

STEVEN L. COHN

DECISION MAKING IN
**Perioperative
Medicine**

CLINICAL PEARLS

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Decision Making in Perioperative Medicine

Clinical Pearls

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Decision Making in Perioperative Medicine

Clinical Pearls

EDITOR

Steven L. Cohn, MD, MACP, SFHM

Professor Emeritus

Department of Medicine

University of Miami Miller School of Medicine

Miami, Florida



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To my family, I would like to thank my wife, Debbie, and children Alison and Jeff, for their love and encouragement. And to my parents, I dedicate this book to you in recognition of the unfaltering support you provided throughout my educational and professional career; I share this latest accomplishment in your memory.

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Contributors

Steven L. Cohn, MD, MACP, SFHM

*Professor Emeritus
Department of Medicine
University of Miami Miller School of Medicine
Miami, Florida
Chapters 1, 2, 4, 8, 9, 10, 36*

Darin J. Correll, MD

*Associate Medical Director for Clinical Development
Pain Division
Vertex Pharmaceuticals
Boston, Massachusetts
Chapter 42*

Jeffrey B. Dobyms, DO, MSHA, MSHQS, FASA

*Associate Medical Director
UAB Perioperative Optimization and Transition Units
Associate Professor
Department of Anesthesiology
University of Alabama
Tuscaloosa, Alabama
Chapter 3*

James D. Douketis, MD, FRCP(C), FACP, FCCP

*Staff Physician in Vascular Medicine and General
Internal Medicine
St. Joseph's Healthcare
Professor
Department of Medicine
McMaster University
Hamilton, Ontario
Chapter 5*

Leonard Feldman, MD, FACP, SFHM, FAAP

*Program Director
Combined Internal Medicine-Pediatrics
Urban Health Residency Program Director
Comprehensive General Medicine Consult Service
Associate Program Director
Osler Medical Residency
Associate Professor
Department of Medicine and Pediatrics
Johns Hopkins School of Medicine
Baltimore, Maryland
Chapter 18*

Patrick C. Foy, MD

*Associate Program Director
Hematology–Oncology Fellowship
Assistant Professor
Department of Medicine and Hematology
Medical College of Wisconsin
Milwaukee, Wisconsin
Chapter 22*

Paul J. Grant, MD, SFHM, FACP

*Chief Medical Information Officer
Director Perioperative and Consultative Medicine
Associate Professor
Department of Medicine
University of Michigan
Ann Arbor, Michigan
Chapter 4*

Scott Kaatz, DO, MSc, FACP, SFHM

*Senior Staff Hospitalist
Medical Director for Professional Development and Research
Clinical Professor
Department of Medicine
Henry Ford Hospital
Detroit, Michigan
Chapters 5, 39*

Smita Kohli Kalra, MD, FHM

*Associate Professor
Department of Medicine
University of California Irvine School of Medicine
Orange, California
Chapter 6*

Efrén Manjarrez, MD, SFHM, FACP

*Associate Professor
Department of Medicine
University of Miami Miller School of Medicine
Miami, Florida
Chapters 14, 35*

Gregary D. Marhefka, MD, FACC, FACP

*Program Director
Cardiovascular Disease Fellowship
Co-Director
Cardiovascular Intensive Care Unit
Associate Professor
Department of Medicine and Cardiology
Sidney Kimmel Medical College at Thomas Jefferson University
Philadelphia, Pennsylvania
Chapters 11, 12*

Heather E. Nye, MD, PhD, SFHM

*Associate Chief of Medicine
Director
Co-management and Consult Service
VA Healthcare System
Professor
Department of Medicine and Pediatrics
University of California at San Francisco
San Francisco, California
Chapters 31, 41*

Avital Y. O'Glasser, MD, FACP, FHM

*Medical Director
Preoperative Medicine Clinic
Assistant Program Director
Social Media and Scholarship
Associate Professor
Department of Medicine
Oregon Health and Science University
Portland, Oregon
Chapters 25, 33*

