebook, or index cards to keep patient information, including a miniature history and physical, lab, and test results at hand.

Present Patient Information in an organized manner

Here is a template for the “bullet” presentation:

This is a [age] year old [gender] with a history of [major history such as HTN, DM, coronary artery disease, CA, etc.] who presented on [date] with [major symptoms, such as cough, fever and chills], and was found to have [working diagnosis]. [Tests done] showed [results]. Yesterday the patient [state important changes, new plan, new tests, new medications]. This morning the patient feels [state the patient’s words], and the physical exam is significant for [state major findings]. Plan is [state plan].

The newly admitted patient generally deserves a longer presentation following the complete history and physical format.

Some patients have extensive histories. The whole history can and probably should be present in the admission note, but in ward presentation it is often too much to absorb. In these cases it will be very much appreciated by your team if you can generate a **good summary** that maintains an accurate picture of the patient. This usually takes some thought, but it’s worth it.

Presenting The chest radiograph (cXr)**3 “shuns” + “ABCDEFGHI”**

1. Identification (identificay-SHUN)
 - correct patient, medical record number, date, and time.
2. Rotation (rotay-SHUN)
 - is this a posteroanterior (PA) or anteroposterior (AP) film?
 - are the clavicles at an equal height and can you see both medial convexities?
3. Penetration (penetray-SHUN)
 - the spinal column should become obscured halfway down the mediastinal silhouette.
 - A. **Airway**
 - trachea midline, without deviation
 - carina and bronchi visible, without distraction
 - look for presence and position of ETT—should be 2 cm above the carina
 - look for pneumomediastinum (perforation)
 - B. **Bones**
 - good inspiratory effort? (7–8 ribs visible)
 - look for rib/clavicular/humeral/sternal/scapular fractures or joint dislocations
 - C. **Costophrenic (angle)**
 - look for blunting (hemothorax/pleural effusion)
 - D. **Diaphragm**
 - look for flattening (COPD), hemidiaphragm
 - look for free air under the diaphragm (pneumoperitoneum)

E. Esophagus

- can't really see the esophagus, but can see presence of an NG or OG tube. Make sure that it's uncoiled, in the stomach, and not in the lung.
- make sure the stomach is in the abdomen, not the chest (diaphragmatic hernia vs. rupture)
- look for pneumomediastinum (perforation)

F. Lung Fields

- look for airspace disease, opacities, pneumothorax, venous congestion, hilar lymphadenopathy
- look for presence of chest tubes

G. Great vessels

- look for widening of mediastinum or mediastinal shift
- look for presence of central venous catheters

H. Heart

- look for cardiomegaly
- look for retrocardiac opacities

I. Interval

- compare this film to the patient's previous films to see changes.

A sample CXR presentation may sound like:

This is the CXR of Mr. Jones. The film is an AP view with good inspiratory effort. There is an isolated fracture of the 8th rib on the right. There is no tracheal deviation or mediastinal shift. There is no pneumo- or hemothorax. The cardiac silhouette appears to be of normal size. The diaphragm and heart borders on both sides are clear; no infiltrates are noted. There is a central venous catheter present, the tip of which is in the superior vena cava.

The key elements of presenting a CXR are summarized in Table I-2.

TABLE I-2. How to Present a Chest Radiograph (CXR)

- First, confirm that the CXR belongs to your patient.
- If possible, compare to a previous film.

Then, present in a systematic manner:

1. Technique

Rotation, anteroposterior (AP) or posteroanterior (PA), penetration, inspiratory effort.

2. Bony structures

Look for rib, clavicle, scapula, and sternum fractures.

3. Airway

Look for tracheal deviation, pneumothorax, pneumomediastinum.

4. Pleural space

Look for fluid collections, which can represent hemothorax, chylothorax, pleural effusion.

5. Lung parenchyma

Look for infiltrates and consolidations: These can represent pneumonia, pulmonary contusions, hematoma, or aspiration. The location of an infiltrate can provide a clue to the location of a pneumonia:

- Obscured right (R) costophrenic angle = right lower lobe
- Obscured left (L) costophrenic angle = left lower lobe

(continues)

TABLE I-2. How to Present a Chest Radiograph (CXR) (continued)

- Obscured R heart border = right middle lobe
 - Obscured L heart border = left upper lobe
6. Mediastinum
- Look at size of mediastinum—a widened one (>8 cm) goes with aortic rupture.
 - Look for enlarged cardiac silhouette (>1/2 thoracic width at base of heart), which may represent congestive heart failure (CHF), cardiomyopathy, hemopericardium, or pneumopericardium.
7. Diaphragm
- Look for free air under the diaphragm (suggests perforation).
 - Look for stomach, bowel, or NGT tube above diaphragm (suggests diaphragmatic rupture).
8. Tubes and lines
- Identify all tubes and lines.
 - An endotracheal tube should be 2 cm above the carina. A common mistake is right mainstem bronchus intubation.
 - A chest tube (including the most proximal hole) should be in the pleural space (not in the lung parenchyma).
 - An NGT tube should be in the stomach, and uncoiled.
 - The tip of a central venous catheter (central line) should be in the superior vena cava (not in the right atrium).
 - The tip of a Swan–Ganz catheter should be in the pulmonary artery.
 - The tip of a transvenous pacemaker should be in the right atrium.

Types of Notes

In addition to the admission H&P and the daily progress note, there are a few other types of notes you will write on the surgery clerkship. These include the preoperative, operative, postoperative, and procedure notes. Samples of these are depicted in Tables I-3 through I-6.

