

Constantine P. Spanos

Acute Surgical Topics

An Infographic Guide

Acute Surgical Topics

Constantine P. Spanos

Acute Surgical Topics

An Infographic Guide

Constantine P. Spanos
1st Department of Surgery
Aristotelian University School of Medicine
Thessaloniki
Greece

ISBN 978-3-030-68699-4 ISBN 978-3-030-68700-7 (eBook)
<https://doi.org/10.1007/978-3-030-68700-7>

© The Editor(s) (if applicable) and The Author(s), under exclusive license to Springer Nature Switzerland AG 2021
This work is subject to copyright. All rights are solely and exclusively licensed by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, expressed or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

This Springer imprint is published by the registered company Springer Nature Switzerland AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

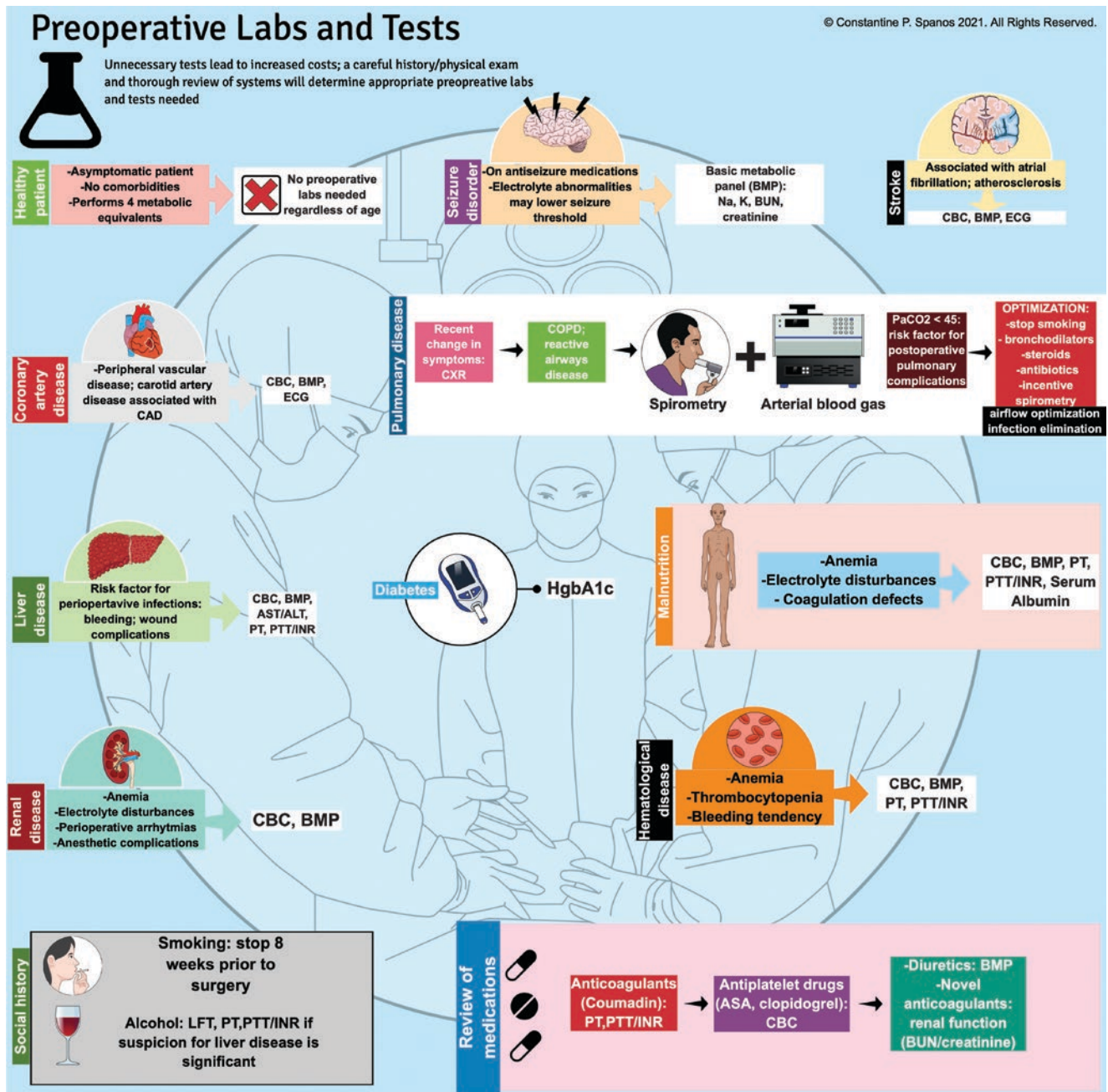
*To my wife Evangelia, and my daughters Marianna, Fotini, and Athena, for
all their love and support.*