Kurt Pfeifer, MD, FACP, SFHM

*Chief
Section of Perioperative and Consultative Medicine
Professor
Department of Medicine
Medical College of Wisconsin
Milwaukee, Wisconsin
Chapters 15, 16, 17, 22*

Nidhi Rohatgi, MD, MS, FACP, SFHM

*Chief
Surgical Co-Management Division of Hospital Medicine
Clinical Associate Professor
Department of Medicine
Stanford University Medical Center
Stanford, California
Chapters 13, 26, 27, 37*

Linda A. Russell, MD

*Ann and Joel Ehrenkranz Chair in Perioperative Medicine
Director of Perioperative Medicine
Director of the Osteoporosis and Metabolic Bone Center
Associate Professor of Clinical Medicine
Department of Medicine
Weill Cornell Medical College–Hospital for Special Surgery
New York City, New York
Chapter 28*

Sunil K. Sahai, MD, FAAP, FACP, SFHM

*Division Chief
General Medicine Department of Internal Medicine
Edna S. & William C. Levin Professorship in Internal
Medicine
Professor
Department of Medicine
University of Texas Medical Branch at Galveston
Galveston, Texas
Chapters 20, 29, 30, 32*

Jeffrey W. Simmons, MD, MSHQS, FASA

*Vice President
UAB Health Systems
Community Practices
Associate Professor
Department of Anesthesiology and Perioperative
Medicine
University of Alabama
Tuscaloosa, Alabama
Chapters 3, 32*

Barbara Slawski, MD, MS, SFHM

*Chief
Section of Hospital Medicine
Professor
Department of Medicine and Orthopaedic Surgery
Medical College of Wisconsin
Milwaukee, Wisconsin
Chapters 21, 24, 40*

Gerald W. Smetana, MD, MACP

*Professor
Department of Medicine
Harvard Medical School
Beth Israel Deaconess Medical Center
Boston, Massachusetts
Chapters 2, 15*

Cornelia Taylor, MD

*Lead hospitalist
Perioperative Comanagement Program
Providence Portland Medical Center
Portland, Oregon
Chapter 38*

Brahm Vasudev, MD

*Director
Nephrology Fellowship Training Program
Associate Professor
Medical College of Wisconsin
Milwaukee, Wisconsin
Chapters 24, 40*

J. Njeri Wainaina, MD, FACP

*Medical Director
Preoperative Clinic
Froedtert Hospital
Associate Professor
Department of Medicine and Surgery
Medical College of Wisconsin
Milwaukee, Wisconsin
Chapters 7, 23, 34*

Paul J. Wang, MD, FAHA, FACC, FHRS, FESC

*Director
Cardiac Arrhythmia Service
Professor
Department of Medicine and Cardiology
Stanford University Medical Center
Stanford, California
Chapters 13, 37*

Howard H. Weitz, MD, MACP, FACC, FRCP

*Senior Associate Dean
Bernard L. Segal Professor of Clinical Cardiology
Department of Medicine and Cardiology
Sidney Kimmel Medical College at Thomas Jefferson
University
Philadelphia, Pennsylvania
Chapters 11, 12*

Christopher M. Whinney, MD, FACP, SFHM

*Chairman
Department of Hospital Medicine
Clinical Assistant Professor
Department of Medicine
Cleveland Clinic Lerner College of Medicine
Cleveland, Ohio
Chapters 19, 20, 29*

Preface

Worldwide, over 200 million people undergo major surgery every year. Although patients are unlikely to die from anesthesia, the burden of perioperative complications falls more on exacerbations of underlying medical conditions, in part because we are operating on older and sicker patients. While it is unrealistic to believe that perioperative deaths and complications can be completely eliminated, our goal is to minimize this risk as much as possible.