TABLE I-3. Sample Procedure Note (for Wound Repair)

Under sterile conditions following anesthesia with 5 cc of 2% lidocaine with epinephrine and negative wound exploration for foreign body, the laceration was closed with 3-0 Ethilon sutures. Wound edges were well approximated and no complications occurred. Wound was dressed with sterile gauze and triple antibiotic ointment.

TABLE I-4. Sample Preoperative Note

| | |
|--------------------------|--|
| Pre-op diagnosis: | Abdominal pain |
| Procedure: | Exploratory laparotomy |
| Pre-op tests: | List results of labs (CBC, electrolytes, PT, aPTT, urinalysis), ECG, CXR (Most adult patients require coagulation studies; patients over 40 usually need ECG and CXR—these are institution specific.) |
| Blood: | How many units of what type were crossmatched and available; or, “none” if no blood needed |
| Orders: | For example, colon prep, NPO after midnight, preoperative antibiotics |

t A B I e i - 5 . Sample o perative n ote

| | |
|--------------------------|---|
| pre-op diagnosis: | Abdominal pain |
| post-op dx: | Small bowel obstruction |
| procedure: | Segmental small bowel resection with end-to-end anastomosis |
| Surgeon: | Dr. Attending |
| Assistant: | Your name Here |
| Anesthesia: | Get A (general endotracheal anesthesia) |
| | eBL (estimated blood loss): 100 cc |
| | Fluid replacement: 2000 cc crystalloid, 2 units FFP |
| | Uo = 250 cc |
| Findings: | 10 cm of infarcted small bowel |
| | Dermoid tumor, left ovary |
| complications: | none |

Wound was clean/clean contaminated/contaminated/dirty. (pick one)

closure: 0-0 prolene for fascia, 3-0 vicryl SQ staples for skin.

Procedure tolerated well, patient remained hemodynamically stable throughout. instrument, sponge, and needle counts were correct. Patient was extubated in the OR and transferred to the recovery room in stable condition.

t A B I e i - 6 . Sample postoperative n ote

| | |
|------------------------------|--|
| postoperative day: | 1 |
| procedure: | colon resection with diverting colostomy. |
| Vitals: | |
| intake and output: | For intake include all oral and parenteral fluids and t Pn . For output include everything from all drains, tubes, and Foley. |
| physical examination: | note particularly lung and abdominal exam, and comment on wound site. |
| Labs: | |
| Assessment: | |
| plan: | |

Your Rotation Grade

Many students worry about their grade in this rotation. There is the perception that not getting honors in surgery pretty much closes the door to obtaining a residency spot in general or subspecialty surgery (ophthalmology, otolaryngology, neurosurgery, plastic surgery, urology). While this is not necessarily true, the medicine and surgery clerkships are considered to be among the most important in medical school, so doing well in these is handy for all students. Usually, the clerkship grade is broken down into three or four components.

- Inpatient evaluation. This includes evaluation of your ward time by residents and attendings and is based on your performance on the ward. Usually, this makes up about half your grade and can be largely subjective.
- Ambulatory evaluation. This includes your performance in clinic, including clinic notes and any procedures performed in the outpatient setting.

- Written examination. Most schools use the NBME or “Shelf” examination. Some schools have their own homemade version, very similar to the NBME’s. The test is multiple choice. This portion of the grade is anywhere from 20% to 40%, so performance on this multiple-choice test is vital to achieving honors in the clerkship. More on this below.
- Objective Structured Clinical Examination (OSCE). Some schools now include an OSCE as part of their clerkship evaluation. This is basically an exam that involves a standardized patient and allows assessment of a student’s bedside manner and physical examination skills. This may comprise up to one-fourth of a student’s grade. It is a tool that will probably become more and more popular over the next few years.

How to Study

Make a List of Core Material to Learn

This list should reflect common symptoms, illnesses, and areas in which you have particular interest, or in which you feel particularly weak. Do not try to learn every possible topic. The Association for Surgical Education (www.surgicaleducation.com) has put forth a manual of surgical objectives for the medical student surgery clerkship, on which this book is based. The ASE emphasizes:

Symptoms and Lab Tests

- Abdominal masses
- Abdominal pain
- Altered mental status
- Breast mass
- Jaundice
- Lung nodule
- Scrotal pain and swelling
- Thyroid mass
- Fluid, electrolyte, and acid–base disorders
- Multi-injured trauma patient

Common Surgeries

- Appendectomy
- Coronary artery bypass grafting (CABG)
- Cholecystectomy
- Exploratory laparotomy
- Breast surgery
- Herniorraphy
- Peptic ulcer disease (PUD) surgery
- Bariatric surgery

We also recommend:

- Preoperative care
- Postoperative care
- Wound infection
- Shock

The core of the general surgery rotation consists of the following chapters:

1. The Surgical Patient
2. Wounds

3. Acute Abdomen
4. Trauma
5. Critical Care
6. Fluids, Electrolytes, and Nutrition
7. The Esophagus
8. The Stomach
9. Small Bowel
10. Colon, Rectum, and Anal Canal
11. The Appendix
12. Hernia and Abdominal Wall Problems
13. The Hepatobiliary System
14. The Pancreas
15. Endocrine System
16. The Spleen
17. The Breast
18. Burns
20. Vascular Surgery
24. Cardiothoracic Surgery

The other chapters are somewhat less important, as they focus on subspecialty surgery. The subspecialty chapters are comprehensive and less “high yield” than the abdominal chapters, but they are an excellent primer for anyone considering going into subspecialty surgery. We kept the detail in these chapters due to feedback from several students who wanted a concise but comprehensive overview of surgical subspecialties.