Contents

1 Preoperative Labs and Tests	1
Further Reading	3
2 Preoperative Cardiac Evaluation	5
Further Reading	7
3 Preoperative Pulmonary Evaluation	9
Further Reading	11
4 The ABCs of Medical Imaging	13
Further Reading	16
5 Appendicitis	17
Further Reading	28
6 Acute Cholecystopathy	29
Further Reading	38
7 Acute Pancreatitis	39
Further Reading	45
8 Acute Diverticulitis	47
Further Reading	52
9 Small Bowel Obstruction (SBO)	53
Further Reading	57
10 Large Bowel Obstruction (LBO)	59
Further Reading	63
11 <i>Clostridioides difficile</i> Colitis	65
Further Reading	69
12 Upper Gastrointestinal Bleeding	71
Further Reading	75
13 Lower Gastrointestinal Bleeding	77
Further Reading	81
14 Variceal Bleeding	83
Further Reading	85
15 Caustic Ingestion	87
15.1 Esophageal Perforation	88
Further Reading	91
16 Neutropenic Enterocolitis	93
Further Reading	95

17	Acute Mesenteric Ischemia	97
	Further Reading	101
18	Ruptured Abdominal Aortic Aneurysm	103
	Further Reading	108
19	Aortic Dissection	109
	Further Reading	112
20	Peripheral Arterial Embolism	113
	Further Reading	117
21	Hypercoagulability	119
	Further Reading	121
22	Bleeding Disorders	123
	Further Reading	125

- Labs and tests are a significant component of evaluation prior to surgery. Unnecessary labs and tests lead to increased costs; occasionally they lead to more unnecessary tests. A careful history, physical exam, and thorough review of systems will determine the appropriate preoperative laboratory interventions needed.
 - A healthy patient undergoing surgery has no symptoms, comorbidities and can perform at least four metabolic equivalents (MET) of activity without symptoms. No preoperative labs are needed, regardless of age.
 - Examples of METs:
 - Dressing up, eating, use of toilet alone = 1 MET
 - Walking up one flight of steps or hill or level ground walking (up to 6 km/h) = 4 METs
 - Heavy work around the house (scrubbing floors, lifting furniture, walking up two flights of stairs) = 4–10 METs
 - Participation in strenuous sports activities (swimming, tennis, football, basketball, skiing): >10 METs
 - Patients with a history of seizures on antiseizure medication are at risk when electrolyte abnormalities exist. These may lower the seizure threshold. A basic metabolic panel (BMP) is obtained. BMP = Na⁺, K⁺, Blood urea nitrogen (BUN), creatinine.
 - Strokes are associated with atrial fibrillation and atherosclerosis. In these patients, a complete blood count, BMP, and ECG are obtained.
 - Cardiovascular disease includes coronary artery disease, peripheral vascular disease, carotid artery disease, and abdominal aortic aneurysmal disease. In these patients a CBC, BMP, and electrocardiogram are obtained.
 - Patients with pulmonary disorders and a recent change in symptoms should get a chest X-ray. Patients with COPD and reactive airway disease are evaluated with spirometry and arterial blood gasses (ABGs). A paCO₂ > 45 mmHg is predictive of postoperative pulmonary complications.
- Airflow optimization and infection prevention in patients with severe pulmonary disease includes:
- Smoking cessation 8 weeks prior to operation
 - Bronchodilators
 - Inhaled steroids
 - Antibiotics
 - Incentive spirometry
- Liver disease is a risk factor for perioperative bleeding, infection, and wound complications. A CBC, BMP, AST/ALT, PT, PTT/INR are obtained.
 - Diabetic patients are at risk for perioperative complications. Optimization of HgbA1c (glycosylated hemoglobin) may lead to better surgical outcomes and should be obtained preoperatively.
 - Malnutrition may lead to anemia, electrolyte abnormalities, and coagulation defects. A CBC, BMP, PT, PTT/INR, and serum albumin are obtained.
 - Renal disease is associated with anemia, electrolyte abnormalities, perioperative arrhythmias, bleeding, and anesthetic complications. A CBC, BMP, and ECG are obtained.
 - Hematological diseases may lead to anemia, thrombocytopenia, and bleeding tendency. A CBC, BMP, PT, PTT/INR are obtained.
 - Review of medications is extremely important regarding their effect on bleeding risk, electrolyte abnormalities, and pharmacokinetics with organ dysfunction. Below are examples of drugs and labs obtained:
 - Anticoagulants(coumadin): PT, PTT/INR
 - Antiplatelet drugs (aspirin, clopidogrel): CBC
 - Diuretics: BMP
 - Novel direct anticoagulants: BUN/creatinine
 - Smokers should quit (ideally) or stop smoking 8 weeks prior to surgery. Patients consuming alcohol should get AST/ALT, PT, PTT/INR if there is suspicion of liver disease.