With the explosion of medical knowledge, treatment innovation, and increasing specialization, it is difficult for any physician to keep current with the constant influx of information. While surgeons, anesthesiologists, and some hospitalists may spend a major portion of their clinical time caring for patients in the perioperative period, many other hospitalists, primary care physicians, and their teams of nurse practitioners and physicians assistants may need guidance to address specific issues for their patients before and/or after surgery. The goal of this book is to provide a simple, direct guide to the medical, as opposed to surgical and anesthetic, aspects of perioperative care. It is not intended to be a comprehensive textbook, and references have deliberately been limited to keep the focus on the practical aspects of patient care. This book is intended for use by all members of the perioperative team - hospitalists, general internists and specialists, anesthesiologists, surgeons, advanced practice providers, and residents in-training who are caring for patients before and after surgery.

The genesis of this book comes from a lecture I gave at the annual meeting of the American College of Physicians. Attendees at the session asked many questions - which risk calculator should I use, how long should surgery be delayed after percutaneous coronary intervention (PCI), should aspirin be continued, how long before surgery should I stop a direct-acting oral anticoagulant (DOAC), who needs

bridging, should surgery be delayed for a sleep study, and many more. They also repeatedly requested lists of risk factors, tables for medication management, and algorithms for the approach to evaluation and management of various comorbid conditions. This book is a response to these requests. I invited leading experts to distill their vast knowledge and experience into focused, need-to-know information that will be useful to clinicians at the point-of-care. Over two-thirds of the book contributors are senior faculty members with professor or associate professor appointments and serve as section chiefs and perioperative clinic or service directors. The result is this practical decision-making reference which incorporates information from multiple guidelines, clinical trials, and expert opinion. It uses algorithms, tables, and clinical pearls to summarize the key concepts and takeaways.

Our collective goal is to navigate clinicians to the best evidence-based and most cost-effective decisions that will in turn ensure quality, patient-safety, and optimal perioperative outcomes. To this end, the content has been organized into four sections:

1. key takeaways on perioperative evaluation, testing, anesthesia, and medication management;
2. prophylaxis to prevent venous thromboembolism, surgical site infection, and endocarditis;
3. guidance on specific risk factors by organ system to help clinicians evaluate the effect of various comorbidities on surgical outcome and provide perioperative management to minimize risk; and
4. a brief review of common postoperative medical complications and their treatment.

The field of perioperative medicine continues to evolve, and new information may make previous guidelines and recommendations obsolete. Errors,

inaccuracies, and omissions are an inevitable part of any human endeavor, and the reader is urged to use this book in the context of clinical judgment and confirm information, particularly as it relates to medications and dosing. This book was written during a difficult time – the COVID-19 pandemic. We have not witnessed anything like this in the modern era. At the time this book was going to press, over 2,100,000 lives have been lost worldwide (over 425,000 in the U.S. alone), and the numbers continue to increase. It has burdened our health system and changed surgical practice. The coronavirus affects multiple organ systems, and we do not fully know the extent of its after-effects. Scheduling and operating room procedures have changed and continue to evolve, guided by recommendations from various societies, and perioperative testing for COVID-19 varies by hospital and test availability. There are currently no specific guidelines for any changes to perioperative evaluation and

testing of patients who have had COVID-19. Due to this lack of information and the evolving nature of the problem, I have chosen not to include a chapter on this topic.

With over 30 years of experience in perioperative medicine and having served as the director of preoperative clinics and medical consultation services at two major academic medical centers (SUNY Downstate Medical Center/Kings County Hospital and University of Miami Miller School of Medicine/Jackson Memorial Hospital), I have dedicated my medical career to the field of perioperative medicine. I hope that this book will provide key information to increase knowledge and instill confidence in clinicians providing perioperative care, and as a result help ensure optimal patient outcomes.