You will notice that the chapters discuss pathophysiology and in general a lot of things that seem like they belong in a medicine book. The reason for this is that **the NBME clerkship exam covers the medicine behind surgical disease**. The exam does not ask specifics of operative technique. So, in a way, you are studying for three distinct purposes. The knowledge you need on the wards is the day-to-day management know-how. The knowledge you want in the OR involves surgical knowledge of anatomy and operative technique (see OR TIPS). The knowledge you want on the end of rotation examination is the epidemiology, risk factors, pathophysiology, diagnosis, and treatment of major diseases seen on a general surgery service.

as you see PaTienTs, noTe Their major symPToms anD Diagnosis for r eView

Your reading on the symptom-based topics above should be done with a specific patient in mind. For example, if a patient comes to the office with a thyroid mass, read about Graves’ disease, Hashimoto’s, thyroid cancer, and the technique of needle aspiration in the review book that night.

sel ecT your s Tu Dy ma Te r i al

We recommend:

- This review book, *First Aid for the Surgery Clerkship*
- A major surgery textbook such as *Schwartz’s Principles of General Surgery* (costs about \$140), or *Lawrence’s Essentials of General Surgery*.
- A full-text online journal database, such as www.mdconsult.com (subscription is \$99/year for students)

- A small pocket reference book to look up lab values, clinical pathways, and the like, such as Maxwell Quick Medical Reference (ISBN 0964519119, costs \$7)
- Free smartphone apps to look up drugs, such as Epocrates (Athenahealth, free)

PrePar e a Talk on a ToPic

You may be asked to give a small talk once or twice during your rotation. If not, you should volunteer! Feel free to choose a topic that is on your list; however, realize that this may be considered dull by the people who hear the lecture. The ideal topic is slightly uncommon but not rare, for example: bariatric surgery. To prepare a talk on a topic, read about it in a major textbook or a review article not more than 2 years old, and then search online or in the library for recent developments or changes in treatment.

Pr ocedur es

During the course of the surgery clerkship, there is a set of procedures you are expected to learn or at least observe. The common ones are:

- Intravenous line placement
- Nasogastric tube placement
- Venipuncture (blood draw)
- Foley (urinary) catheter placement
- Wound closure with sutures/staples
- Suture/staple removal
- Surgical knots (hand and instrument ties)
 - Ethicon Endosurgery (ethicon.com) provides free knot-tying training kits with instruction booklets for students. Simply go to their website, click “surgeons/clinicians” to contact a representative, and simply ask them to send one to your house.
- Dressing changes (wet to dry, saline, Vaseline gauze)
- Incision and drainage of abscesses
- Technique of needle aspiration (observe)
- Ankle–brachial index (ABI) measurement
- Evaluation of pulses with Doppler
- Skin biopsy (punch and excisional)
- Removal of surgical drains
- Transillumination of scrotum

How to Prepare for the c linical c lerkship examination

If you have read about your core illnesses and core symptoms, you will know a great deal about the medicine of surgery. To study for the clerkship exam, we recommend:

- 2–3 weeks before exam:** Read this entire review book, taking notes.
- 10 days before exam:** Read the notes you took during the rotation on your core content list, and the corresponding review book sections.
- 5 days before exam:** Read this entire review book, concentrating on lists and mnemonics.
- 2 days before exam:** Exercise, eat well, skim the book, and go to bed early.
- 1 day before exam:** Exercise, eat well, review your notes and the mnemonics, and go to bed on time. Do not have any caffeine after 2 p.m.

Other helpful studying strategies include:

Study with friends

Group studying can be very helpful. Other people may point out areas that you have not studied enough, and may help you focus on the goal. If you tend to get distracted by other people in the room, limit this to less than half of your study time.

Study in a bright room

Find the room in your house or in your library that has the best, brightest light. This will help prevent you from falling asleep. If you don't have a bright light, get a halogen desk lamp or a light that simulates sunlight (not a tanning lamp).

Eat light, Balanced meals

Make sure your meals are balanced, with lean protein, fruits and vegetables, and fiber. A high-sugar, high-carbohydrate meal will give you an initial burst of energy for 1–2 hours, but then you'll drop.

Take Practice exams

The point of practice exams is not so much the content that is contained in the questions, but the training of sitting still for 3 hours and trying to pick the best answer for each and every question.

Tips for answering Questions

All questions are intended to have one best answer. When answering questions, follow these guidelines:

Read the actual question, then glance at the answers. For all questions longer than two sentences, reading the actual question stem (the last sentence) and then the answer choices first can help you sift through for key information.

“Look for the words *EXCEPT, MOST, LEAST, NOT, BEST, WORST, TRUE, FALSE, CORRECT, INCORRECT, ALWAYS*, and NEVER. If you find one of these words, circle or underline it for later comparison with the answer.

Evaluate each answer as being either true or false. Example:

Which of the following is least likely to be associated with pulmonary embolism?

- A. Tachycardia **T**
- B. Tachypnea **T**
- C. Chest pain? **F not always**
- D. Deep venous thrombosis? **T not always**
- E. Back pain **F? aortic dissection**

By comparing the question, noting LEAST, to the answers, “E” is the best answer.