Further Reading

Benarroch-Gampel J, Sheffield KM, Duncan CB, et al. Preoperative laboratory testing in patients undergoing elective, low-risk ambulatory surgery. *Ann Surg.* 2012;256(3):518–28.

Davis S, Raeburn CD. Preoperative laboratory evaluation. In: McIntyre Jr RC, Schulick RD, editors. *Surgical decision making*. 6th ed. Philadelphia: Elsevier; 2020. p. 2–3.

- Cardiac disease is prevalent among patients undergoing noncardiac surgery. A careful history and physical exam, careful review of electrocardiograms as well as laboratory values afford the clinician the ability to screen for cardiac risk.
- **Risk factors** for cardiac disease include:
 - Age > 55 years.
 - History of prior coronary artery disease (CAD) or myocardial infarction (MI).
 - Prior percutaneous coronary intervention (PCI).
 - Prior coronary artery bypass graft (CABG).
 - History of heart failure.
- Several prediction tools for cardiac risk in noncardiac surgery exist, such as the Revised Cardiac Risk Index, and the NSQIP MI and Cardiac Arrest Calculator. Several patient parameters are used to input and calculate the risk of cardiac events and mortality in patients undergoing surgery.
- Patients with active major cardiac clinical predictors should be stabilized before surgery. These predictors include:
 - STEMI
 - Non-STEMI
 - Unstable angina
 - Decompensated heart failure
 - Arrhythmia
 - Valve disease
- Surgical procedural risk is classified as low risk (<1%) for a major adverse cardiac event (MACE), and elevated risk (>1%) MACE.
- Low-risk MACE procedures include inguinal herniorrhaphy, breast biopsies, and procedures in which low fluid/volume shifts occur. Surgery may proceed without further cardiac evaluation in these cases.
- Elevated risk MACE procedures include major intra-abdominal surgery, intrathoracic procedures, infra-inguinal vascular surgery, and emergency surgery. In these cases, preoperative cardiac evaluation is advised.
- Noninvasive cardiac stress evaluation tests include treadmill + continuous ECG (Bruce protocol), as well as pharmacologically induced cardiac stress + imaging. Dobutamine, adenosine, and dipyridamole are used for stress induction. An echocardiogram or thallium/SESTAMIBI nuclear scan is used for cardiac imaging.
- If significant cardiac lesions are found on these tests, patients must proceed to invasive testing (percutaneous coronary angiography) ± revascularization.
- Regarding perioperative use of β-blockers, these should be continued if they are chronically administered. Starting β-blockers within 24 h of major procedures may reduce the incidence of nonfatal MI. However, there is an increased risk of stroke, bradycardia, hypotension, and death if drug dosing is not titrated to prevent perioperative hypotension.
- Patients with stent placement after PCI are on chronic antiplatelet therapy (frequently dual therapy). When bare metal stents are placed, antiplatelet medications cannot be stopped for 30 days. When drug-eluting stents are placed, antiplatelet medications cannot be stopped for 1 year. Elective noncardiac surgery should be planned accordingly.
- Appropriate timing for antiplatelet/anticoagulant cessation prior to surgery may reduce perioperative bleeding complications. The risk of thrombotic/embolic events secondary to drug cessation should be assessed as well.
 - Clopidogrel/aspirin: hold for 7 days
 - Coumadin can be reversed with vitamin K and FFP
 - Rivaroxaban: hold for 1–3 days
 - Apixaban: hold for 1–3 days
 - Dabitrigan: hold for 2–4 days
- Emergency reversal of anticoagulant drugs:
 - Dabitrigan: idarucizumab
 - Apixaban/rivaroxaban: andexanet-α, prothrombin complex concentrate (PCC)

Preoperative Pulmonary Evaluation