–**Steven L. Cohn, MD, MACP, SFHM**

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About the Editor

Dr. Cohn is Professor Emeritus in the Department of Medicine at the University of Miami Miller School of Medicine. He is the former Director of the Medical Consultation Service at Jackson Memorial Hospital and Medical Director of the UHealth Preoperative Assessment Center (UPAC) and Medical Consultation Service at the University of Miami Hospital, having relocated to Miami after 30 years at the State University of New York - Downstate Medical Center in Brooklyn. He served as the Chief of the Division of General Internal Medicine and Associate Medical Director for Performance Improvement at Downstate, and the Director of the Preoperative Medical Consultation Clinic and Medical Consultation Service at Kings County Hospital Center. He was responsible for education and supervision of over 1000 senior medical residents in both inpatient and ambulatory care settings, and he has evaluated over 30,000 patients preoperatively. After receiving his medical degree from the University of Monterrey, Dr. Cohn completed his residency in internal medicine at SUNY-Downstate Medical Center. He is a Master of the American College of Physicians (ACP), a senior fellow of the Society for Hospital Medicine (SHM), and a board member of the Society for Perioperative Assessment and Quality Improvement (SPAQI). He has given over 400 lectures, authored/edited three books and over 100 book chapters and peer-reviewed manuscripts, and in 2017, he received the Society for Hospital Medicine award for Excellence in Teaching.

INTRODUCTION TO PERIOPERATIVE PATIENT CARE

Role of the Perioperative Medical Consultant

Steven L. Cohn, MD, MACP, SFHM

INTRODUCTION

Preoperative medical consultation and perioperative management of the surgical patient are important roles in the clinical practice of internists, hospitalists, and subspecialists. The role of the hospitalist has expanded to include comanagement for orthopedic, neurosurgical, vascular, and other surgical patients, and even the role of the anesthesiologist has evolved, focusing on perioperative medicine outside the operating room setting as well. This chapter will discuss principles of medical consultation and the role of the perioperative medical consultant. Specifics regarding risk assessment and management will be discussed in subsequent chapters.

ROLE OF THE PERIOPERATIVE MEDICAL CONSULTANT

The role of the perioperative medical consultant can be described as having three main goals:

1. Preoperative risk stratification – to define and evaluate the patient's current medical conditions, uncover previously unrecognized problems, and estimate the patient's surgical risk
2. Medical optimization – to recommend risk reduction strategies, perioperative medication management, and any additional testing if indicated
3. Postoperative follow-up – to re evaluate medical problems, ensure compliance with recommendations

and medical therapy, provide advice, and anticipate, recognize, and treat any postoperative medical complications

GENERAL PRINCIPLES OF MEDICAL CONSULTATION

In 1983 Goldman and colleagues¹ published their “Ten Commandments” for effective consultation which were modified in 2007 by Salerno and colleagues² (Table 1-1). These basic principles included: 1) Determine the question. 2) Establish urgency. 3) Look for yourself. 4) Be as brief as appropriate. 5) Be specific and concise. 6) Provide contingency plans. 7) Honor thy turf. 8) Teach with tact. 9) Talk is cheap and effective. 10) Follow-up. The basic meaning of these concepts is noted in Table 1-1, and they will be highlighted throughout this discussion.

Types of Consultation

It is important to recognize different types of consultation requests. The traditional or standard medical consult is a formal request from the patient's attending physician/surgeon to evaluate the patient and answer a specific question. In this role, the consultant is expected to address the question and provide advice and recommendations, but not to write orders, request additional consultants, or assume primary care of the patient. The consultant focuses on