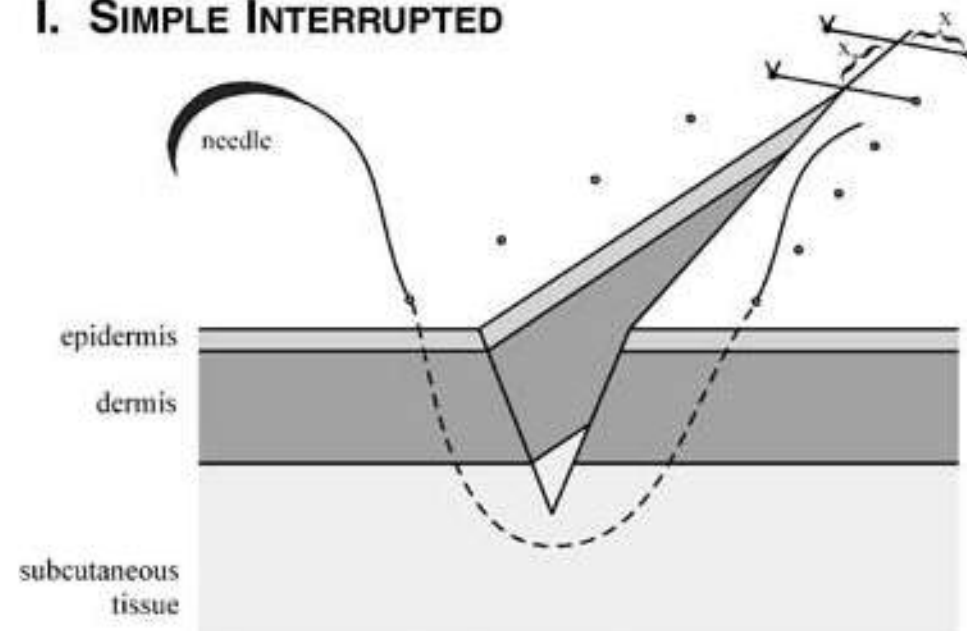
Finally, as the boy scouts say, “BE PREPARED.”

Pocket cards for the Wards

The following “cards” contain information that is often helpful during the surgery rotation. We advise that you make a copy of these cards, cut them out, and carry them in your coat pocket when you are on the wards.

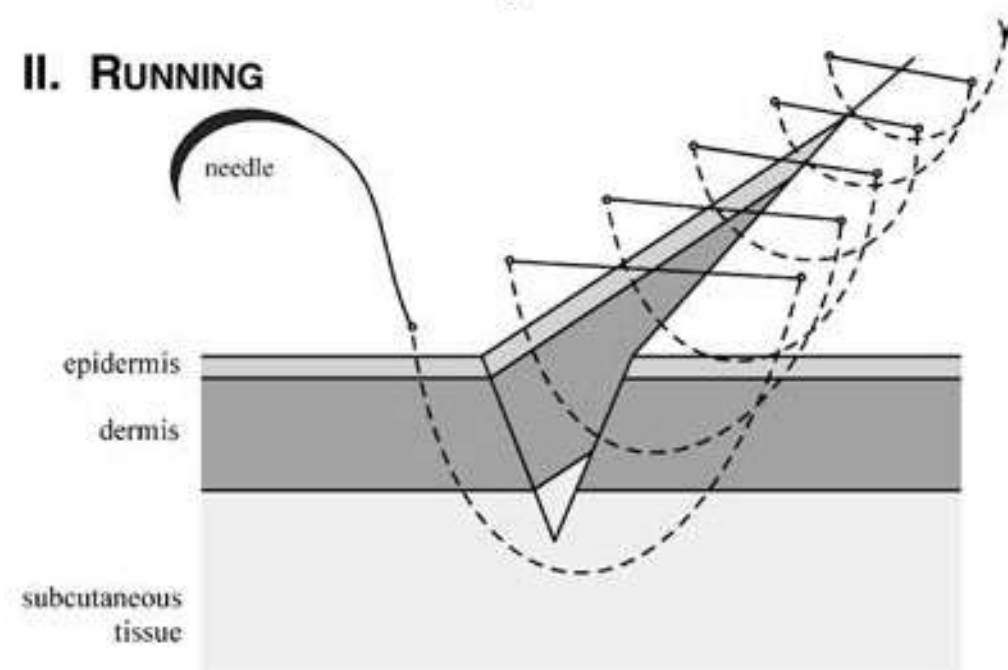
SUTURE TECHNIQUE

I. SIMPLE INTERRUPTED



- Used to close most simple wounds
- Edges should always be everted to prevent depression of scar. Do this by entering needle at 90 degrees to skin surface and follow curve of needle through skin.
- Entrance and exit point of needle should be equidistant from laceration.
- Do not place suture too shallow, as this will cause dead space.
- Use instrument tie or surgeons knot and place knot to one side of laceration not directly over laceration.

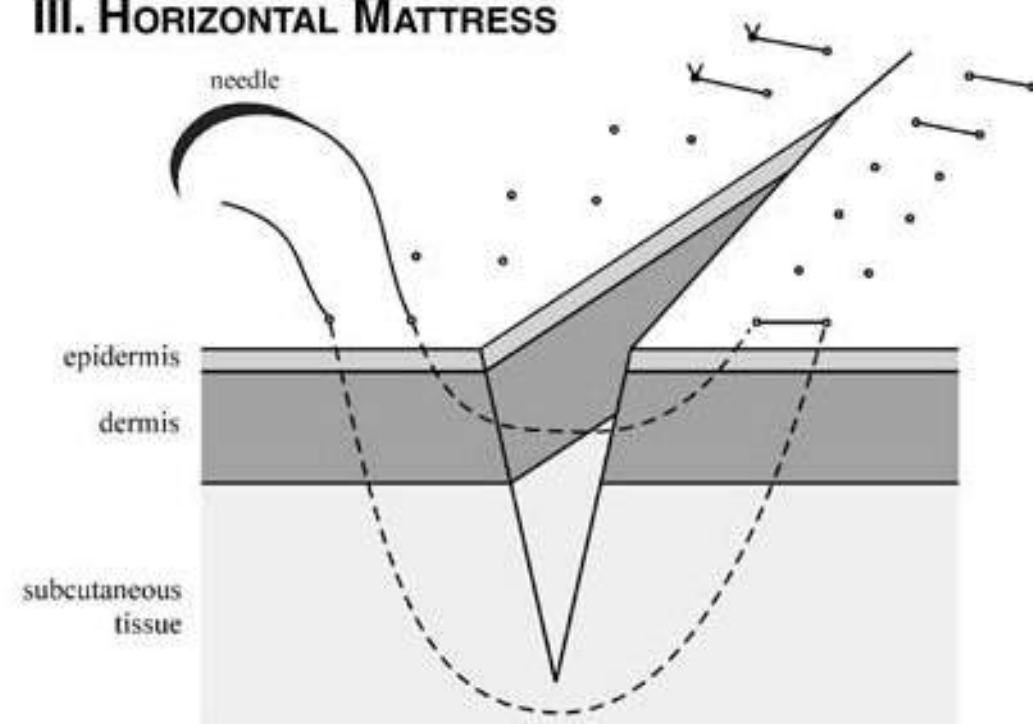
II. RUNNING



- Not commonly used in the ED
- Disadvantage: One nicked stitch or knot means the entire suture is out.
- Advantage: Done well with sturdy knots, it provides even tension across wound.

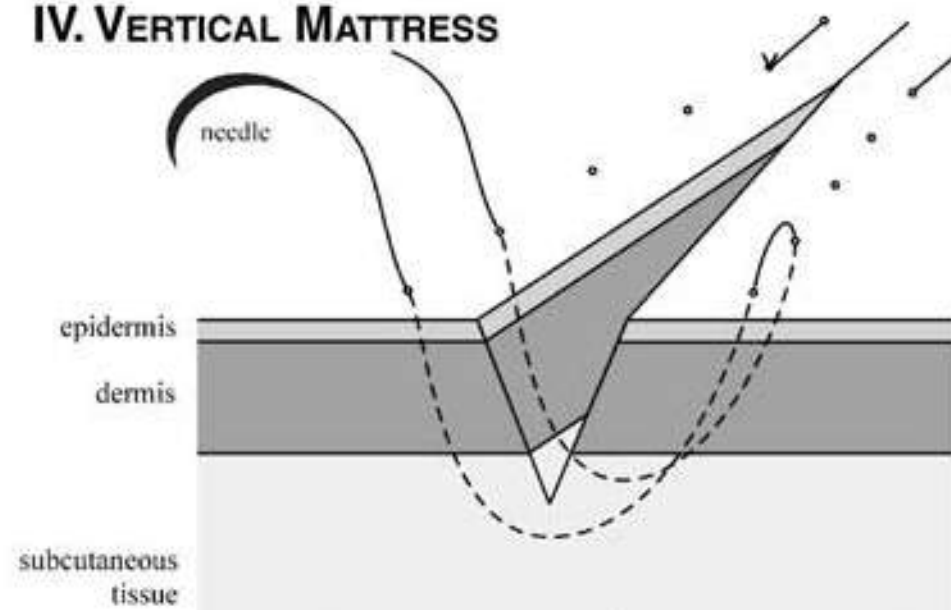
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III. HORIZONTAL MATTRESS



- This suture also assists in wound edge eversion and helps to spread tension over a greater area.
- This stitch starts out like a simple interrupted suture; however, after the needle exits, it then enters again on the same side that it exited from only a few millimeters lateral to the stitch and equidistant from the wound edge and exits on the opposite side.