TABLE 1-1. Original and Modified Ten Commandments for Effective Consultations			
	1983 COMMANDMENTS ¹	2006 MODIFICATIONS ²	MEANING AND MODIFICATION
1	Determine the question.	Determine <i>your customer</i> .	If the specific question is not obvious, call the requesting physician – <i>and ask if they want comanagement</i> .
2	Establish urgency.	Establish urgency.	Determine whether the consultation is emergent, urgent, or elective.
3	Look for yourself.	Look for yourself.	Gather data independently to be most effective.
4	Be brief as appropriate.	Be brief as appropriate.	No need to repeat in full detail the data that were already documented.
5	Be specific.	Be specific, <i>be thorough, and descend from thy ivory tower to help when requested</i> .	Limit recommendations to improve likelihood of compliance vs. <i>leave as many specific recommendations as needed but offer assistance in order writing if needed</i> .
6	Provide contingency plans.	Provide contingency plans <i>and discuss their execution</i> .	Anticipate potential problems, document therapeutic options <i>and contingency plans, and provide 24-hour contact information for help if needed</i> .
7	Thou shalt not covet thy neighbor's turf.	Thou <i>may negotiate joint title</i> to thy neighbor's turf.	In most cases, consultants should play a subsidiary role; <i>however, consultants can and should co manage any facet of patient care the requesting physician desires (but clarify who is responsible for what)</i> .
8	Teach with tact.	Teach with tact <i>and pragmatism</i> .	Sharing your expertise is appreciated – <i>although decisions on leaving references should be tailored to the requesting physician's specialty, level of training, and urgency of the consult</i> .
9	Talk is cheap and effective.	Talk is <i>essential</i> .	There is no substitute for direct personal contact with the primary physician.
10	Provide appropriate follow-up.	Follow-up <i>daily</i> .	Recognize when to fade into a background role, but that time is almost never on the same day as the consult. <i>Daily written follow-up notes are desirable, but when problems are no longer active, sign-off after discussing with the requesting physician</i> .

Data from Salerno et al. *Arch Intern Med*. 2007; 167:271-275 and Goldman et al. *Arch Intern Med*. 1983;143(9):1753-1755.

the specific problem rather than other medical issues, follows-up briefly in the postoperative period, and then signs off. More recently, many surgeons are requesting the medical consultant to assume more of a co management role taking a more global approach, addressing all necessary medical issues, writing orders, and providing daily follow-up. The responsibilities of

the consultant and the surgical team need to be clearly defined in advance. Another type of consultation is the so-called “curbside” or informal consult in which the consultant is asked to provide an opinion or advice without personally seeing the patient. These should be discouraged from a medicolegal standpoint as there is no formal doctor-patient relationship although at

times this has been challenged in court. Instead, the consultant should offer to perform a formal consult, but if any advice is given, it should be generic and simple. The “consultant” should also inform the requesting physician not to refer to him in the medical record.

Determining the Question

Although incumbent on the requesting physician to clearly define the reason for the consultation and provide relevant information, this is often not the case. Many consult requests only state “medical clearance” or “preoperative evaluation” without mentioning the medical problems or even the type of surgery planned. Therefore, it is imperative for the consultant to determine what is being requested to be able to respond appropriately. The best way to clarify the question is by direct verbal communication with the requesting physician.

Answering the Question

In order to decide whether the patient is medically optimized for surgery, the consultant must identify and address any specific medical problem mentioned as well as any others that may impact surgical risk. As noted above, there has been a shift from the traditional consult to more of a comanagement request, and the consultant now tends to address more than just the specific disease that was initially mentioned. The basic approach on how to answer the question is listed in Table 1-2. The consultant should also avoid use of the phrase “cleared for surgery,” even if that was the request, as it implies that the procedure carries no risk for the particular patient when all patients are potentially at some risk when they undergo anesthesia and surgery. The consultant cannot and should not guarantee a complication-free outcome.

TABLE 1-2. My Ten Commandments for how to Answer the Question

QUESTIONS TO BE ADDRESSED	ANSWERS
1) What’s wrong?	List all the patient’s relevant medical conditions.
2) How bad is it?	Describe the severity of the disease.
3) Is it adequately controlled?	Ensure stability of the disease as well as appropriate medical therapy.
4) Does it affect surgical risk?	Decide if this disease has an important impact on risk and whether it requires treatment now.
5) Are additional tests indicated to improve risk estimation or change management?	Ascertain what other information, if any, will affect clinical decision-making.
6) Are there treatments that will reduce risk?	Determine what treatments are available that might lower risk of perioperative complications without potential for harm.
7) How urgent is the surgery?	Decide if there is enough time to do something if necessary.
8) Should surgery be postponed for further workup and treatment?	Assess whether the patient is medically optimized or would benefit in terms of lower risk by additional workup or therapy now as opposed to after surgery.
9) What do the surgeon and anesthesiologist think?	Communicate with your colleagues and get their input.
10) What do the patient and family want?	Discuss risks/benefits with the patient/family to involve them in decision-making.