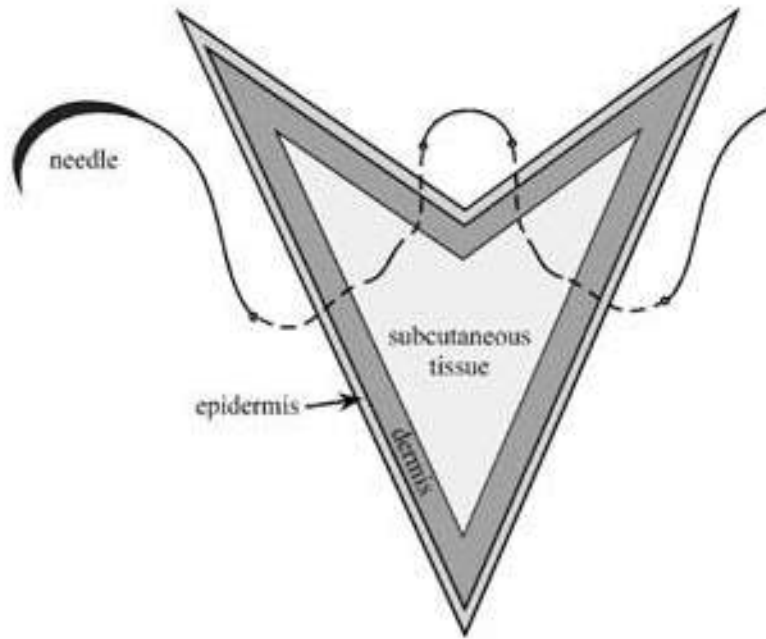
IV. VERTICAL MATTRESS



- This suture helps in reducing dead space and in eversion of wound edges.
- It does not significantly reduce tension on wound.
- The needle enters the skin farther away (more lateral) from the laceration than the simple interrupted and also exits further away on the opposite side.
- It then enters again on the same side that it just exited from but more proximal to the laceration and exits on the opposite side (where it originally entered) proximally.

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V. CORNER STITCH



- This is used to repair stellate lacerations and help to preserve the blood supply to the tips of the skin.
- The needle enters the epidermis of the nonflap or nontip portion of the wound.
- It then enters the dermal layer of the skin tip on one side and proceeds through the dermal layer to exit the dermis on the other side of the tip (this portion will be buried).
- It then enters and exits the other side of the stellate wound. It will appear as a simple interrupted suture.

VI. DEEP SUTURES

- Absorbable
- Used for multilayered closure
- Deep sutures are absorbable because you will not be removing them.
- Use your forceps (pickups) to hold the skin from the inside of the wound.
- The first stitch is placed deep inside wound and exits superficially in dermal layer on same side of wound.
- Then it enters in the superficial dermal layer on the opposite side and exits deep.
- Tie a square knot and cut the tail of the suture close to the knot, which is called a buried knot.
- Now proceed with your superficial closure of the skin with nonabsorbable sutures.

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| LOCATION | SUTURE SIZE & TYPE | SUTURE TECHNIQUE | REMOVAL |
|----------------|--|--|------------|
| Scalp | 3-0 or 4-0 nylon or polypropylene | Interrupted in galea, single tight layer in scalp, horizontal mattress if bleeding not well controlled | 7-12 days |
| Pinna | 5-0 Vicryl/Dexon in perichondrium | Close perichondrium with interrupted Vicryl and dose skin with interrupted nylon | 3-5 days |
| Eyebrow | 4-0 or 5-0 Vicryl (SQ) 6-0 nylon for skin | Layered closure | 3-5 days |
| Eyelid | 6-0 nylon | Single-layer horizontal mattress or simple interrupted | 3-5 days |
| Lip | 4-0 Vicryl (mucosa) 5-0 Vicryl (SQ or muscle) 6-0 nylon (skin) | If wound through lip, close three layers (mucosa, muscle, skin); otherwise do two-layer closure | 3-5 days |
| Oral cavity | 4-0 Vicryl | Simple interrupted or horizontal mattress if muscularis of tongue involved | N/A |
| Face | 6-0 nylon (skin) 5-0 Vicryl (SQ) | Simple interrupted for single layer, layered closure for full-thickness laceration | 3-5 days |
| Trunk | 4-0 Vicryl (SQ, fat) 4-0 or 5-0 nylon (skin) | Single or layered closure | 7-12 days |
| Extremity | 3-0 or 4-0 Vicryl (SQ, fat, muscle) 4-0 or 5-0 nylon (skim) | Single-layer interrupted or vertical mattress; apply splint if over a joint | 10-14 days |
| Hands and feet | 4-0 or 5-0 nylon | Single-layer closure with simple interrupted or horizontal mattress; apply splint if over a joint | 7-12 days |
| Nail bed | 5-0 Vicryl | Meticulous placement to obtain even edges, allow to dissolve | N/A |

SECTION II

High-Yield Facts For The Surgeon Clerks

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the surgical patient

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WARD TIP

Ask yourself: What does the patient need in order to undergo the operation with the lowest risk possible?



WARD TIP

Patients with aortic stenosis are at increased risk for ischemia, myocardial infarction (MI), and sudden death.



WARD TIP

Stress test is positive if ST depressions > 0.2 mV are present or if there is an inadequate response of heart rate to stress or hypotension.



Exam TIP

- Goldman's Index: Top Risks
 - #1—CHF
 - #2—MI within 6 months
 - #3—Arrhythmia
 - #4—Age > 70
 - #5—Emergent Surgery



Exam TIP

- Absolute Contraindication to Surgery: DKA



WARD TIP

Echo is concerning when there is evidence of aortic stenosis (AS) or if the ejection fraction (EF) is $< 35\%$.



WARD TIP

Low-risk patients require only history and physical (H&P) and ECG. Higher-risk patients may require further workup as described above.

Preoperative Evaluation

- Thorough history and physical exam.
- Optimization of any medical problems (i.e., cardiac or pulmonary diseases).

Anesthetic history

Note any prior anesthetics and associated complications.

the ASA Physical Status Classification system

See Anesthesia chapter.

evaluate Airway

Mallampati Classification (Figure 1-1) predicts difficulty of intubation. Test is performed with the patient in the sitting position, the head held in a neutral position, the mouth wide open, and the tongue protruding to the maximum.

- Class I: Visualization of soft palate, fauces, uvula, anterior and posterior tonsillar pillars.
- Class II: Visualization of soft palate, fauces, uvula.
- Class III: Visualization of soft palate, base of uvula.
- Class IV: Nonvisualization of soft palate.

Cardiac Risk Assessment

- For a patient greater than 40 years old with no cardiac history: Obtain electrocardiogram (ECG); if normal, no further workup required.
- For a patient of any age with cardiac history, or for an older patient: Obtain ECG; consider stress test and echocardiogram.

Goldman's risk assessment for noncardiac surgery (see Figure 1-2).

Pulmonary Risk Assessment

risk factors for Pulmonary complications

- Known pulmonary disease.
- Abnormal pulmonary function tests (PFTs) (FEV < 11 , maximum breathing capacity $< 50\%$ predicted).
- Smoking.
- Age > 60 .
- Obesity.

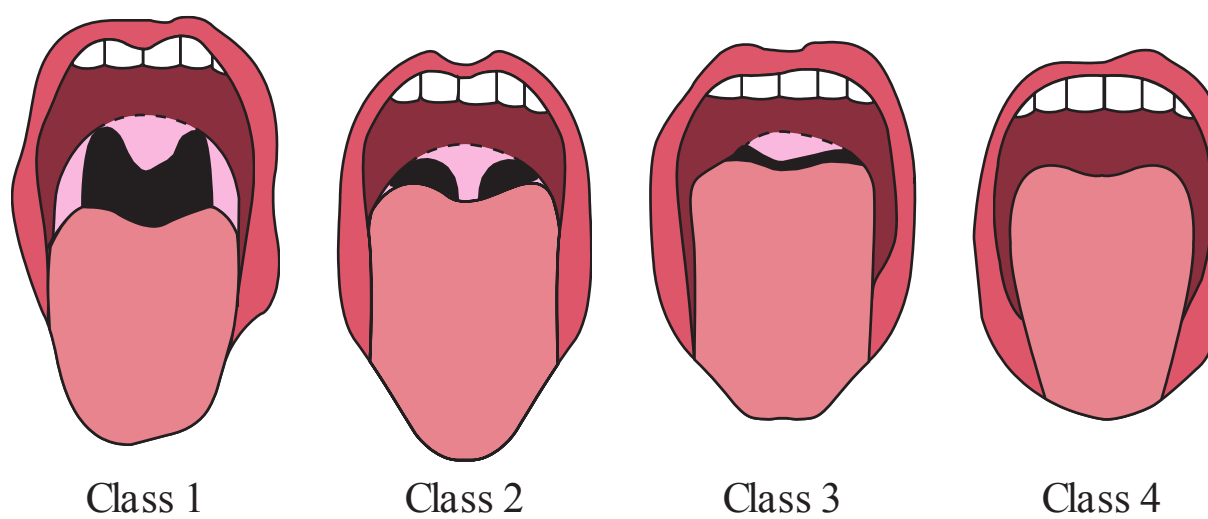


Figure 1-1. Mallampati classification of ease of intubation.

| points | | Probability of life-threatening complications |
|---|----|---|
| S3 gallop or JVD on exam | 11 | Add points to get risk 0–5 = class I = 1% 6–12 = class II = 5% 13–25 = class III = 11% >25 = class IV = 22% |
| MI within 6 months | 10 | |
| >5 PVCs/minute | 7 | |
| Rhythm other than sinus rhythm (SR) or SR with APCs on last ECG | 7 | |
| Age >70 | 5 | |
| Emergent operation | 4 | |
| Intrathoracic, intraperitoneal, or aortic surgery | 3 | |
| Significant aortic stenosis | 3 | |
| Poor general medical condition | 3 | |

Figure 1-2. Goldman's risk assessment for noncardiac surgery. (Reproduced, with permission, from Goldman L, Caldera DL, Nussbaum SR, et al. Multifactorial index of cardiac risk in noncardiac surgical procedures. *N Engl J Med* 297:845, 1977.)

- Upper abdominal or thoracic surgery.
- Long OR time.

Goals to reduce risks

- Decrease or cease smoking (benefit if at least 8 weeks preoperatively).
- Increase/optimize bronchodilator therapy.

Ways to decrease complications

- Incentive spirometry.
- Early postop ambulation.
- Chest physical therapy (PT).
- Deep vein thrombosis (DVT) prophylaxis by sequential compression device (SCD) and subcutaneous heparin.

Hepatic Risk Assessment

There are two methods to determine Hepatic risk: The Child's Classification (see Table 1-1) and the Model for End-stage Liver Disease (MELD) (see below).

Table 1-1. Child's classification

| Measure | 1 point | 2 points | 3 points |
|--|------------|--|------------------------------|
| Total bilirubin, $\mu\text{mol/L}$ (mg/dL) | < 34 (< 2) | 34–50 (2–3) | > 50 (> 3) |
| Serum albumin, g/dL | > 3.5 | 2.8–3.5 | < 2.8 |
| Prothrombin time, prolongation (seconds) | < 4.0 | 4.0–6.0 | > 6.0 |
| Ascites | None | Mild | Moderate to severe |
| Hepatic encephalopathy | None | Grade I–II (or suppressed with medication) | Grade III–IV (or refractory) |

MELD Score

$$\text{MELD} = 3.78 \times \ln [\text{serum bilirubin (mg/dL)}] + 11.2 \times \ln [\text{INR}] + 9.57 \times \ln [\text{serum creatinine (mg/dL)}] + 6.43.$$



WARD TIP

Echocardiography:

- Sensitivity 90–100%
- Specificity 50–80%
- Fixed defects, or defects that persist with time, indicate infarcted or scarred tissue.
- Reversible defects are more concerning: Normal and fixed defects have similar negative predictive values for cardiac events.