Demographics	Patient information (name, DOB, MR#) Reason for consult Referring physician/service/contact info Surgery: planned procedure/date Anesthesia: type, if known
Pertinent medical problems (positive or negative)	Cardiopulmonary disease, HTN, DM, thyroid disease, bleeding disorder, stroke, seizures
Past surgical history	Operations, type of anesthesia, date, complications
Social history	Tobacco, alcohol, drug use – amount, duration, last use
Medications – Rx and OTC (home and hospital)	Name, dose, frequency, compliance
Allergies	Description of allergic reaction
Pertinent family history	Genetically related diseases: malignant hyperthermia, bleeding disorders
Review of systems (focused)	Cardiopulmonary (chest pain, dyspnea, cough), exercise capacity/ADLs, bleeding/bruising
Physical exam	Vital signs, usual exam with focus on airway, dentition, murmur/gallop, adventitious sounds, neurologic deficit, mental status/cognitive dysfunction
Lab tests	Patient and surgery directed testing (pertinent basic blood tests, ECG) and any specific results of relevant recent/past cardiac tests (stress test, echocardiogram, coronary angiography, pacemaker interrogation), PFTs, head CT/MRI, carotid dopplers, etc.
Impression	Patient is/is not in his/her optimal medical condition (or is medically optimized) for the planned procedure
Recommendations	Current meds (continue, stop, change dose), new meds, prophylaxis (SSI, VTE, IE), postop monitoring (ECG, troponin, telemetry, pulse oximetry)
Discussion	Discuss specifics of pertinent problems (severity, stability, degree of control), assess level of risk, and summarize; can include results of various risk calculators (cardiac, OSA, pulmonary, frailty, delirium) in terms of increased risk rather than quoting a percent
Consultant information	Name, contact info (cellphone/beeper); date/time consult report was written

DOB-date of birth; MR-medical record; HTN-hypertension; DM-diabetes mellitus; Rx-prescription; OTC-over the counter; ADL-activities of daily living; ECG-electrocardiogram; PFT-pulmonary function test; CT-computerized tomography; MRI-magnetic resonance imaging; SSI-surgical site infection; VTE-venous thromboembolism; IE-infective endocarditis; OSA-obstructive sleep apnea

The Consultation Report

Ideally a template can be created in the electronic medical record that will import existing information into required fields to streamline data entry. However,

it is important to verify all data elements with the patient to ensure that the information is accurate. Consultants have varying styles, but the bottom line is that the report includes all pertinent information,

TABLE 1-4. Factors that Influence or Improve Compliance with Consultant Recommendations

Prompt response (within 24 hours)
Limit number of recommendations (≤ 5)
Identify crucial or critical recommendations (vs. routine)
Focus on central issues
Make specific relevant recommendations
Use definitive language
Specify drug dosage, route, frequency, duration
Frequent follow-up including progress notes
Direct verbal contact
Therapeutic (versus diagnostic) recommendations
Severity of illness

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addresses the question being asked, assesses medical optimization and surgical risk, and makes recommendations for perioperative management. Table 1-3 is a checklist for items to be included in the consultation report.

IMPROVING COMPLIANCE WITH RECOMMENDATIONS

Although the consultant evaluates the patient, renders an opinion, and makes recommendations, it is important to understand that this advice may not be followed. Studies have found various factors that are associated with improving compliance (Table 1-4).³ In following Goldman's Ten Commandments, determining the question and answering it in an appropriate manner is paramount. Establish the urgency and respond in a timely fashion. Elective consults should be answered within 24 hours (ideally the same day) and sooner if deemed urgent (within several hours) or emergent

(immediate phone contact followed by in-person evaluation within 10–30 minutes or less). Be concise, prioritize crucial recommendations, and limit the number of recommendations. The longer the list, the less likely all recommendations will be addressed. The more severely ill the patient, the more likely recommendations will be implemented. Recommendations regarding therapy are somewhat more likely to be followed than those for diagnostic tests. Use definitive language and be specific, particularly when recommending medications. Specify the drug (not class), dose, frequency, route of administration, and duration of therapy as the surgeon may not be familiar with the medication. Although some EMRs may automatically notify the requesting physician when a consult has been completed, and the current generation of clinicians tends to rely on text messaging rather than talking, direct verbal communication with the surgeon is the most-effective means of discussing your thoughts and recommendations. A preliminary text can be sent, but it should be quickly followed by a phone call to ensure that the message was received and that there are no questions regarding patient management. Make appropriate follow-up visits to ensure that recommendations were followed and reassess the patient, and document your findings in a progress note. Depending on the situation, follow-up may be as short as a single postoperative visit, or in the case of a severely ill patient or co management, may be daily until improvement or discharge. When signing off, document this in the medical record and inform the surgical team. Also, indicate if the patient requires any specific follow-up after discharge.

SUMMARY

Perioperative medical consultation is a combination of art, science, and politics. The ideal medical consultant is someone who will “render a report that informs without patronizing, educates without lecturing, directs without ordering, and solves the problem without making the referring physician appear to be stupid.”⁴ By following the principles outlined by Goldman and colleagues, the medical consultant will provide information and advice that will be helpful to the requesting physician who will then implement the recommendations with the goal being improved patient outcomes.

Clinical pearls

- A good consultant follows the three A's of medicine – availability, affability, and ability.
- Obey Goldman's "Ten Commandments" – understand the question, respond to it in a timely fashion with appropriate recommendations, and communicate with the requesting physician and surgical team to ensure compliance.

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Preoperative Testing

Steven L. Cohn, MD, MACP, SFHM and Gerald W. Smetana, MD, MACP

INTRODUCTION

Preoperative evaluation of apparently healthy patients is a common activity for internists and other medical specialists. In general, the most important test is a careful medical history to seek elements which may increase perioperative risk above baseline. Individual laboratory and other tests should be ordered selectively based on patient and procedure-related characteristics, and in general, should not be done routinely without a clinical indication. Despite decades of evidence arguing against routine testing, medical culture is such that some of this testing persists. General rationales for ordering preoperative tests are to identify patients at higher risk for particular postoperative complications, to guide anesthetic management, to predict which patients require particular monitoring after surgery, and for medicolegal reasons. In fact, in most instances, testing for any of these indications rarely achieves the desired goals. In this chapter, we discuss the recommended selective indications for testing.

If enough routine tests are ordered, it is likely that one or more tests may be abnormal due to the typical definition of normal as within 2 standard deviations from the mean. This means, by definition, that in 5% of patients without underlying disease, a test will be abnormal. If tests are done routinely, an abnormal test result may result in an unnecessary delay of surgery, patient worry, and additional testing which may be costly, and in some cases, carry risk for the patient.

A selective approach to preoperative test ordering avoids this trap.

Commonly, the results of preoperative testing do not actually change perioperative care. Results are more likely to be ignored or overlooked rather than guide perioperative care. An optimal test would be one that accurately identified patients at risk of postoperative complications who would otherwise be characterized as low-risk based on a history and physical, is inexpensive, carries little risk, and has a high sensitivity and specificity. Few tests have these qualities.

Increasingly, surgeons, anesthesiologists, and hospital standards committees have recognized this fact and are requiring fewer routine tests than had been the case historically. For example, in the Choosing Wisely guidelines, national societies were given the chance to list five things that we should question or not do. Many of the relevant surgery and anesthesiology guidelines made a recommendation to avoiding unnecessary preoperative testing.¹ At least 13 different societies chose recommendations to limit preoperative testing. Table 2-1 summarizes these recommendations. In 2012, the American Society of Anesthesiologists stated in a practice advisory that “preoperative tests should not be ordered routinely... tests may be ordered, required, or performed on a selective basis for purposes of guiding or optimizing perioperative management.”²

As an example of the unnecessary overuse of preoperative tests, in a study of patients undergoing low-risk surgery (elective hernia repair), 34% of patients had