EXAM TIP

Up to 35% of postoperative deaths are due to pulmonary complications.



WARD TIP

Major abdominal surgery decreases vital capacity by 50% and functional residual capacity by 30%.



WARD TIP

- $\text{FEV}_1 < 70\%$ predicted indicates increased risk.
- If $\text{VO}_2 > 20$, patient not likely to have pulmonary complications.



EXAM TIP

Heparin-induced thrombocytopenia (HIT).



WARD TIP

Because of the method by which they work (accentuate systemic thrombolysis) one SCD should work as well as two if one leg is injured.



WARD TIP

Atelectasis and/or pneumonia affect 20–40% of all postoperative patients.



EXAM TIP

Pneumonia has the highest morbidity and mortality of all pulmonary complications. The mortality of elderly patients with postoperative pneumonia is 50%.



WARD TIP

Remember that fluid mobilization typically occurs on postoperative day 2 or 3.



WARD TIP

$\text{NH}_3 > 150$: Mortality 80%
 $\text{INR} > 2$: Mortality 40–60%



EXAM TIP

Increased BUN and creatinine indicate a loss of at least 75% of renal reserve. Intra- and postop hypotension must be strictly avoided in renal patients.

cAutions

- Watch for prolonged elevations in drug levels in patients with preoperative liver dysfunction.
- Acute hepatitis is relative contraindication to surgery.
- Attempt to control ascites prior to elective surgery, with fluid restriction, diuretics, and nutritional therapy.

Renal Risk Assessment

Preoperative evaluation

- Check blood urea nitrogen (BUN) and creatinine.
- Estimate preoperative creatinine clearance (Cockcroft Gault equation):

$$\frac{[(140 - \text{age}) \times \text{Ideal body weight in kilograms}]/72 \times \text{Plasma creatinine (mg/dL)}}{\text{Plasma creatinine (mg/dL)}}$$
- Maintain intravascular volume.
- Ensure electrolytes are repleted; correct acidosis.
- Dialysis patients should be dialyzed within 24 hours prior to surgery to best control creatinine, electrolytes, and uremic platelet dysfunction.

dialysis

- Overall mortality for dialysis-dependent patients: 5% (even when dialyzed within 24 hours of surgery).
- Acute renal failure that develops in perioperative period requiring dialysis is associated with a mortality of approximately 50–80%.
- Morbidity: Shunt thrombosis, pneumonia, wound infection, hemorrhage.

Hematological Assessment

Preoperative Labs

- Check complete blood count (CBC).
- Blood should be typed and crossed.

Anemia

- Determine cause.
- Postpone elective operations.
- Patients with chronic hypoxia, ischemic heart disease, or cerebral ischemia do not tolerate anemia well.
- Sickle cell patients have increased risk of vaso-occlusive crises with operations. (This increased risk does not include patients with sickle cell trait.)

thrombocytopenia

See Table 1-2.

Table 1-2. Risk of postoperative Bleeding by platelet count

| Platelets | Likelihood of Bleed Perioperatively |
|-----------------|---|
| > 150,000 | Normal |
| 100,000–150,000 | Unlikely |
| 50,000–100,000 | Unlikely with adequate hemostasis |
| 20,000–50,000 | Possible excessive surgical bleeding |
| 10,000–20,000 | Spontaneous mucosal and cutaneous bleeding |
| < 10,000 | Major spontaneous mucosal bleed, including GI tract |

coAGulopathy

- Check prothrombin time (PT) and partial thromboplastin time (PTT) preoperatively.
- Note that elevated values should be expected in patients with liver disease.
- Factor abnormalities should be addressed (e.g., with hemophilia).

Nutritional Assessment

- Ideal body weight (IBW) = 50 kg + 2.3 kg/inch over 5 ft (male) or 45.5 kg + 2.3 kg/inch over 5 ft (female).
- Body mass index (BMI) = kg/m^2 .
 - Loss of > 10% body weight in 6 months or a serum albumin level of < 3 is a poor prognostic indicator.

Antibiotic Prophylaxis

by type of surgery

- In general: Cefazolin.
- Gastrointestinal (GI) surgery: Cefazolin and metronidazole.
- Urologic procedures: Ciprofloxacin.
- Head and neck: Cefazolin or clindamycin and gentamicin.

General Postoperative Complications

- Immediate (0–24 hours):
 - Primary hemorrhage—either starting during surgery or following postoperative increase in blood pressure: Replace blood loss, and may require return to OR to reexplore.
 - Basal atelectasis.
 - Shock: Blood loss, acute MI, arrhythmias, pulmonary embolism (PE).
 - Oliguria: (hypotension intra- or postoperatively).

Exam TIP

The risk of bleeding increases in patients with BUN > 100 due to platelet dysfunction, which can be corrected by desmopressin (DDAVP).



WARD TIP

The most common complication in dialysis is hyperkalemia (in nearly one third of patients).



WARD TIP

To determine source of a renal problem:

- $FE_{Na} > 1$ = intrinsic damage
- Specific gravity = 1.010 in ATN
- $U_{Na} < 20$ in prerenal



WARD TIP

- Risk of bleeding is further increased at any platelet level if patient is septic or has a functional platelet deficit.
- One unit of platelets raises platelet count by 5,000–10,000.